Urbanised Forested Landscape

Urbanisation, timber extraction and forest care on the Vișeu Valley, northern Romania

PhD dissertation by

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Abstract

By looking at urbanisation processes from the vantage point of the forest, and the ways in which it both constitutes our living space while having been separated from the bounded space of the urban in modern history, the thesis asks: *How can we (re)imagine urbanisation beyond the limits of the urban? How can a feminine line of thinking engage with the forest beyond the capitalist-colonial paradigm and its extractive project? and How can we "think with care" (Puig de la Bellacasa 2017) towards the forest as an inhabitant of our common world, instead of perpetuating the image of the forest as a space outside the delimited boundaries of the city?* Through a case study research, introducing the Vișeu Valley in northern Romania as both a site engaged in the circulation of the global timber flow, a part of what Brenner and Schmid (2014) name "planetary urbanisation", where the extractive logging operations beginning in the late XVIIIth century have constructed it as an extractive landscape, and a more than human landscape inhabited by a multitude of beings (animal, plant, and human) the thesis argues towards the importance of forest care and indigenous knowledge in landscape management understood as a trans-generational transmission of knowledge, that is interdependent with the persistence of the landscape as such. Having a trans-scalar approach, the thesis investigates the ways in which the extractive projects of the capitalist-colonial paradigm have and still are shaping forested landscapes across the globe in order to situate the case as part of a planetary forest landscape and the contemporary debates it is engaged in. By engaging with emerging paradigms within the fields of plant communication, forestry, legal scholarship and landscape urbanism that present trees and forests as intelligent beings, and look at urbanisation as a way of inhabiting the landscape in both indigenous and modern cultures, the thesis argues towards viewing forested landscapes as more than human living spaces. Thinking urbanisation through the case of the Vișeu Valley's urbanised forested landscape, the thesis aligns with alternate ways of viewing urbanisation as co-habitation with more than human beings, particularly those emerging from interdisciplinary research in the Amazon river basin (Tavares 2017, Heckenberger 2012) and, in light of emerging discourses on the rights of nature, proposes an expanded concept of planetary citizenship, to include non-human personhood.

List of Abbreviations:

CLC: Corine Land Cover.

EUTR: European Timber Regulation.

EUFLEGT: European Union Forest Law Enforcement, Government and Trade.

FAO: Food and Agriculture Organization of the United Nations.

FAOSTAT: Food and Agriculture Data by the Food and Agriculture Organization of the United Nations.

FSC: Forest Stewardship Council.

OS Vișeu: Ocolul Silvic Vișeu / Vișeu Forestry Yard.

PNMM: Parcul Natural Munții Maramureșului / Maramureș Mountains Natural Park.

List of figures and Tables:

Source: LandMark, 2019. “Indigenous and Community Lands.” www.landmarkmap.org. Accessed through Global Forest Watch on 27/02/2021. www.globalforestwatch.org.

Fig. 5. The Planetary Forest Landscape. Source: idem Fig. 1.

Fig. 6. World Intact Forest Landscapes.

Source: Greenpeace, University of Maryland, World Resources Institute and Transparent World. “Intact Forest Landscapes. 2000/2013/2016” Accessed through Global Forest Watch on 21/09/2020. www.globalforestwatch.org.

Fig. 7. World Tree Plantation Landscapes (2015).

Source: Harris, N., E. Goldman and S. Gibbes. “Spatial Database of Planted Trees (SDPT) Version 1.0.” Accessed through Global Forest Watch on 21/09/2020. www.globalforestwatch.org.

Fig. 8. World Concession Landscapes.

Sources:

“Managed forest concessions.” Accessed through Global Forest Watch on 27/02/2021. www.globalforestwatch.org.

“Mining concessions.” Accessed through Global Forest Watch on 27/02/2021. www.globalforestwatch.org.

“Oil palm concessions.” Accessed through Global Forest Watch on 27/02/2021. www.globalforestwatch.org.

Round Table on Responsible Soy. “RTRS Guides for Responsible Expansion.” Accessed through Global Forest Watch Commodities on 27/02/2021. commodities.globalforestwatch.org

Roundtable on Sustainable Palm Oil. “RSPO Member Concessions.” Accessed through Global Forest Watch on 27/02/2021. www.globalforestwatch.org.

“Oil and Gas Concessions”. Accessed through Global Forest Watch on 27/02/2021. www.globalforestwatch.org.

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Data source: FAOSTAT. Accessed 10/03/2020.

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Data source: FAOSTAT. Accessed 17/03/2017. Background image: idem Fig. 1.

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Data source: FAOSTAT. Accessed 17/03/2017. Background image: idem Fig. 1.

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The process of this thesis involved decolonial work, shedding preconceptions, layers of formal education and walking away from the narratives on the forest that dominate the media culture in both Romania and at planetary level. Special acknowledgements go to plant kin that have helped me unlock the knowledge that resided in my body, cellular memories. In the last two years and a half of this endeavour, when this text was thought and written, I drank different herbal tea combinations. Lemon balm was a herb I used a lot. Herbalists say it is good for memory and for remembering. I like to think that it helped me recollect the memories within my body, that were inscribed through walking the forest, through reading, and through all the encounters I've had with people, plant and animal kin. The motivation that kept me going throughout the pandemic was the thought that I was delivering a message from the trees.

I feel incredibly privileged, as a citizen of the European Union, to have been allowed the time for this work to unfold, as many of my colleagues coming from other continents were pressured by expiring visa agreements in order to complete their work in the appointed time.

I am grateful to the University of Sheffield that has sponsored this research, to my initial supervisor Dr. Nishat Awan who took a leap of faith with supporting my research in the first years of this project, to Prof. Doina Petrescu who always took an interest into my research and my future, to Dr. Claudia Rojas who supported me as a supervisor when I returned from a very long leave of absence, and to Dr. Armina Pilav whose encouragements and interest have supported me during the later stages of the writing process.

I am thankful to the Administration of the Maramureș Mountains Natural Park who welcomed me in Vișeu and allowed me to accompany the park rangers on their daily routine patrolling. Through them I was able to experience the forested territory of the Vișeu Valley. I thank also ing. Vasile Vlad, head of the Vișeu Forestry Yard at that time, that opened his archive for me to study and took me on a trip to the forest. Without the generosity of the people I met in Vișeu while on fieldwork, this thesis would not have been written.

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Forward

The initial brief of my PhD proposed to look at the transformation of the landscape induced by a high rate of human migration from northern-western Romanian rural areas to western European urbanised territories. At a first visit in some villages in the Oaș region, one of the prominent regions where this phenomenon has become a way of life, I encountered a temporarily deserted landscape. All I encountered in July 2014 were empty houses and empty fields. For most of social scientists and migration scholars this encounter sparks a pursuit of knowledge around questions such as where are the people? how were the houses built? who inhabits them and when? what socio-cultural ideas of houses cross state boundaries along with the people that carry them? For me, however, the possibility of entering people's lives and houses in the search of answers to these questions does not spark an interest. There are photographers, social scientists and film-makers that are more interested and more equipped to study this phenomenon, as they have already done so.[1] In the summer of 2015 I presented a paper summarising previous research on the subject and my explorations into the Oaș region at the ICAR Conference held by the Ion Mincu University of Architecture and Urbanism in Bucharest. That marked the end of my first 9 months into the PhD programme, as my interest was shifting towards other territories.

In the spring of 2014 I visited the village of Moisei, on the Vișeu river valley, still pursuing a more interesting connection between landscape and migration. From the valley, from Moisei, and the neighbouring city of Borșa, there is a high rate of migration particularly to Italy that is displayed through big houses and construction sites, similar to the Oaș region. Most economic migration is now temporary and seasonal. While in the 1990s people from Oaș and Maramureș formed migration networks and went in large numbers to Western Europe, in the 2000s and 2010s, Western European agribusiness has extended their networks attracting Eastern European seasonal migrants to work on plantation landscapes. These include strawberry fields, apple orchards and also forests, as one of the skills the people of these regions have is logging. During the 1970s and 1980s, when the Romanian borders were partially closed, they were seasonally migrating for work throughout the country in the logging, construction and agricultural sectors. Migration is a way of life for them, as the mountainous landscape offers forest resources (timber, berries and mushrooms) and pastural landscapes for raising sheep and cattle while it is a harsher environment for cultivating vegetables and crops. Though crops were introduced in the 1970s and 1980s as part of the national planning strategies, the opening of the economy towards the global

[1] For research on migration from the Oaș region see Moisa, Daniela. 2010. "Maison de Rve Au Pays d'Oas. (Re)Construction Des Identités Sociales à Travers Le Bati Dans La Roumanie Socialiste et Postsocialiste." Université Laval. Petrescu, Doina. 2010. "The Tactics of Faux Migration. Pavilion Journal." Accessed October 29, 2014. http://pavilionmagazine.org/doina-petrescu-the-tactics-of-faux-migration1/. Călinescu, Petruț, and Ioana Hodoiu. 2013. Mândrie și Beton. Pride and Concrete. București: Igloo.

market has not favoured them, possibly due to reduced yields compared to crops from other more fertile regions.

In the background of my initial scientific inquiry, my visit was marked by the presence of the forest as a more than human presence, and by the passing of trucks loaded with timber logs through the main valley street. Behind the village of Moisei, the forested Maramureș Mountains rise. This thesis emerged as an exploration of the forested landscape of the Maramureș Mountains and its planetary connections expressed both as physical connections established between resource landscapes and urbanising landscapes and as meta-physical connections, beyond the materiality of the forest, into philosophical understandings of trees as beings and the legal, ethical and caring implications of recognising them as such.

Lexicon

Language has an almost automatic quality that makes us, in certain situations, not even think of the words we have spoken. There is a contemporary need to address the ways in which some words, though their use and abuse, have almost lost their power of giving new meaning to the situations they are being deployed in (Olmo 2018). We are so used to using words in specific associations with other words, that when we see them in a different association we do not know what they mean. It requires our full attention, to be present also with the words that we speak, hear and read, in order for them to shift something in our consciousness, to forge new pathways of meaning. There is value in taking a step back, sitting with the words and creating new meanings and new ways of speaking. One of the outcomes of having taken my time to sit with the words we use to speak of the forest is that new notions, concepts and new associations of words have emerged. Another outcome has been the tracing of some words and concepts that we so often use, to some of the first ways they have been employed, bringing more specificity into their use. The following section introduces some old and new concepts to talk about the forest from a planetary and more than human perspective.

Forest

Languages have more than one word that designate a forest according to the character of the forest, to its relation to humans and their settlements and to its relations with human forms of government and management. In the latin language, the word “foris” designates the outside of an enclosed territory governed by specific laws (Konijnendijk 2008:3). Throughout history, forests have been used for a multitude of agricultural, spiritual and resource gathering purposes. Some forests have been enclosed as nobility hunting grounds. In XVIIIth century Central Europe, with the invention of scientific forestry, the meaning of forest came to be associated to a production forests, as other agricultural activities like bee keeping and animal raising were expelled from forested landscapes. In the English language, the words “woodland” and “wildwood” were used to differentiate named, owned and enclosed forests from unmanaged forests (idem). In the Romanian language, there are two words for forest, “codru” and “pădure”. *Pădure* stems from the latin word “padulem”[2], meaning swamp or bog. The etymology of ”codru”, on the other hand, is disputed between the latin word “quadro”, designating an enclosure, and the Cyrillic word “kodre”, meaning hill. While I situate the dispute in the intellectual work of the construction of Romanian identity as derived from Roman and Dacian descendants, the Cyrillic word “kodre” seems to me to be more attuned to the forested landscapes of Romania, that are hilly and

[2] *Online dictionary in Romanian.* https://dexonline.ro/definitie/padure. Accessed 05.05.2021.

mountainous landscapes. As the most used today among both words, *pădure* is directly associated to the forested landscape and its management forms. *Codru*, on the other hand, at once retains an ancestral connection with previous generations that inhabited the forested landscapes through its use in poems and stories, and is both deployed as a specific forest management technique that cultivates a multi age forest, “codru grădinărit”, a gardened forest.

Forested landscapes

Throughout the thesis I use both forest and forested landscape. From the human point of view of the ways in which trees appear to live in a dense community or seemingly independent in open spaces, a *forest* comprises a community of trees closely living together, in joint communities with other species. The most parts of our landscapes, except the oceans and the deserts, are *forested landscapes*, inhabited by trees and their companion species in more dense or sparse patterns. Looking at cities and urbanised areas through the lens of trees reveals them as forested landscapes as well. In Romanian legislation, the jurisdiction of the forestry code that regulates logging, extends to all trees within and without forests. Few exceptions are under the jurisdiction of agricultural laws, as they bear fruit that we have maintained as a part of our modern diet. Walnut trees are one such exception as they are considered highly valuable for their nuts and thus benefit from legal protection against being logged from an agricultural point of view. While the separation between agriculturally valuable trees and trees valuable for their timber is more sharp today, in previous centuries, forested landscapes were largely used for sustenance, and valued also for their agricultural potential through practices that modern science has named “agro-forestry” practices and “agro-pastoral” practices.

Ethical landscapes / Non-ethical landscapes

These are the landscapes that emerge through business certification schemes and market regulations at national (in the US, Australia and Japan), regional (EUTR) and international level (EUFLEGT) arising from Western customers preoccupation with the ethical sourcing of resources. They are created through an implicit design that sorts between areas that comply with Western ethical standards and areas that do not comply with them. Because resource flows cross both landscapes, they are landscapes where you *go* at risk. While they appeal to the ethical standards of Western consumers, and some of their most genuine preoccupations, they also appeal to businessmen who feed on the adrenaline that comes from taking risks.

More than human landscapes

In contemporary scientific and artistic practices, the idea that there is more to the human, that we are more than human, is an acknowledgement of the fluid boundaries between bodies and species and of organisms (both human and non-human) as multi-species organisms. It counters the idea of the isolated species inhabiting a bounded ecosystem. Instead, it proposes to think of species as multi-species and of ecosystems as unbounded. While the idea might seem difficult to grasp, since we are so used to thinking of the human as a species, different than other species, the microbiology of our gut lining, itself inhabited by multiple species of bacteria, that are different than, yet a part of us, supports an understanding of humans are multi-species organisms. The 2020 - 2021 “Series of more than human encounters” curated by the Kai Theater in Brussels further reflects on the idea of the more than human, while advancing the concept of a “multispecies urbanism” (Solomon 2020(a)). Inspired by her research and collaborative practice in urban gardening, Solomon’s conception of “multispecies urbanism” acknowledges the collaborative work and care of the more than human inhabitants of urban environments in collectively coproducing the environments we share with them. According to Solomon 2020(b) “multispecies urbanism denotes forms of just urban development that prioritise care for the urban natural world”.

Mosaic landscapes

The concept of “mosaic landscape” is part of the repertoire of concepts developed by landscape ecology. It emerged, together with the term “landscape ecology” with the development of aerial photography (Dramstad, Olson and Foreman in Lister and Reid 2020:131) that allowed for vast areas of the landscape to be surveyed from above, at a scale bigger than the scale of an observing human within a landscape. The term was coined by ecologist Richard Foreman in the 1980s (Sordi 2016:42). In landscape ecology, the mosaic serves to conceptualise the differentiated patterns of the landscape, themselves interconnected through corridors of connectivity (Dramstad, Olson and Foreman in Lister and Reid 2020:135). Mosaic is a scale sensitive concept. While from an aerial perspective the mosaic emerges at the scale of the landscape, for biologists, the scale of the mosaic is much smaller. For biologists, mosaic refers to parts of the landscape that may seem similar from a wider perspective, but that differ in the association of plants that inhabit them, and between which there is a possibility of migration of different plants. From a biological point of view, the mosaic complements the concept of “habitat”, in that in certain landscapes, it is impossible to clearly delimit habitats from one another, as plants can migrate from one habitat to another.

Operational landscapes

In his PhD dissertation, “From Hinterland to Hinterglobe. Urbanisation as Geographical Organization” Katsikis (2016:24-25) introduces the terms “operational landscapes” and “agglomeration landscapes” to discuss planetary urbanization. The current organisation of economic processes assembling supply chains linking distant extraction sites with manufacturing facilities and the service economy traditionally associated to the urban, prompts Katsikis to approach urbanisation as a planetary affair, and draw attention on the need to include the “operational landscapes” that source much needed resources supporting urban growth in our understanding of urbanisation processes (Katsikis 2016:5).

Planetary boundaries

The concept of planetary boundaries has been advanced by Rockstrom et al. (2009) and Steffen et al. (2015) (see Alberti, 2016:210). According to Rockstrom et al. (2009), planetary boundaries are important to be defined with regards to “climate change, biodiversity loss, input of nitrogen and phosphorus into soils and waters, stratospheric ozone depletion, ocean acidification, global consumption of freshwater, changes in land use, air pollution, and chemical pollution” (idem). Steffen et al. (2015) emphasise the interactions across scales and the need to account for regional heterogeneity in defining planetary boundaries (idem). This suggests that while at planetary scale there are some changes in climate, water regime, quality of air, soil and water, boundaries are also location specific.

Plantation landscapes / Production landscapes

In discussing forested landscapes as resource landscapes I introduce the terms “production landscape” and “plantation landscape” to differentiate between different approaches to attaining varying degrees of productivity from forests. Whereby all forested landscapes are productive, offering not only timber but also other plants, parts of plants, fungi, and berries, to think in the terms of “production landscapes” and “plantation landscapes” highlights the intensification of production characteristic of the capitalist-colonial system. Plantation landscapes, in this thesis, are a specific form of production landscapes, whereby the most reductive, replacing and reducing the complexity of life within a landscape to a few species. As studies indicate, plantation forests have a different landscape ecology than the landscapes they replaced, forest or non-forest (see Scott 1999, Wohlleben 2016).

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0. Encountering the unknown. Introduction

The Vișeu river valley is part of the Danube - Carpathian bio-geographical region, that hosts the last standing natural and unexploited virgin forests in Europe and most of its last natural and intact rivers and wetlands.[3] The Carpathian mountains crossing nowadays Romania distribute the flow of the Danube's tributary rivers on either side of their slopes. The Vișeu River flows into the Tisa river at the Romanian - Ukrainian border after which the Tisa rivers follows its course across Hungary and Serbia to flow into the Danube. Historically, the Carpathian mountains have separated the territories residing in their inner arch, as part of the Austrian and the Austro-Hungarian empires, from the territories residing outside of their arch, that formed The Romanian principalities, until the end of the First World War. Prior to 1918, the Vișeu river valley was part of the Maramureș region, a border region of the Austro-Hungarian empire. In 1918, Maramureș was divided between Romania and Czechoslovakia along the Tisa river. Though briefly reunited under Hungarian rule in 1944-1945, the two parts of Maramureș have remained separated throughout the XXth century and still today. The Vișeu valley was traditionally known for its timber resources. Part of its mountains were named the Small Alps by the Austrians during the XIXth century. Prior to 1918, and during the first half of the XXth century, the flow of water directed the flow of resources and people from the valley towards the interior territories of the Austro-Hungarian empire and the newly formed states of Austria and Hungary. It was only in the second half of the XXth century that the Romanian part of Maramureș and the Vișeu valley were connected by train with the larger territory of Romania, redirecting the flow of resources and people. With the restructuring of European borders in the early 1990s, and the inclusion of Romania in the European Union in 2004, the Tisa now draws the border between Romania, as part of Europe and Ukraine.

The mountainous landscape and its border status have maintained in part ancient landscape and pastoral practices that have allowed the landscape to preserve a diversity of its plant, animal, fish and bird inhabitants. In 2004, as a result of close collaboration between the Romanian branch of the World Wide Fund (WWF) and concerned citizens in the wider Maramureș county, the Maramureș Mountains Natural Park was instituted as a legal form recognising the value of the mosaic landscape characteristic of the mountainous landscape. As they argue, the landscape carries forth a tradition of pastoral and forestry practices that has resulted in "one of the best

[3] *The Danube Carpathian bioregion.* WWF. https://wwf.panda.org/knowledge_hub/where_we_work/black_sea_basin/danube_carpathian/ Accessed 15 August 2020.

diversified age structures of any forest it's size in Romania"[4]. While National Parks for the preservation of nature have been instituted since the 1970s, the institution of the Natural Park is new to Romania as it includes not only natural reserves, but also agricultural and settlement lands. The Maramureș Mountains Natural Park is the largest among Natural Parks in Romania, with a declared surface of 133.418 ha[5]. Approximately 70% of this surface is forest land (91.865,26 ha), while 14.5% of it is under total protection (13.505,9 ha). 8.5% (11.379ha) of its surface is occupied by alpine pastures, while only an estimated 15% of them are preserved through traditional practices.[6] With such a dense forest cover, the territory of the Vișeu Valley is one of the richest water territories throughout Romania. The river itself has one of the highest water flow rates in Romania, to which a high amount of precipitation adds (over 1100 mm/year).[7]

Over the last 250 years, urbanisation on the valley was driven by the exploitation of its resources, traditionally timber and for a brief period of time in the second half of the XXth century, nonferrous metals. Urbanisation has transformed not only the cities and villages on the valley, but also its forested landscape through the construction of extraction infrastructure deep into the forest. To this day, the valley is inhabited by about 90.000 people, making it a scarcely populated landscape in relation to its size. The inhabited area stretches along an almost continuous urbanised strip along the Vișeu valley, and its main affluents, Țâsla, Vasser, Repedea, Frumușeaua. In the current territorial development strategy, the valley, as other mountainous regions in the Romanian Carpathian Mountains, is categorised as a disadvantaged mountainous region[8]. The indexes that make for such a 'diagnostic' are a high rate of external migration, industrial decline associated with a high rate of unemployment due to the closing of the mining industry in the area, and a low rate of the extension of urban infrastructure (asphalted roads, water sanitation infrastructure, and the extension of the gas national network). In the context of rising timber exports from Romania in the last 20 years, with the settling in Romania of one of Europe's biggest timber processing company, and the exposure of illegal logging practices since 2014, part of the Vișeu Valley's forested territory has been highlighted as a hot spot of illegal logging.

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[4] Government of Romania. United Nations Development Programme. *Strengthening Romania's Protected Area System by Demonstrating Public-Private Partnership in Romania's Maramures Nature Park*. 2003:25.

[5] *Localizare Munții Maramureșului*. https://www.muntiimaramuresului.ro/index.php/ro/despre/localizare, Accessed 09.05.2018.

[6] Maramureș Mountains Natural Park Management Plan, 2014:20

[7] Maramureș Mountains Natural Park Management Plan, 2014:16.

[8] Ministerul Dezvoltării Regionale și Administrației Publice. *Strategia de dezvoltare teritorială a României. România policentrică 2035. Coeziune și competitivitate teritorială, șanse egale pentru oameni*. https://www.fonduri-structurale.ro/Document_Files/Stiri/00017493/7hctm_Anexe.pdf. 2015:101. Accessed 25.09.2019.

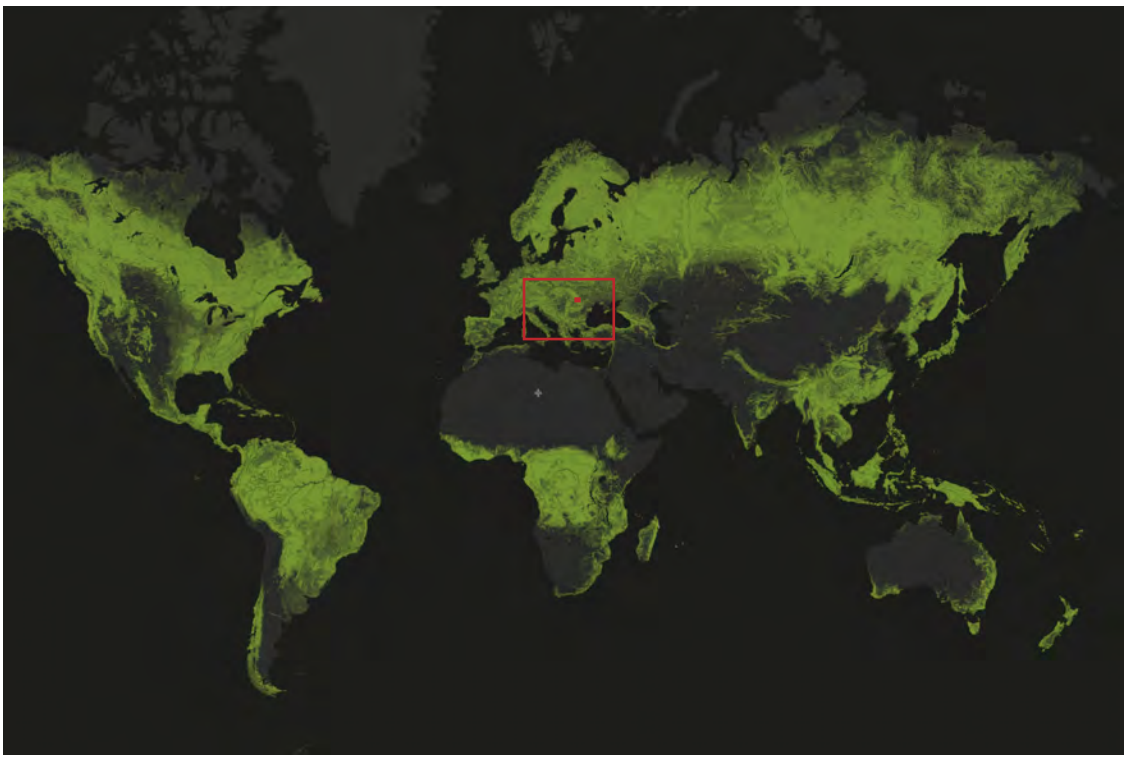


Fig. 1. The Danube Carpathian Bioregion.
Worl Tree Cover >30% canopy density (2000)
SOURCE: www.globalforestwatch.org

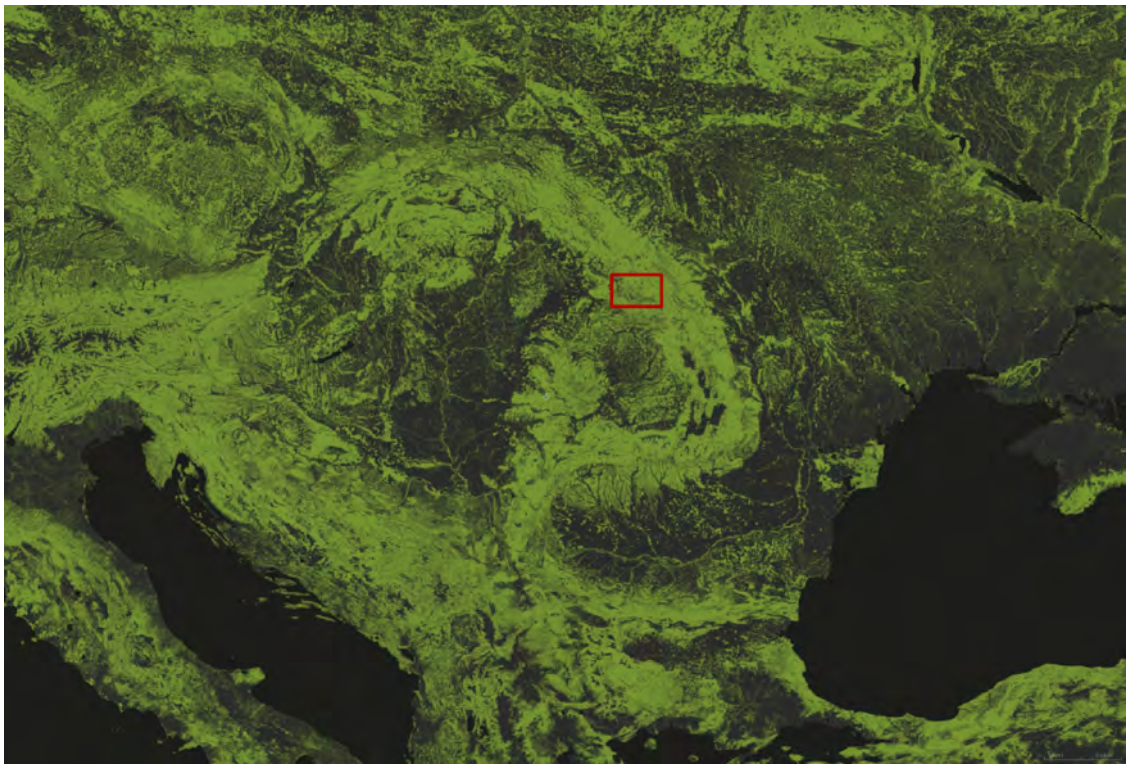


Fig. 1.1. The Viseu River valley in the Danube Carpathian Bioregion.
Tree Cover >30% canopy density (2000)
SOURCE: www.globalforestwatch.org

The map on the following page represents the Vișeu Valley while reinterpreting some of the landscape categories of the 2018 Corine Land Cover survey. In particular, the light yellow on the map gathers together heterogenous landscapes, whose differentiation in use is highly unprecise in satellite image interpretation (see Erb et al. 2007). It also gives another interpretation of the deforestation areas shown in green. Deforestation can have many causes, including clear cut logging, fire and windfall. In the aftermath of these events, forests continue their life cycles, in most cases, transitioning towards a close canopy forest during several decades. From the distance of satellite images, only close canopy forests are detected, while it takes a forest between 15 to 25 years to form a canopy. Following Moran (2005:19-20), thinking of these forests as *forests in transition*, highlighting their transformation, offers a dynamic understanding of forests as seen in their socio-ecological relations, interdependent with human practices and forest governance approaches. In different shades of grey, the difference between coniferous, deciduous and mixed forests is marked. Deciduous beech forests extend over the landscape from the valley of the Vișeu river to alpine grasslands and heaths, while they also mix with coniferous species. Grasslands and heaths are mostly bordered by coniferous forests. The presence of a large area of coniferous forest landscape adjacent to the Vaser Valey, one of the Vișeu rivers' tributary rivers, attests to the transformation of the forested landscape as a production landscape during the last 250 years. The majority of the forest on the Vaser Valley is a second revolution forest (2008 Forest Management Plan of the Vaser Valley), which in scientific forestry stands for a forest that has been cultivated for logging for the second time, taking into account a 100 years cycle of production. It is assumed that the original, old-growth forest on the Vaser Valley, had previously been logged. The original composition of the forest is unknown, as well as whether the extent of the coniferous forest is due to plantations, or to the favouring of coniferous species to take hold, in previously deciduous forests. Though not detectable from satellite images, some of the coniferous forests on the Vaser Valley, as well as on the Cisla Valley are even aged coniferous forests, stemming from clear-cut logging in previous decades and centuries.

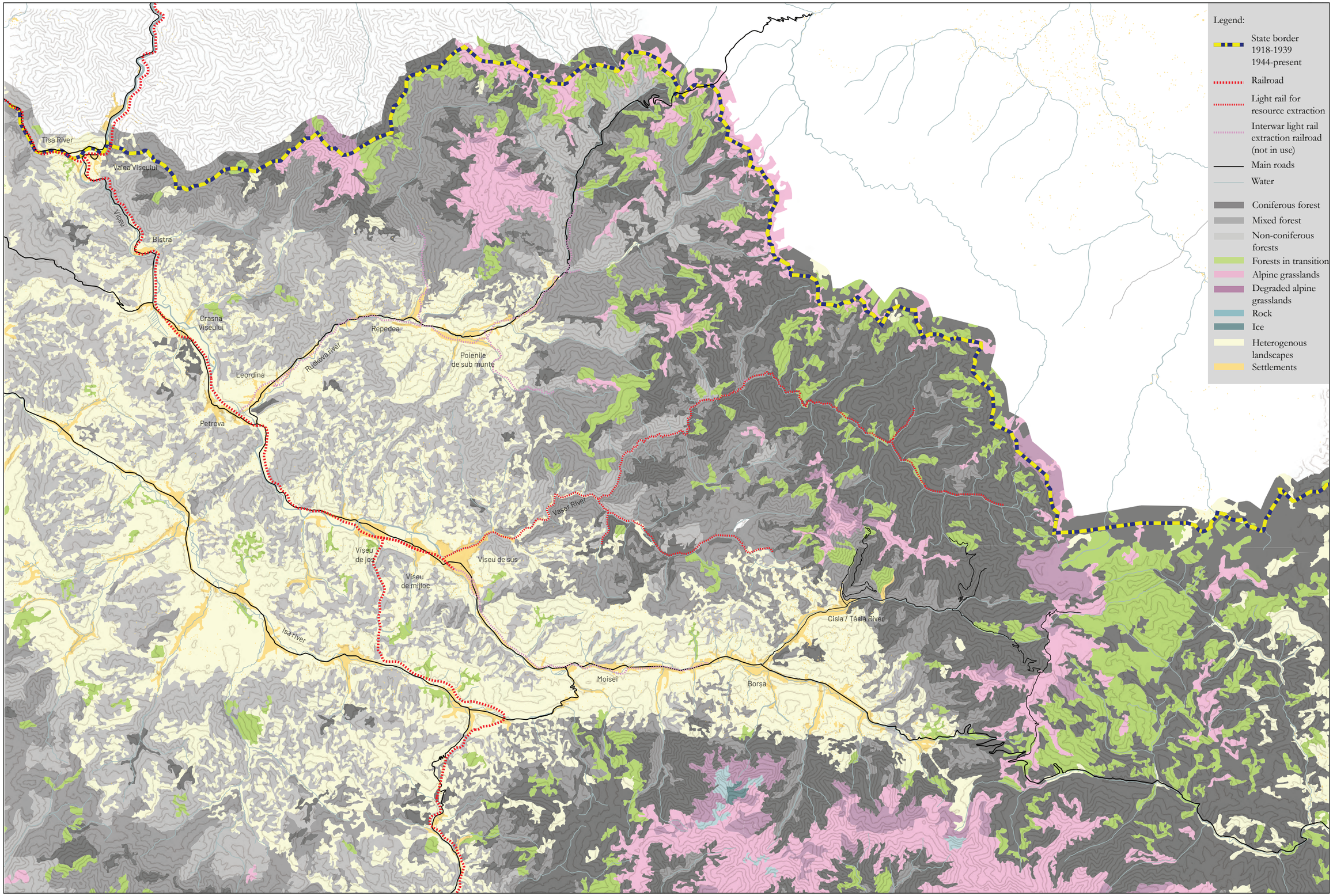


Fig. 2. The Vişeu Valley

For architecture and urbanism, the forest is an *unknown* territory, or at best a territory *being discovered*. There are two paradigms in landscape urbanism and urban studies going beyond the epistemic boundary separating the city from its "constitutive outside" (Brenner and Schmid 2012, Topalovic 2016(b)), that either directly approach the forest as an important part in structuring the urbanisation process and the form of the urban , or, through focussing on the urbanisation process as driven by industrialisation and its reliance on distant extraction landscapes and infrastructures of distribution and transportation expand the realm of analysis of the urban to account for the non-urban, and hence, also the forest and forested landscapes. "Forest urbanism" (De Meulder, Shannon, Nguyen 2019, Wambecq 2019, 2015) is becoming a new lens through which to view urbanised regions as inhabiting forested landscapes. This new way of looking sees the forest as its primary layer while aiming to redesign the relation between forests, urbanity and urbanisation (De Meulder, Shannon, Nguyen 2019, Wambecq 2019, 2015). Brenner and Schmid's (2012) "planetary urbanisation" paradigm deconstructs the urban as an analytical concept, to reconstitute it from the fragmented and disparate spaces scattered through the planetary landscape and interconnected through infrastructure networks that together *make* the urban and make it function at the high speed of our contemporary networked society. Brenner (2016) argues that, as an analytical term, the urban has been used without critically interrogating it and its use exposes "epistemological fissures" in the prevailing understanding of urbanisation. To Brenner (2016), the urban is either synonymous with the extension, replication and expansion of the city, while cities themselves are inherently heterogenous, or urbanisation is equated with city growth within some assumed boundaries of the city, whereas the delimitation of an urban from a non-urban space is inherently problematic taking into account the spatial ruptures that the industrialisation process has produced since the late XIXth century, and its territorial expansion. Following Lefebvre, they urge for a reorientation of disciplinary analysis towards urbanisation processes and a methodological approach of urbanisation as a dual process of resource flows and landscape transformations (Brenner and Schmid's 2012). In linking urbanised areas with areas of resource extraction, intensified production, transportation corridors, and the material infrastructure laying underground and underwater that sustain urban life, new "political horizons" emerge (Brenner in Brenner ed. 2014:199). Brenner (in Brenner ed. 2014:199) argues for the creative and critical potential of finding common ground between struggles for the urban commons and struggles for what he calls "the global commons", whose defenders are "peasants, small landholders, farm workers, indigenous populations and their advocates" and that are being fought elsewhere from cities. The question emerges: *What is urbanisation*, if it is not the expansion of the urban within ever expanding yet bounded boundaries and its replication in space? Or better yet, *How can we (re)imagine urbanisation beyond the limits of the urban?* This thesis aims for a partial answer to this question, by thinking urbanisation from the vantage point of the forested landscape of the Vișeu river valley.

Urbanised Forested Landscape looks into urbanisation beyond the urban in a more than human landscape, where the agency inherent in transformation processes is redistributed between the landscape's more than human inhabitants, some of whom are species, like humans, trees, flowers, animals, fish, some of whom are living materialities, like soil and water, whose continuous existence is interdependent with the fragile lives of their inhabiting species, all of them considered beings. To encounter the forest as an unknown, I took guides. While during my fieldwork experience through the Vișeu Valley I was guided by forestry engineers and park rangers, my research was guided by Brenner and Schmid's planetary urbanisation paradigm and their proposition to study urbanisation as a dual process involving landscape transformation and the mobilisation of planetary resource flows (Brenner and Schmid 2012). I asked: *How have the last 250 years of urbanisation shaped the forested landscape of the Vișeu Valley?* and *How is the valley engaged in the material flows of planetary urbanisation?* The research process has unfolded as the result of an encounter. As I went to the Vișeu Valley to study the transformations of the landscape in relation to human migration, I encountered the forest as a *presence* in the Valley. Through this encounter I also came to encounter myself as a feminine *presence* during fieldwork. While my research was guided by very specific questions relating to the transformation of the Vișeu Valley landscape and its engagement in the resource flows of planetary urbanisation, my feminine encounters and interests have led to the articulations of two other research questions, that inquire more generally about our engagements with forested landscapes at a planetary scale: *How can a feminine line of thinking engage with the forest beyond the capitalist-colonial paradigm and its extractive project? and How can we "think with care" (Puig de la Bellacasa 2019) towards the forest as an inhabitant of our common world, instead of perpetuating the image of the forest as a space outside the delimited boundaries of the city?* Specifically about the Vișeu Valley I ask: *How is the forest taken care of?*

The approach is interdisciplinary. While the forest is not the traditional territory of study of architecture and urbanism, I have looked at the disciplines of biology and forestry engineering, the ways in which they advance new ways of seeing the forest and the ways in which these new ways converge with other disciplines. While forestry engineering is primarily concerned with the productive aspect of the forest, there are other aspects relating to how to care for the forest in order for it to continue to produce high quality timber that are embedded in the discipline. Connected to them, there is a contemporary endeavour of forestry engineering at a global level towards assuring the resiliency of forested landscapes in the face of increased extraction and climate change. New research in forestry science and plant biology are challenging the ways in which we look at plants, trees and forests as live less things. Studies in plant communication advance scientific *proof* for acknowledging plants as beings, adding to the western philosophical idea of the rights of nature proposed

by Michelle Serres (1995) and to indigenous cosmologies that recognise them as such. Of particular interest for this study has been the emergence of the rights on nature in contemporary legal scholarship and in legal cases, particularly regarding territories where "natural" beings are threatened by overexploitation.

An important methodological pursuit has been to confront western, modern ways of understanding urbanisation processes in forested landscapes with indigenous ways of understanding and inhabiting forested landscapes. The reason for this has been to question the dominant western paradigm of separating humans from "nature". As argued, the separation of humans from "nature" was constructed against indigenously governed natural areas and implied viewing indigenous people as part of nature while justifying extractive projects into their lands. Beyond this separation, and the distinct approaches of modern science and indigenous cosmologies at viewing the world and its human and non-human inhabitants, contemporary scholarship is converging with indigenous world-views, particularly in the ways we view forests and forested landscapes.

The concept of "encounter" serves to frame a particular moment in time and space that is relevant to this research. The purpose of framing the research process as an encounter is to introduce the subjectivity of the author, my subjectivity, in choosing the relevant debates, and the particular view points that I was allowed into the forested landscape of the Vișeu Valley. Framing the research process as a series of encounters is also meant to underline the novelty of approaching a territory that is only emerging as a potential research subject in the fields of architecture, urbanism and urban studies. I use encounter both as a metaphor for encountering theoretical debates and emerging paradigms and as a reference to an ethnographic encounter with the forested landscape of the Vișeu Valley. In approaching the forested landscape as a more than human landscape, I follow Eduardo Kohn's (2013) proposition for an "ethnography beyond the human".

I have framed methodology as a methodology of *presence*. *Being present* addresses first and foremost the more than human landscape, through learning to see it differently, to hear what it says, to read it from a more than human perspective. It is also consistent to an interdisciplinary approach, as it engages with knowledge from other fields, in both theory and practice. *Being present* addresses also being present with the theories I read, and being present with the practitioners of other disciplines that have mediated *my encounter* with the forest. *Being present* confronts the ways in which knowledge is distributed among different disciplines, and the role of research into other fields of knowledge.

Mixed methods have been used in field analysis: statistical and geospatial analysis of timber flows, document analysis, mapping and fieldwork. I have used André Corboz' (1985)

metaphor of seeing the territory as a palimpsest as a key approach to mapping territorial transformation on the Vișeu Valley. Consistent with a more than human approach, I have introduced the agencies of water and of the life projects of plants and animals within the mapping project. I have organised fieldwork as part of an internship at the Maramureș Mountains Natural Park in 2017. During fieldwork I have engaged in an immersive ethnography of the forested territory, through practices of *walking with* and photographic survey. *Walking with*, as a research practice, has provided for a mediated encounter with the forested territory through its carers, park rangers, biologists and forestry engineers. *Being present* as a research methodology, emphasises the importance I give to the body as a navigational instrument and as a depository of knowledge, while the bodies that I reference are both human and non-human. *Walking with*, through the territory of the forest, has been instrumental in understanding the dynamics of a landscape.

The diagram on the next page offers a reading key to the thesis, while highlighting the important links between the theoretical research and the field research.

Part I. Theoretical Encounters gathers a theoretical body of knowledge on three main themes: the transformation of the forest into a productive landscape over the centuries, including the contemporary ways in which production landscapes are engaged in planetary urbanisation; other ways of seeing trees, forests and forested landscapes that bypass the productive paradigm while focusing on forests as beings, depositories of collective memory, exhibiting processes of collective intelligence, and ways of seeing the relation between humans and forests as an inter-dependent one, expressed through specific forms of governance; urbanisation as a process, focussing on the post World War II evolution of urbanisation towards the planetary scale, the challenges that the process posses on natural landscapes and contemporary ways of approaching them.

Part II. Forest Encounters approaches the Vișeu Valley through the paradigm of planetary urbanisation, looking into the flows of timber and the transformation of its territory and its landscape while accounting for its more than human community. The chapters approach each of these aspects, for which different methods of investigation have been used. *Chapter 6. The forest as material* presents a reading of the economic landscape of timber trade through its statistical and geospatial analysis. *Chapter 7. The forest as infrastructure* presents the territorial evolution of the forested landscape of the Vișeu Valley through mapping the palimpsest. *Chapter 8. The forest as a more than human landscape* presents the immersive ethnography experience through photographic surveys and accounts from the field while relying on key and emerging theoretical concepts from the discipline of biology.

Methodological discussion

On being present in the field

On interdisciplinary research

On mapping and other research practices

PART 1. Theoretical encounters

Theoretical research

On forest
- forest governance
- forest intelligence
- forest urbanism

On production landscapes
- frontier landscapes
- the rise of an environmental consciousness
- infrastructure space

On urbanisation
- planetary urbanisation
- post-industrial urbanisation
- ecological thinking in urbanisation

PART 2. Forest encounters

Field research

Tracing
- timber flows

Mapping
- the forest territory as a palimpsest
- the forest with the body (accompanied forestwalks)

Fieldwork
- archival research
- historical investigation on the Viseu Valley
- document research
  - Forest Management Plans
  - Management Plan of the Maramures Mountains Natural Park

PART 3. Ways forward

Fig. 3. Methodology diagram

1. Ways to be present. Methodology

"Every new undertaking seeks and invents the place where it will be able to make a difference, a place that should take into account the requirements and obligations it brings into existence. But the cosmopolitical question insists upon the construction of words that slow the problem down, that prevent it from rushing toward a solution."
Isabelle Stengers, "Cosmopolitics II" (2011:361)

The following discussion approaches the challenges of an interdisciplinary research project in dialogue with other fields of knowledge and scientific practices. The research process has enfolded as an un-boxing of scientific concepts, trying to understand what specific concepts and notions mean within other fields of knowledge and what they mean to the practitioners of other sciences that I have encountered during research that have facilitated my knowledge path. It also introduces *presence* as a way of being in the forest and a methodological approach to perceiving non-human communication.

In *1.1. Presence* I introduce ways of listening to, and of acting as an intermediary in communicating nature's speech. They have been useful in approaching fieldwork within the forest, while being guided by its custodians. As I present it, fieldwork has proven to be an exercise in learning to speak about nature to its custodians, my field companions, park rangers, biologists, and forestry engineers. Fieldwork has allowed me access to a form of presence within the forest that, together with the expert accounts that I present throughout the thesis is articulating an informed position about the forested landscape and its future.

1.2. Becomings discusses three interrelated forms of becoming: of myself, of the forest, and of my field companions and forest guides. It reflects on the transformation processes that had occurred during fieldwork and on the dynamic position I embodied while doing fieldwork among the practitioners of other fields of knowledge within a male dominated field.

1.3. Boundary conditions discusses specific ways of approaching other fields of knowledge. I introduce John Law's (2004) concept of "knowledge hinterlands", as things that are omitted in scientific study or that are unmentioned while being part of the process.

1.1. Presence

In their collection of essays "How nature speaks. The dynamics of the human ecological condition." Haila and Dyke (2006) introduce the issue of nature's speech as a form of presence. To them, the presence of nature is manifested in human actions through specific forms of nonverbal communication and "rich, multiply constrained and enabled interactions between humans" (Haila and Dyke 2006:44) and other living beings. Presence is change whereby all living beings share the dynamics of life on multiple levels. They further define this presence as a form of interference, a concept they borrow from music. In musical theory, interference can amplify sounds or it can reduce them to silence (Haila and Dyke 2006:45). The concept of interference suggests a multiplicity of voices, not only human voices but also the voices of other beings. In ancient cultures, other species (plants, animals, insects), atmospheric phenomena (rain, snow, wind, sunlight), geographical forms (rivers, forests, deserts, oceans), geological formations (rocks, tectonic plates, land and ice caps) were considered beings, a quality that was lost with modern science. As will be argued in *Chapter 4. Shifting consciousness on forested landscapes*, the forest and the trees were and still are considered beings by the indigenous people that have preserved their ancient cultures.

The question of who speaks for nature and the ways in which this is done in contemporary representative democracies is one of the utmost importance. While nature's speech is experienced through presence, as Haila and Dyke (2006) suggest, its presence in the forums of representative democracies, those places where decisions on natural landscapes are made, "requires human representation" (O'Neill 2006:266). Given our reliance on arguments delivered through language and specific formulations, it is biologists, ecologists, environmental activists, local citizens, and indigenous communities that represent nature in the political arena. O'Neill (2006) and Latour (1993, 2004) reflect on how nature is represented in these forums. O'Neill (2006:266-269) presents three ways of legitimising representatives of non-represented groups or entities: based on authority and accountability, on knowledge and expertise, and on shared identity and presence. Among the three, the first two encounter the resistance of local inhabitants, while the third encounters the dangers of being dismissed in democratic forums (idem). Forms of representation that are based on authority, instituted through institutional bodies are often contested by local voices that are present and live in the concerned natural areas (idem). Representation forms grounded in authority and expertise, as the ones embodied in environmental advocacy and political ecology scholarship, lacking a shared presence in a concerned natural area, fail to transform the political field (Latour 2004). According to Latour (2004, 1993) the issue is a constitutional one, in the sense of the re-constitution of the political through the enlargement of the collective that defines it, by including the non-humans. As O'Neill (2006:269) indicates, forms of representation that have grounded themselves in a "politics of presence" in a wider

sense, as being present in nature, and that were able to articulate this presence through expert knowledge have been successful in reconstituting the political arena. This is the case of indigenous communities in Ecuador that have successfully argued for the introduction of the Rights of Nature into the 2008 Constitution.

In a 2016 article, “Thinking Architecture with an Indian Ocean Archipelago”, Lindsay Bremner recounts a meeting of government officials from the Maldives archipelago in the tidal waves of the Indian Ocean, to sign a post-disaster treatise. Through their meeting in the ocean, they allowed the ocean a voice in the debate on the future of the archipelago. Bremner goes on to discuss two ways of thinking architecture in the Maldives in the context opened by the tsunami preceding the meeting with the ocean. A first one, prevailing since the 1970s, she argues had changed the relation between land, people and the ocean transforming a fluid way of inhabiting the islands of the archipelago into a dense way of inhabiting the capital city and its surrounding touristic resorts, while stopping the ocean from overflowing on land. A second way of thinking architecture in the Maldives would imply thinking with the Indian ocean, in accord to how living with the ocean has unfolded for centuries and millennia beforehand, not blocking the sea, but living with it, allowing it to temporarily overflow on land.

Similar to Bremner’s way of thinking architecture *with* the Indian Ocean, and *from* the Ocean, this research project is an exercise in thinking urbanisation *with* the forested landscape of the Vișeu Valley. Methodologically, this has been pursued through an immersive ethnography in the forested landscape while *walking with* my field companions, both human and non-human. Though I am not an inhabitant of the valley myself, the research process has been an exercise in articulating the non-human voices of the forest and its inhabitants through shared presence and expert knowledge.

More than collecting data, being present in the field sets the settings for a scientific experiment. Through the very presence, the observer in a scientific experiment participates in the observed situation (Ingold and Vergunst 2008:15). To Ingold (2011) presence in the field is a form of immersion, where the boundary between the observer, the participants, and the observed vanishes. In other words, presence is the experience of the “*unfolding continuum*” (Ingold 2011:47) of life shared between humans and non-humans: people, forests, rivers, mountains, trees, animals, insects etc.

Western thought has privileged ways of knowing through the mind, that follow the path of unfolding thoughts rather than walking the path laid ahead by ancestral knowledge inscribed in the land. In indigenous cultures, walking is a way of knowing that integrates thought and action for it requires knowledge in movement (see Legat in Ingold and Vergunst 2008 and

Tuck-Po in Ingold and Vergunst 2008). In their edited volume "Ways of Walking: Ethnography and Practice on Foot", Tim Ingold's and Jo Lee Vergunst's (2008) assemble accounts of walking as a way to forge knowledge in movement (Ingold and Vergunst 2008:17). Through a phenomenological approach, the accounts of walking that are gathered in the volume present walking as a "way of knowing" (Ingold and Vergunst 2008:5) through a rich engagement with the path and the surrounding environment where the tactile, the olfactive, the visual, and the auditory senses are stimulated and add to the experience of a place. Particularly in indigenous cultures of inhabiting forested landscapes, presented by Allice Legat and Lye Tuck-Po walking and story-telling intertwine to assure the "intergenerational transmission of knowledge" (Ingold and Vergunst 2008:6). Through Lye Tuck-Po's (in Ingold and Vergunst 2008) account of walking with the Batek forest community in Indonesia, a navigational knowledge as the ability to follow a trail without knowing it in advance emerges as early as childhood as the whole community lives on the move. With Allice Legat's (in Ingold and Vergunst 2008) account of the way "knowledge of government" is passed on with the Thcha tribe of the Dene nation in Canada, story telling, trail travelling and revisiting locations where past events occur emerge as practices for sedimenting knowledge and for building memory in both mind and body. Through walking the paths that have been walked before, the Dene walk in the footprints of their ancestors thus establishing a relation with both the present environment and with the ancestral knowledge they carry with and within them. There is co-presence in the act of following the footprints other have walked before (Ingold and Vergunst 2008:7). It is felt as ancestral connection through remembering the stories told and as connection with an ever changing environment. Walking and storytelling serve also as practices of differentiating between the ones that claim to know and the ones that have acquired knowledge through walking the path and of being present within a continuously changing environment (Ingold and Vergunst 2008:5).

As an immersive experience, fieldwork proved to be a form of co-presence. This presence was felt as a matter of co-present bodies and experienced trough the senses. Through the senses, non-verbal communication and rich interactions occur. On the one hand I was directly confronted with the presence of the forest, while on the other hand the forest came to be present in my actions, thoughts and writings. In an exploratory field trip in April 2015 on the Vișeu Valley, where I stayed for a couple of weeks in the village of Moisei, I initially felt the presence of the forest as a larger entity governing life in the valley. The forest was present both through its physical body covering the mountains visible from the valley, as well as in the actions and conversations I witnessed, heard and participated in. Trucks of timber were passing through the valley, forestry engineers were driving in 4x4 cars, and people were talking. They were talking about those trucks, about surveillance technology, about their own forests and ways to better safeguard the timber that was to come out of them, about other people's forests and how they exploit, safeguard, or unlawfully appropriate

them. All of this was part of their daily lives, as they went about receiving guests, planning their children's future, tending to their households, their cattle, their chickens and their pastures. During and after fieldwork, I began to be interested in all maters forest-related, from media reports and investigative journalism, to art exhibitions, books, and talks about forests.

Negotiating the field was an issue of being curious, taking risks, gaining trust, and feeling safe at the multiple boundaries described by the territories of woman and man, researcher and research participant, urbanist and forestry engineer / biologist / environmental engineer. I returned for my fieldwork in March 2017. Empirical research builds on a one and a half months in spring 2017 (March-April) and a two weeks period in the autumn of 2017 (end of September, beginning of October). For most of this period I was an intern at the Maramureș Mountains Natural Park. Access to the field was negotiated through the structures of power that govern the forest. Navigating them, the compass always pointed towards the ground. As my interest in the forest had a particular forest in view, I was always pointed into the direction of the valley by all the persons I encountered in the governmental and non-governmental structures of forest governance at regional level. As I asked for forest planning documents from the regional government structures I was directed towards the local forest government structures. The same thing happened with the forest expert of the Romanian branch of the World Wide Fund (WWF), the environmental NGO that helped in the constitution of the Natural Park, as well as with respected members of the academic community in the city of Cluj, Romania, that I approached. They were all directing me towards the people living and managing the forested territory of the Vișeu Valley. Knowledge of the forest proved to be ground-knowledge. The keepers of this knowledge proved to be mostly men. Not the same can be said on the administration of the Natural Park that employs both men and women. Negotiating my feminine presence in a predominantly masculine field has unfolded as a personal journey of becoming. I will further elaborate on this in the next sub-chapter where I discuss *becomings*.

This negotiation proved to be an exercise in learning to speak about the forest to its custodians: biologists, forestry engineers, environmental engineers, and valley inhabitants. Speaking about it as a continuous geographical form, a fluid and dynamic landscape, fragmented by territorial boundaries, provided the bridge towards speaking with the biologists and environmental engineers employed at the Natural Park, whom I accompanied in their patrolling routine. Territorial boundaries are important for biologists and ecologists, but the continuity of nature in both time and space comes first. Speaking about the global timber trade that traverses the Romanian territory and to which timber logged within Romania adds to, opened a communication path with forestry engineers and valley inhabitants. This form of tacit knowledge that comes from experience, opened the field for

me. It also indicates that we are but witnesses to the continuity of nature and to the flows of resources that circle the globe.

Fieldwork was comprised of a series of forest walks that I took part in during my internship at the Natural Park. As I asked to see the forest, they showed it to me by taking me along in their daily patrolling. All of these walks were daily assignments to the park rangers. Mornings started in the headquarter of the Natural Park, in the city of Vișeu where tasks were distributed and teams assembled. We drove along the Vișeu Valley and the valleys of its affluents to access the depths of the forest. We walked on forestry roads, mining roads, along streams and tourist paths. We went to inspect forests approved for logging, to search for animal traces in the spring monitoring campaign, to mount and de-mount cameras for animal surveillance. During our walks, we felt the ground beneath our boots getting our feet tired and sometimes sore, we passed through water, mud and snow, we stepped on rocks, we passed by tree logs and the remains of tree trunks both legally and illegally cut down, forest workers' barracks, animal feeding posts, sheepfolds, water troughs (*jgheaburi, adăpătoare* in Romanian*)*. We heard the songs of the birds starting to sing at sunrise, we were surprised to encounter deers that were equally surprised to encounter us, we saw hawks circling the skies and frogs jumping in small ponds by the road. We drank spring water, told stories and laughed sitting by the fire one spring night. My being there felt like an initiation journey, to which every walk added knowledge and strength. My first walk was rather short, yet through longer and shorter walks I completed the first one and a half months of fieldwork with an eight hour walk through the forest and a daffodil meadow while we were searching for traces and mounting cameras to monitor the Black Grouse. I took notes after the walks, and even though I recorded some interviews as initially planned, I am not making use of them for writing. I rather rely on field encounters and the discussions I had while walking with my field companions in the forest, as they have proved to be more rich in knowledge. The practice of recording interviews has been rather unproductive. While I was denied consent to record several times, whenever I introduced it and obtained the consent of my interviewees, the presence of the recorder affected the conversation we were having. In *2.3. Mapping, walking and tracing flows* I present the difference I encountered between a typical interview situation and walking through the forested landscape with my field companions, as well as the preference for using walking *with* as accompanied walking as a research method.

1.2. Becomings

Phenomenological and ecological approaches to *being-in-the world*, as the works cited ahead introduce, are grounded in perception and ways of entering into relation with other beings. During fieldwork and throughout the research process, entering into relation with other beings, human and non-human, I have witnessed three interrelated processes of becoming: the "becoming woman" Braidotti (2003) of myself in the field, the becoming of the forest from an extraction landscape into a landscape that is inhabited and *cared for* by a more than human community (see Puig de la Bellacasa 2017:155), and the becoming of my field companions and forest guides into holders of a kind of knowledge situated at the intersection of scientific and indigenous. Being in the company of forestry engineers and biologists, helped me to think with them on the becomings of the forest.

As Braidotti (2003) points out, when power is at issue, "mobility is one of the terms which indexes access to it". Throughout fieldwork, my identity changed every time I encountered someone new and someone again as the knowledge gained through walking was sedimenting in me. While learning to speak about the forest with its custodians I also navigated the "multiple becomings" (Braidotti 2003) of an architect and a woman gaining knowledge on the forested landscape. Most of my encounters were with men, as they make the majority of work force at the administration of the Natural Park and at the local Forestry yards. One can say that the forest gathers them around it. Out of the multitude of encounters I had, only five of them were with women, all of them working for the Natural Park, and only two of them in the forest. Perhaps this is indicative of a needed change in territorial government, to be more gender inclusive. During these encounters, my internal boundaries of woman, researcher and architect were in constant negotiation.

During fieldwork I inevitably witnessed the becoming of my forest guides, rangers and biologists at the Natural Park as they were becoming fathers and mothers along side nature's custodians. While these are events on life's paths, a series of other becomings are more interesting for the becoming of the forest. Those are the multiple becomings of them responding to specific situations and conditions in their professional lives. Depending on the situation presented, they were making alliances or standing against each other. When the life of the forest was threatened they joined sides. This happened when a fire threatened the forest, when an old tree was displaced and its seedlings were moved to new locations as when illegal logging was caught in the act. When professional interest is at play, that is when they mostly stand behind their knowledge and their view, as happened at one of the meetings for drafting the forest management plan of the forest on the Vaser valley that I attended. There were also some who were immobile in their position, an immobility that impeded them to act in situations of threat.

Throughout the research process, the becoming of the forest, from the narrow view of defining it as a productive landscape, an operational landscape of planetary urbanisation, to a wider view of seeing it as a being, with its own history, memory and agency to act for its future existence has enfolded. While the becoming woman of myself as a female researcher, and the becomings of my field companions during fieldwork have happened simultaneously during fieldwork, through direct interaction, the becoming of the forest has been through a conscious process of research into the other possible ways of seeing a forested landscape. It has unfolded over the last two and a half years that I have been writing this thesis.

1.3. Boundary conditions

Walking into the forest with forestry engineers and park rangers has also meant walking with them into their fields of knowledge. Trying to understand the ways in which they were seeing the forest and making sense of it, it almost seamed that there were multiple forests, a forest of the biologist, a forest of the forestry engineer, as well as several forests of valley inhabitants. In an ethnographic account, the multiplicity of the forest would be acknowledged through the different ways in which different practices enact different forests (see Mol 2002). Through their practice, biologists and forestry engineers craft forests, along with whole worlds where the forests are entangled in. The forest of biological ecologists, the forest of forestry engineers and the forest of local inhabitants all differ through the way relations are drawn inside and outside the field of interactions that define them. When confronted with this multiplicity of forests, John Law's (2004) and Isabelle Stenger's (2011) proposition to slow down thought in order to find ways to understand has proved fruitful.

The work required by encountering the multiple practices that enact differentiated forests and transforming the results of this encounter to relay them to architecture and urbanism practitioners is a work that Isabelle Stengers (2011:382) qualifies as the work of a diplomat. The practice of the diplomat belongs to what Stengers qualifies as "the third sciences", under which she understands the social sciences and the ways in which they differentiate themselves from field and experimental-laboratory sciences. The third sciences are "addressed to beings who, by definition, are interested, or could be interested, or are capable of being interested, in what is required of them, in the way they are addressed" (Stengers 2011:377). The diplomat analogy entails a problem of representation, in the way that it carries with it both scientific and political claims (Stengers 2011:383). To resolve it, Stengers proposes to distinguish between a "diplomat-researcher" and a "diplomat-technician" (Stengers 2011:383). In their "diplomatic" work both are engaged in cultural translation, that is the translation of the cultural practices they encounter from the group that practices them to the group that sent them to do this work and report back their "findings".

The crucial question for the diplomat-researcher engaged in knowledge construction is the question of her translation being accepted by those she encountered (Stengers 2011:383). On then other hand, the question of the diplomat-technician that becomes a mediator of the practices he has been entrusted with by those he/she encountered is "(cosmo)political", as "the enterprise is no longer in the construction of knowledge […] but is situated […] with those she represents" (Stengers 2011:283). As with any diplomatic undertaking, both of these practices entail risks, and particularly the risk of betrayal (Stengers 2011:379). The work presented here accounts for the practice of a "diplomat-researcher". Transforming the knowledge I was entrusted with into the form of knowledge I bring forth has required I "think with care" (Puig de la Bellacasa 2017) towards the forest and its carers, my field companions.

To Isabelle Stengers, "science, technology and industry are interrelated" (Stengers 2010:44). To analyse the ways in which the science of forestry, the technologies of extraction and timber production and the timber industry operate, I regard them as an "ecology of practices" (Stengers 2010:36). Stengers' "ecology of practices" applies first and foremost to experimental science (Stengers 2010:51). It highlights the relations established between the scientist, her/his 'object', and the scientific community to which he/she is reporting in order for the validity of her/his appreciations to pass as a scientific proposition. Stengers contends that in an ecology of practices, there is "reciprocal capture" (Stengers 2010:36) that manifests itself in the form of constraints: "requirements" set by the scientist on behalf of phenomena, and the "obligations" that she/he has towards the scientific community (Stengers 2010:51). However, requirements and obligations operate also outside of scientific experiments, where they "describe a king of topology", linking together "a heterogenous collective of competent specialists, devices, arguments, and "material at risk", that is phenomena whose interpretation is at stake" (Stengers 2010:52). Chapter *6. The forest as material* describes this topology, where statistical data reported to FAO, intertwines with journalistic investigations, business strategies, government instruments tracing timber flows, environmental organisations' reports.

When the forest is multiple, when the forces that traverse and transform it are many, when the actors multiply, a "slow method" (Law 2004:10) is a vulnerable and uncertain way towards building bridges of understanding. It serves to make present that which is made absent through the ways scientific practices define and enact their fields of knowledge. To Law, this absence *"comes in two forms: as manifested absence (for instance as what is represented); or, and more problematically, as a hinterland of indefinite, necessary, but hidden Otherness*" (Law 2004:14). Law's knowledge hinterlands are enacted as relations that distinguish between what is included and what is excluded from the research field. They encompass:

"*tacit knowledge, computer software, language skills, management capacities, transport and communication systems, salary scales, flows of finance, the priorities of funding bodies, and overtly political end economic agendas.*" (Law 2004:40-41).

Law (2004:3) enlists three ways of knowing that are useful in exploring knowledge hinterlands: ways of knowing that are embodied and make use of the senses in order to know through experience, ways of knowing that are situated and bring forth knowledge and expertise where it is appropriate, and ways of knowing that are emotional, for knowing that which remains unknown and can only be grasped.

For architectural and urban practice and theory, the forest is very much a hinterland of knowledge, even though interest in the forest as a landscape of urbanisation is arising. Following Law's conceptualisation, it is relegated to the hinterland as a problematic othering of the city. While architects dealing specifically with the forest are few (see Tavares 2013(a), (b), 2017, Smachylo in Hutton, Moe, Ibañez ed. 2018:67-62, De Meulder, Shannon and Nguyen 2019, Wambeque 2019), the forest is part of what Topalovic (2016 (b)) and Brenner and Schmid (2012) name "the constitutive outside" of the city. Slowing down thought, in order to explore the forest as a hinterland, has relied on the multiple ways of knowing that Law proposes: walking as an embodied way of knowing, mapping as a research practice, and emotional ways of sensing that which was unspoken. Along the research process, trees have become my thinking companions, as I have let myself be affected by them in caring ways. Trees cannot speak for themselves as their way of communicating does not present itself as verbal speech. In their non-verbal communication, trees engage our capacities to observe and listen to what is not being said but is present.

Within scientific practices there are already examples of how the exploration of knowledge hinterlands have fostered the emergence of new concepts, new ways of seeing and new hypothesis. Tim Ingold's (2011) ecological anthropology, Nicolas Georgescu-Roegen's (1971) bio-economy, and Emanuele Coccia's (2019) metaphysics of mixture are but a few examples. Beyond the boundaries of their fields of knowledge they see a world in flux, in continuous transformation as flows of energy pass through, transform and mobilise matter into different states. Moreover, we, as human beings, are part of the space-time continuum within which life unfolds and matter is transformed. Their scholarship accounts for that which methodic practice has confined to the hinterlands of knowledge.

Tim Ingold's ecological anthropology starts from the realisation that anthropological studies on material culture have less to do with materials in themselves than with the images and symbols they carry. His epistemic claim is that while material culture studies remain within these realms, they relegated to the hinterland material processes of

transformation and human engagements with materials in transformation (Ingold 2011:20). As such, they re-enact the boundary between the cultural and the material world. To Ingold, the concept of the material world that anthropologists are operating with, obscures environmental relations, which, as he pertains are a prerequisite for entering into contact with the material world (Ingold 2011:20). In the absence of a pre-defined conception of the material world in anthropology, Ingold relies on Gosden's 1999 definition dividing the material between landscape and artefact (Ingold 2011:21). To this qualification, Ingold (2011:21) adds that atmospheric phenomena as rain, fog, snow, frost, dewdrops, the warmth of the sun, the flow and the action of fluid materials, like water and lava are not accounted for in neither the concept of landscape nor artefact. As these oscillating and rhythmic changes in environmental parameters act to transform the materials they encounter, it becomes apparent that artefacts, landscapes, and the material world itself are hybrid formations to which natural and artificial processes equally contribute. Thus, Ingold concludes that the artificial and the natural are, in themselves, ambiguous categories (Ingold 2011:21-22).

Nicolas Georgescu-Roegen's 1971 book "The Entropy Law and the Economic Process" was a ground-setting book for the establishment of the field of bio-economy. Even though his critiques pointed to the fact that as a law of physics, the Entropy Law that accounts for the dissipation of energy at the limits cannot be translated to the processes of material transformation, his epistemic claims on the way neo-classical economic theory excludes the qualitative transformation of materials in their life cycle have stood the proof of scientific validity. As Stengers points out, the notion of entropy exerts a fascination beyond the science of physics where it was initially created. During the 1970s it became associated with environmental degradation as it raised concerns about the outputs of human economic activity. There is an inherent ambiguity in the notion of entropy that relates to the impossibility of distinguishing natural and artificial processes. (Stengers 2010:214) This ambiguity corresponds to the ambiguity associated to human responsibility in planetary scale environmental change. To Georgescu-Roegen entropy served to introduce natural processes of material transformation in a discipline that only accounted for the production of material goods within the factory gates and which was oblivious of its impact beyond the enclosed production unit.

In his "The Life of Plants. A Metaphysics of Mixture" (2019) Emanuele Coccia starts his exploration from the acknowledgment that biological science methodologically enacts a view of life as fashioned from the model of the animal and human body, thus relegating to the hinterland the bodily complexity of plant species and their ecological relations. The significant difference between animal and plant bodies is the way they concentrate and distribute functions across their bodies (Coccia 2019:5). Instead of concentrating

functions in organs, plant bodies distribute them across their whole bodies. This model of the body and the way it enters into contact with its environment, prompts Coccia to adopt a conception of being-in-the world as a form of immersion, similar to Ingold.

Beyond their role at exemplifying research in knowledge hinterlands, Ingold's, Georgescu-Roegen's and Coccia's propositions are valuable for my research into forested landscapes as they inform on both unproductive assumptions, and possible pathways of investigation. Following Ingold's conclusion, that the artificial and the natural are ambiguous categories, this research does not employ them as categories for analysis. It rather looks at the hybridity of the forest landscape, where the natural and artificial co-exist. This is most visible in *Chapter 7. The forest as infrastructure*. Nicolas Georgescu-Roegen's propositions serve as a starting point for thinking of the transformation of trees into timber beyond the narrow economic economic account of it. They open *Chapter 6. The forest as material*. Emanuele Coccia's "metaphisics of mixture" serves as guideline into reporting on my fieldwork experience from the perspective of immersion and of accounting for fieldwork methodology as an immersive ethnography. The perspective of the forest from my immersion into it is explored in *Chapter 8. The forest as a more than human landscape*.

1.4. Conclusion

The themes approached in this chapter, *presence* as a methodological way of approaching fieldwork, the *becomings* of both researcher and research subject, and the ways of approaching other fields of knowledge through paying attention at what is left outside or unmentioned, serve to infuse a research practice that has relied on multiple methods, not all of them from the repertoire of tools of architecture and urbanism. They also serve as guiding towards approaching the forest as a "knowledge hinterland" of architecture and urbanism, while *encountering* fields of knowledge and of practice for which the forest is a territory of study.

Stenger's and Law's propositions for approaching scientific practices and their "hinterlands of knowledge" has been useful in approaching biology and forestry engineering as sciences and practices whose "object" is the forest. Thinking with Stengers concept of an "ecology of practice" characterising scientific research and comprising obligations set on behalf of phenomena and responsibilities towards the scientific community, I have looked at scientific forestry and the way it is practiced in the Vișeu Valley as an "ecology of practice". While not part of laboratory sciences, forestry engineering is akin to such scientific practices, in that it directly aims to influence and to transform forested landscapes while collecting data on them. In *Chapter 3.1. The plantation* I present Scott's overview of the development of scientific forestry in the XVIIIth century and his assessment that as a science, forestry

engineering is transforming forests into large scale live laboratory spaces. In *Chapter 7.3. A changing land management* I make an assessment of how scientific forestry has been practiced on the Vaser Valley. I have not looked at biology in the same way, as in the present moment, biologists in the Maramureș Mountains Natural Park are not actively engaged in transforming the forested landscape, rather in monitoring its transformations. However, in *Chapter 8. The forest as a more than human landscape* I approach some concepts that can be said to belong to the "hinterlands of knowledge" of biological science. As concepts that are used often and that have almost become part of our portraying of "nature", the idea of "harmony in nature" and the "mosaic landscape", have a recent history in the history of knowledge, and also a specific meaning attached to them through that history. By retrieving these meanings, I question modern assumptions about the ways these concepts are used.

2. Mapping and other research practices

This chapter is in part theoretical research on how to approach the landscape from a more than human perspective, and in part a discussion on the research methods used to do so. As military maps were the first maăs made of the territory of the Vișeu Valley, in this chapter I discuss the military origins of mapping techniques and introduce complementary research methods and concepts to think through mapping projects in *unknown* territories.

2.1. Mapping as a capitalist-colonial project discusses how capitalist-colonial mapping projects used the grid as a device to transform complex, more than human inhabited landscapes into resource extraction landscapes. Confronting Western, modern ways of urbanisation of a territory, with indigenous forms of urbanisation I discuss how the grid was used as an organisational principle and an embodied way of inhabiting a territory. Though pre-colonial settlements have disappeared, this knowledge has persisted in the landscape and in the bodies and memories of indigenous descendants.

2.2. Life projects introduces and discusses the concept of *the life projects* of human and non-human inhabitants of a landscape. I introduce it here, while discussing mapping, as there is a specific way in which the life projects of the more than human inhabitants "map" their living territory. Such "mapping" is conceptualised as "paths" (Ingold 2008, Aït-Touati, Arènes, and Grégoire 2019). While paths also offer analytical informations on reading a landscape, the overview offered by a map is difficult to grasp while moving along a path.

2.3. Mapping and other research practices discusses mapping and complementary research practices that have been used within this research project. In discussing precision in contemporary digital land use mapping techniques and how satellite image interpretation is often unreliable in heterogenous landscapes, I argue for other research methods to compensate for this: in particular reading the territory as a "palimpsest" (Corboz 1985) and *walking with* as a research practice, a guided visit through the landscape, accompanied by the people that know it and that have developed a way of reading it. Following Brenner and Schmid's (2012) call to study planetary urbanisation as a dual phenomenon of landscape transformation and resource flows, I also discuss the tracing of resource flows as a research method. Modern production landscapes have been transformed to accommodate an increased resource flow, so looking at these flows provides a more comprehensive view on what is at stake in the development of infrastructures for extraction revealed through mapping projects and digital satellite images.

2.1. Mapping as a capitalist-colonial project

The militarisation of the ways in which we see and imagine territories pervades contemporary society. This way of seeing originates in the colonial gaze that performs an othering of both "nature" and indigenous inhabitants of the landscape. The history of map-making is entwined with the history of the capitalist colonial and extractive projects (Tavares 2013(b)). Mezzadra and Nielson (2013(a)) argue that map making was constitutive of the capitalist-colonial project of designing and creating the "new world" throughout the XVIth and XVIIIth centuries by projecting a vision of territorial occupation through border tracing for resource extraction and the enslavement of human beings. In the XVIth century, early modern geography, astronomy, medicine and architecture shared concepts, one of these concepts being the expression "Fabrica mundi" used by Mercator in his famous Atlas, signifying a world being made as it is being imagined (Mezzadra and Nielson, 2013(a)). Throughout these centuries, as Mezzadra and Nielson show, an extraction of meaning occurred, through which the expression "Fabrica mundi" lost the visionary quality of world-making as projects of resource extraction focussed on the extracted product while putting aside the generative capacities of the map-making project. The world, "*mundi",* and its making, "*fabrica",* were separated, as the vision of the world came to be dominated by the colonial vision, and "fabrica" came to be associated to the workshops where things were made under colonial occupation (Mezzadra and Nielson, 2013(a)).

The grid was and is still used as a device for the advancement of the capitalist-colonial project. Capitalist-colonial projects extended the European model of civilisation over all conquered land introducing grid-like settlements and organising plantation landscapes in grid structures. The case of the Amazon river basin is indicative of how the map-making capitalist-colonial project has been transforming an indigenously inhabited rainforest territory into a Cartesian landscape for intensified production. Paulo Tavares and Ursula Biemann's extended research, both independently and as a collective, into the transformations of the Amazon river basin in the last 50 years documents the way the territory of the forest was visualised in its depths through mapping projects and the use of satellite military technology throughout the 1970^{s} and 1980^{s}[9]. The intention brought forth by these mapping projects was the extraction of under ground resources deposited over millennia underneath the living soil. Through their documentation work, the territorial unity of the rainforest, where all living beings co-habit emerges as fractured, as humans, trees, and the strata of underground deposits were each extracted from it through mapping projects.[10] These maps also provide testimonies of the eco- and genocide perpetrated by colonial and state powers in the

[9] personal notes from the exhibition "Rights of nature" 24 January - 15 March 2015. Nottingham Contemporary, curated by TJ Demos and Alex Farquharson with Irene Aristizábal where Ursula Biemann and Paulo Tavares exhibited their work including the video work "Forest Law".

[10] idem

Amazon river basin (Tavares 2013(a)). The ethnographic maps of indigenous inhabitation patterns and movement pathways were used to exterminate and forcibly assimilate the indigenous population, while the grid-like structures of urban-rural inhabitation and the developmental axes traced by government plans traversed the rainforest (idem). The clearing of the rainforest and the expansion of roads, crop plantations and settlements that we are witnessing today were initiated through these project in the aftermath of the Second World War, aimed at mapping underground resources and indigenous labour resources (Tavares 2013(b)). Their spatial pattern follows a 1970s' settlement scheme designed to expand colonial settlements along newly opened roads (Tavares 2013(b)). As Tavares (2013(b) indicates, the tropics acted as a ground for experimentation for the development dreams of post World War II global policies. The creation of "cartesian landscapes" has been expanded to the planetary scale. Milica Topalovic and Bas Princen's (2014) photo-essay and research present how palm plantation are replacing complex more than human inhabited forested landscapes. *Chapter 3.1. The plantation* will discuss the ways in which the model of the plantation transformed the European forested landscape.

As an orientation device, the grid pre-dates the capitalist-colonial project. It transcends cultural divides to serve humans in all times and places. Indigenous cultures in the Americas had developed similar systems of orientation based on grid organisational structures prior to colonial contact. Michael Heckenberger's (2003, 2007, 2012) research into indigenous inhabitation in the Amazon river basin unveiled the networked settlement structures hidden underneath layers of vegetation and high trees and the way orientation into the forested landscape connected settlement and forest through grid-like structures using the cardinal points and ones own body. His collaborative research project on the evolution of the Amazon river basin accounts for a truly other way of urbanisation of a forested landscape before colonial contact. Through reading the geological strata of the earth, interpreting satellite image light reflection, and ethnographic inquiry, their maps show the evolution of the forest landscape as a complex socio-natural landscape, where city and forest co-exist. They identified patches of the forest of similar age structure that used to constitute human indigenous settlements in the rainforest and re-construct the pattern of indigenous urbanisation of the Amazon river basin. Heckenberger (2012) conceptualises the urbanised landscape of the Amazon river basin as resembling a fractal structure, where the smallest part is identical in structure to the bigger part and the whole landscape. Using the body as an orientation device, the indigenous cultures of the Amazon organised the home, the settlement and the forest according to the same principles, preserving in each of them a part for spiritual practice and protection (Heckenberger 2012). This form of connection between the body and the landscape persists today in the cultural and spiritual practices of surviving Amazon tribes. While documenting the maps made of the Amazon river basin using military technologies, Ursula Biemann and Paulo Tavares' "Forest Law" also

documented the way of living in the Amazon rainforest. They produced no map, but they showed how the map was embodied by the indigenous inhabitants of the rainforest through video recording. “Forest Law” presents the legal battle the Sarayaku indigenous community pursued and won against an extractive company. Through their project, the Sarayaku community voices its ways of connecting with the forest landscape, planning the landscape, using the plants in the forest for different medicinal and spiritual practices, and the ways they have mobilised this form of connection to protect their territory (Biemann and Tavares 2014:39). The way they understand the forest as interconnected with their bodies, and how they preserve part of the forest for special protection, has been mobilised as an argument in a court of law in defence of their territories against extractive projects (idem). Through their research, Biemann and Tavares illustrates how the body is a compass to navigate, to know, to plan and to inhabit a forested landscape. This documentation of their way of living offered a view of people’s living deeply immersed in the landscape. The Amazon rainforest, as inhabited by indigenous cultures, is a polyculture forested landscape, where cultivation does not extract the land out of the cycle of life of the forest, and does not fix it into a Cartesian matrix.

2.2. Life projects

Tim Ingold (2011:12) defines paths as ways of living, intrinsically linked to inhabitation rhythms and patterns. To him, habitation is not static, but is rather movement along a path described by the observations of the moving point. Through movement and observation, one enters into relation with what one encounters along the path. Inspired by Ingold, Aït-Touati, Arènes, and Grégoire’s (2019) “Manual of potential Cartographies” presents a relational approach to mapping living space while offering conceptual tools to pass from an abstract representation of space to a representation of the space of living bodies. Their quest was inspired by the territories they were asked to design as part of Arènes, and Grégoire’s landscape design practice, and the way they interpreted their task as a need to draw “inhabitable worlds” (Aït-Touati, Arènes, and Grégoire 2019:12). Through the maps they present, Aït-Touati, Arènes, and Grégoire describe the choreographic movement of bodies in spaces. Inspired by GPS tracking technology, they draw maps generated by “points of life” set in motion. The series of maps they present performs a multi-dimensional reading of the Anthropo-scenic landscapes they approach, as they pay attention to the geological strata of the earth, to changing climatic conditions, to the motivations of the “points of life” they trace, and to the conditions of the material relics of our current ways of territorial development that exhausts landscapes leaving them in need of rehabilitation. They ask: How can we inhabit a world that is already inhabited, an Earth that is reactive to our actions? (Aït-Touati, Arènes, and Grégoire 2019:4). By turning their gaze towards the space we intimately inhabit with other beings and species, and by representing them and their

movements as they too create the spaces they inhabit, they reconsider the cartographic gaze as a view from nowhere and the cosmological role of map making as not only representing, but also making a world (Aït-Touati, Arènes, and Grégoire 2019:13). The role of the map changes, it no longer represents a fixed reality, but a provisory state of a world-in-making (Aït-Touati, Arènes, and Grégoire 2019:6). Consequently, also the role of the designer changes, from developing a territory to choreographing the movements of the living (Aït-Touati, Arènes, and Grégoire 2019:13)

At the beginning of the XXth century, urban planner and biologist Patrick Geddes (1915) entertained a similar vision of choreographic movement for human settlements, seeing them as life projects evolving in their territories. His conception of regional development, particularly through increased interconnectivity, was inspired by an evolutionary view of biological life. His valley section diagram represents human inhabitation in relation to what the land makes available. In his section, what is evidenced are the fertile plains used for crop cultivation, interdependent with the river that overflows them, a river that descends from the mountain where hunting and gathering can be practiced. His valley section is complemented by the plans of networks of connection irrigating valley regions, where trade pathways between the different landscapes of the regions appear.

The concepts of “paths” and “choreographic movements” are useful in approaching the more than human inhabitants of the landscape through their *life projects*. Their *life projects* describe paths within the landscape that are for the most part invisible to mapping projects. Through these paths, knowledge of a territory is deposited in their bodies. While maps fix knowledge in territory, the paths described by the *life projects* of the landscape’s more than human inhabitants change with every change in the surroundings, with every season and with the passing of the years. Animal’s paths, guided by their senses, describe in the landscape places to find food, shelter, and quietness from human machines. Plants too, have paths. In *Chapter 4. Shifting consciousness on forested landscapes* I describe the underground paths of trees that through their root systems chart the depths of the earth for resources, for connection with, and information from their kin. They also move in territory, but their movement is hardly perceivable in the life of a human being, as it enfolds over centuries and millennia.

2.3. Mapping, walking *with* and tracing flows

Research has proved to be a practice of "think-doing" as Zitouni (2012) refers to practices that integrate thought and action. While doing research, different practices have succeeded each other in a more fluid way and several of them have intertwined in any one stage of the research process. Methodologically, however, there are three practices that have shaped this research process, and that each corresponds to one of the chapters in *Part II. Forest encounters*: tracing timber paths, mapping territorial evolution and waking with, as a practice conducive to an immersive ethnography.

Tracing timber flows

In a standard methodological account, the analysis on timber flows in *Chapter 6. The forest as material* would be categorised as statistical analysis and geospatial distribution of flows. However, within the current project, that seeks to grow understanding towards the implications and responsibilities we have as inhabitants of more than human landscapes, tracing the flows of non-humans (trees) that are mobilised around the planetary terrain through the infrastructures created to sustain capitalist extractive economies is a way of accounting for their absence. Before they are made into statistical data, timber logs are living trees. It is also intended to draw attention towards the ways in which planetary urbanisation as a phenomena is affecting forested landscapes, specifically how timber flows are increasingly engaging extended landscapes of production.

An approach to tracing resource flows and connecting the production landscapes and the landscapes where they are being used has been proposed by Jane Hutton (2020). Her conceptualisation of "reciprocal landscapes" addresses specifically the relation between production landscapes and use and consumption landscapes. While showing cases where there is a specific and direct relation between a site of extraction and a site where the material is placed into use, relations between production and consumption sites are often not reciprocal from an indigenous perspective. More often they are constructed as power relations between a market demand and multiple supply landscapes.

In order to trace timber flows, understanding how timber and timber products are categorised at a global and national level, how data is reported and aggregated, and what data is available to the public was a constitutive part of the research process. In a global timber market dominated by international corporations that run operations in strategic and multiple sites, source their primary produce from multiple sources and ship their products around the globe, living trees become product categories. Timber tracking mechanisms, such as the EUTR, can hypothetically make it possible to track trees from specific locations

as they are processed in parts and redistributed around the planetary terrain, however, access to the systems that allow such data in not public. As Topalovic (in Jabuka and Topalovic 2014) points out, “information is a securitised territory”. While it is hypothetically possible to track timber through such tracing mechanisms, I have taken another approach. Instead of looking at specific and direct relations between production sites and consumer landscapes, as Jane Hutton’s (2020) undertaking, I have looked at how timber from a specific location, the Vișeu Valley, is entangled into planetary timber flows. From a statistical point of view, it was not possible to isolate timber from the valley from the aggregated data of the Food and Agricultural Organisation (FAO) I have worked with. Statistics are paradigmatic for the way global extractive economies are organised. Timber from the valley is drawn into the planetary resource flows as part of timber from Romania. I have thus traced the flow of timber from Romania as it opens to resource flows and redistributes them.

Walking[11] *with*

Walking has been a way to immerse myself in territory, to pay attention at and to acquire embodied knowledge, to connect to the ground, to the stories that were being told by my human companions, by the trees, the rivers, and the land itself. To say that trees, rivers, and the land tell stories is to acknowledge their presence in the territory I walked through. Walking has allowed for an understanding of the forest as a dynamic landscape, constantly changing, through the experience of different stages in a forest’s growth, different stages in a forest’s annual cycle of life and death, different forests in species composition, and of the extended zones that constitute the edges of the forest.

Walking *with* addresses the more than human landscape of the forest. My forest walks were accompanied walks, as I was taking part in the day to day activities of park rangers at the Maramureș Mountains Natural Park and as I accompanied the head of the forestry office on the Vaser Valley in one of his forest walks. I walked *with* park rangers, forestry engineers, hunters and local guides, that all knew the paths we were walking on. I also walked *with* the forest, the rivers, the birds and the animals. They too, were my field companions. Walking *with* the non-humans echoes Bremner’s (2016) account of the *meeting with* the Indian Ocean of state diplomats.

Unfamiliar with the territory at start, I tracked my walks using GPS technology through a tracking app. *Fig. 36. Forest walks* presented in *Chapter 8. The forest as a more than*

[11] Walking is a practice that belongs to the architectural repertoire of tools. While I am deeply inspired by architectural ways of walking, walking here references anthropological ways of walking that pertain to the immersive ethnography I conducted during fieldwork. As a practice, it is in dialogue with Tim Ingold and Jo Lee Vergunst, eds. *Ways of Walking: Ethnography and Practice on Foot*. Anthropological Studies of Creativity and Perception. Aldershot, England; Burlington, VT: Ashgate. 2008.

human landscape has been generated from these tracks. I carried with me a touristic map of the valley, but because I was always accompanied by people that knew the mountains, I did not make use of it for the most part of our walks. Being in the forest and talking about the forest was a way to be present with the forest itself, that inspired the conversations and the stories that were told. Although I also made use of interviews, there was a considerable difference between what was discussed in a typical interview situation, where I would be seated with my interviewee in a room, and what was discussed while walking *with* him / her in the presence of the forest. The difference was sensed as an embodied difference, between what was embodied in a room and what was embodied in the forest. While in an interview, my interviewees were making references to pieces of legislation, the requirements of their job and knowledge they had, during our forest walks they made reference to the forest itself, to the wind, the water, the animals and everything around us. The kind of knowledge they disclosed in typical interview situations is more accurately portrayed as information as it is publicly available. At the same time, it constituted their relation with such immaterial structures as state structures. During our forest walks they were making use of their embodied knowledge, in order to read a landscape that they knew, but that was in constant change. They had been walking *with* the forest, the rivers, the animals before I had joined them. This kind of knowledge is theirs alone, constituted through years of walking *with* the forest, for which there is no standardised form, for the forest is in a continuous transformation process.

In the book “How Forests Think. Toward an Anthropology Beyond the Human”, Eduardo Kohn (2013) presents the Amazon rainforest as an interconnected web of thinking processes. The forest, in his account, comprises the thinking processes of all its inhabitants, human and non-human (animal and plant), through which they represent the world they inhabit and encounter. Everything is alive in the forest, through virtue of it being represented and interpreted as a “sign” by one of its inhabiting beings (Kohn 2013:33). His account suggests that the presence of the forest, we may come to represent the world in a more complex and multidimensional way, through embodying different perspectives, including of the non-human beings, inhabiting the forest. During our forest walks it may have been that we were accessing the multidimensional reality of the forest and its non-human beings, therefore, also our conversations were much more rich in representations of the world we inhabited.

Reading the palimpsest

In his 1985 text “The territory as a palimpsest”, André Corboz introduced “the palimpsest” as a lens to view a territory in transformation. He further illustrated his way of approaching landscape transformation in his “Atlas du Territoire Genevois”, published in full in 1993.

Corboz' method of overlaying the different cadastral maps of Geneva, from the XIXth and XXth centuries, and evidencing the additions, the erasures and the transformations of the fabric of the city introduced time in the spatial analysis of the city, and viewed the city's evolution in the time-space continuum (Cavalieri and Cogato Lanza 2020). As a method to interpret territorial transformation, the palimpsest has mostly been used and developed to account for human-induced transformation, the evolution of the road-networks, the change of the *parcellaire* (in French), the buildings that have persisted or that have been demolished and the traces they had left. It has mostly been used for dense urban territories, and densely inhabited territories.

Making use of the concept of the palimpsest to read territorial and landscape transformation within a predominantly "natural" landscape, where 70% is covered by forests, implied reading the evolution of the settlements, the evolution of infrastructure networks, and the evolution of the forest in relation to the clearings, pastures and alpine grassland, some man-made, some "naturally" existing as part of the landscape, like the alpine grasslands at the summit of the mountains.

Both the maps and the ground can deceive. Put next to each other, the different maps that I used seemed incomparable. Mapping has been a way of *being present* with the maps. The historical maps I worked with specifically for *Chapter 7. The forest as infrastructure*, date from the XVIIIth century (Europe in the XVIIIth century as mapped during the First Military Survey of the Hungarian Kingdom (1782-1785)), the XIXth century (Europe in the XIXth century as mapped during the Second Military Survey of the Habsburg Empire (1819-1869), the XXth century (1941 Military Survey of Hungary, 1970 territorial map of Romania from the ArgGIS Romanian platform[12]) and the XXIst century (Corine Land Cover 2018). They carry with them unrepresented and misinterpreted details. Among the territorial maps, only in the 1970^{s} map were tree species accounted for. Forestry plans record in maps and tables tree species and their age, yet the oldest of such plans for the Vaser Valley alone dates from 1947. According to The 1947 Forest Management Plan for the Vaser Valley, previous records were destroyed during the Second World War. Only in 2014, with the Management Plan of the Maramures Mountains Natural Plan have records of animal and plant species been represented on a map for the Vișeu river valley, although this kind of information circulates widely among biologists since records started to be made in the early XXth century.

Walking was an integral practice of the mapping process. It provided a necessary experience for understanding the different logics of territorial organisation that were recorded

[12] obtained through the kind collaboration of Ciprian Moldovan, lecturer, and Bogdan Eugen Dolean, PhD student, at the Geography Faculty of the Babes-Bolyai University of Cluj-Napoca

in historical maps. Through walking, other layers of territorial inscription became visible. The mapping of the territorial evolution of the Vișeu Valley introduces the agency of water in providing access to and in protecting the forest, as well as the agencies of other non-humans in shaping their living environment.

The quest for precision in mapping techniques is intrinsically linked to the military origin of map-making technologies. Through the entwinement of military technology and geographical mapping, exact coordinates are made to matter on a battle ground. With the evolution of satellite image precision, and the making available for research and commercial use of this technology, increasingly since the 1980s, it is possible today to show in real time how roads open new territories for extraction in the Amazon river basin as the platform Global Forest Watch discloses. Biemann and Tavares' research project on how the Amazonian forest was surveilled from the distance is indicative of the militarised origins of contemporary satellite image detection. Critics have questioned the precision of contemporary tele detection technologies, such as the ones obtained through the Corine Land Cover program. Hartel et al. (2015:69) point towards the misrepresentation of the heterogenous landscapes that constitute the edges of forested landscapes and the zones of scattered vegetation that integrate living, pastural, and agro-forestry practices. The critique of Erb et al. (2007) is directed towards the simplification of life in landscapes where human settlements cohabit with plant and animal kin in complex inter-dependent systems, fixing them in a few generalising categories. As already mentioned in *0. Encountering the Unknown (Introduction)*, Fig. 2. The Vișeu Valley, thinks through these critical lenses to introduce other categories for landscape analysis than the standard GIS interpretation categories. It groups together heterogenous landscapes in one category, while introducing forests in transition as a category of analysis.

2.4. Conclusion

Each one of the research methods discussed here offers a different view on the forest and the forested landscape. Through tracing the timber flows, a forest *becomes* a productive landscape. In order to *become* a productive landscape, the forest is constructed as such, through developing infrastructures for extraction. It *is* also a living territory for its more than human inhabitants, in continuous *becoming*. In discussing the difference between militarised mapping techniques used for colonisation and resource extraction and embodied ways of organising and mapping a territory for living I stressed the difference between these two ways of seeing the forest. The methodological discussions on precision in mapping and on the grid as a device that transcends human organisational forms are meant to question the over reliance on digital mapping technology. The double role of walking, as a constitutive practice to the mapping project, and as a form of *presence* within the landscape, *walking with* its inhabitants highlights it as a complementary and necessary research practice.

Part II. Forest encounters presents the forest from these multiple points of view: as a material for extraction, as a landscape constructed to increase productivity, and as a living space for a more than human community. The three constitutive chapters approach the forest using the three research methods introduced: *tracing timber flows*, *reading the palimpsest*, and *walking with*. They each differ from one another and from the view they offer of the forested landscape.

Part I. Theoretical encounters

The theoretical encounters presented here uncover valuable concepts for the study of forested landscapes. The interdisciplinary approach brings together architecture and urbanism concepts, along side anthropological research, contemporary scientific findings in plant biology and ecology, and legal studies. Together, they engage the forest as a production landscape, created by capitalist-colonial extractive projects, as a collective body of trees and a being co-inhabiting the Earth with us, and as a landscape that has been and is part of the urbanisation process at planetary, regional and local scales.

Chapter 3. Shifting production landscapes looks into the transformation of forested landscapes into production landscapes driven by capitalist extractive projects. I argue that capitalist extractive projects have and still are altering forested landscapes as they enter the specific spaces they have created to enable continuous production: the space of the plantation, the space of capitalist advancement at the frontier, and the space of international regulations. I explore the creation of the plantation in central European landscapes in the late XIXth century through the separation of landscapes into agricultural and forest landscapes and the intensification of production. Looking into the advancement of the capitalist colonial frontier into the American landscape in the XIXth century, I trace the model of opening new resource frontiers accompanied with the introduction of plantation landscapes that persists through present time. With the changes in business model in the 1970^{s}, and the establishment of supply chains, the rise of an environmental consciousness in Western, developed states, I look into the effects of timber production landscapes being displaced at planetary scale. Particularly the late creation of international regulatory bodies for the timber market in the early 1990^{s} is of interest as an emerging mechanism shaping the planetary forest landscape.

Chapter 4. Shifting consciousness on forested landscapes explores how, in the Western scientific paradigm an awareness of the forest as an important planetary body is emerging and how seeing the forest as another being inhabiting the Earth is changing policy and governance within forested territories. I look into the implications of recognising forests as beings and granting them legal rights and the ways the concept of the rights of nature, emerging in environmental law in the 1970^{s}, are being applied now in particular settings relating to social and climate justice. Through discussing the heterogeneity of the Australian bush landscape, the shifting patterns of human inhabitation and land use of the Białowieża forest in Europe and the reevaluation of human intervention in the American wilderness landscapes, I introduce differing ways of seeing the relation between humans and forests as disturbance and inter-action in modern Western imaginaries and inter-dependency in indigenous world views. The chapter concludes with a nuanced discussion on the planetary forest landscape based on maps extracted from the globalforestwatch.org platform highlighting the inherent dynamics within the forested landscape. Through exploring these

themes and landscapes I propose to look at the forest as a being, a body endowed with intelligence, and to shift the focus from separating forested and urbanised landscapes towards looking at the landscapes we inhabit as forested landscapes. At the planetary scale, it appears we are inhabiting vast forested landscapes.

Chapter 5. Shifting paradigms on urbanisation landscapes looks into urbanisation beyond the urban, the concepts and design practices architects, urbanists and landscape designers have employed to study and design with the landscape. The exploration of such concepts and practices is meant to introduce design approaches to the forested landscapes as a living space. Three concepts emerge as important in guiding further study and intervention into forested landscapes: the horizontality of the urbanisation process through the expansion of infrastructural networks, the conception of infrastructure beyond the civil engineering imaginary towards considering the landscape as an infrastructure in supporting collective life, and the cosmopolitical dimension of the landscape as a more than human landscape. While the practices and research projects mentioned approach not only forested landscapes but also water landscapes, river deltas and coastline shores, they introduce emerging approaches to landscape design in urbanism, landscape urbanism and ecological design thinking. As presented in 5.4. Forest urbanism, the forest is becoming an interesting space and design tool for architects and urbanists.

3. Shifting production landscapes

The emergence of planetary resource flows is intimately tied with colonial expansion, capitalist-extractive projects and the displacement of people, plants and animals seen as either resources, or things standing in the way of the colonisation project. In his latest book, “Down to Earth” (2018:10) Bruno Latour links the massive displacement of humans, plants, animals and microorganisms with changes in climatic regimes. Implicit in Latour’s text is an understanding of climate as referring to both the physicochemical processes that regulate microclimates at regional scale and the politico-economic processes that regulate socio-ecological territories. While both of these phenomena displace not only humans but also non-humans and more than human phenomena that are in search of new ground to settle, Latour proposes (2018:40) “the Terrestrial as a new political actor”, acting outside the tension between the local and the global. This chapter looks into the ways in which capitalist extractive projects have advanced within the Terrestrial through the creation of their own spaces, all the while changing landscapes, political regimes and creating virtual spaces of resource flows, while displacing trees, people, soil and other inhabitants of the Terrestrial. Specific to the forested landscape and the ways in which it was and still is engaged into capitalist extractive projects is the creation of the space of the plantation, of the frontier and of international regulations. Beginning from the late XIXth century, these spaces have multiplied at the planetary scale.

3.1. The plantation presents a brief account of the introduction of plantation landscapes and of the transformation of the European forested landscapes into real life laboratory spaces for the cultivation of single-species forests during the XIXth century. The process of transformation attests to an artificialisation of the landscape with the introduction of selected species in specific formations and landscapes. The account introduces the European forested landscape as a hybrid landscape, a mix between plantations and naturally forested landscapes.

3.2. The frontier looks into the ways the space of the plantation has replaced diverse, multi-species, multi-age and poly-cultured forested landscapes with the capitalist colonial advancement into what have been conceptualised as frontier territories. With this, I revisit the concept of the frontier as a violent place of capitalist advancement, and as a space of exchange of material goods, knowledge and ideas. Looking at the ways in which capitalist colonial projects have, in the last 50 years, continued operating within frontier territories, specifically at the tropics, I follow the shift in business models from local supply towards the creation of supply chains at planetary scale.

3.3. An environmental consciousness evaluates the consequences of frontier development in the last 50 years, looking into the way in which resource extractive territories created through frontier development have come into visibility in the western developed world and the discourses they have enabled.

3.4. Infrastructure space discusses the late introduction of regulatory instruments for the timber market in the early 1990s, as a consequence of environmental and sustainability concerns raised by the expansion of timber extraction landscapes into tropical forest landscapes starting from the 1970s.

3.1. Plantation landscapes

Though at the scientific level there is a debate on whether or not the European continent was fully covered with forests in a point in time when there was no record of human inhabitation, scientific findings suggest that it has always been a heterogenous landscape mixing forests, woods and wooded lands with single trees on grasslands (Kirby and Watkins 2015:39). The settling of this debate has profound implications on how Europeans have used and altered the continental landscape and its nearby islands. While conceiving of a spiritual relation with the forest is more referenced today as an indigenous practice outside of Europe, Letham (in Kirby and Watkins ed. 2015:309-310) argues Europeans entertained a spiritual connection with forested landscapes as life giving landscapes, actually supporting life, through their use by villagers as a place to forage for wild and medicinal plants, to cultivate certain species of plants, to gather honey and have animals graze in them. Before modern conservation practices, a spiritual connection with the forest served to safeguard the forests' wellbeing and life, protecting it from being felled (idem). Use of lands implied forms of management that favoured activities and species. In many cultivated forest landscapes orchard and forest intertwined with each other as villagers selected and planted fruit trees (Hartel, Plieninger, Varga in Kirby and Watkins ed. 2015:63). The free use of forested landscapes was restricted by the reach of the early modern states as forests started to be reserved as hunting grounds for the nobility. Many contemporary protected forests in Europe derive from former hunting grounds (Letham in Kirby and Watkins ed. 2015:310). Managing a forest as a hunting ground implied the artificial increase of animal populations and the elimination of animal predators competing with human ruling classes (Latałowa et al. in Kirby and Watkins ed. 2015:254).

With the extended reach of modern state power that aimed to maximise its revenues, forests and other landscapes were mapped, measured and ultimately transformed in order to extract the calculated revenue. Scott's (1999:11-36) account of the development of technologies of government that aimed to calculate and extract revenue in terms of natural

resources from the landscapes and income tax from its inhabitants suggests that first the European and then the global landscapes were simplified and transformed into real life laboratory spaces for techno-scientific government. In his account, European forest government techniques developed in conjunction with scientific forestry in the late XVIIIth century Prussia and Saxony, as the Habsburg empire extended its fiscal apparatus to calculate the revenue in timber of a fore (Scott 1999:14). The calculation method developed extracted trees out of the complex forest ecosystem and categorised them according to age (idem). The view of the forest the newly made tables allowed became the grounds for the transformation of the real life forest into a plantation forest. With the plantation, the standard tree, the "normalbaum" (Scott 1999:15), was invented and replicated in straight lines through planting. As Scott (1999:18) argues, the elimination of the complex forest ecosystem in which trees would mature into old age created the laboratory conditions where individual species and the effects of fertilisers, insecticides and biocides could be studied. The plantation forest offered occasions to perfect the science of forestry as the second generation plantations did not grow as expected, and German foresters developed "forest hygiene" as a technique to promote the healthy growth of standard trees (Scott 1999:21).

Beginning from the second half of the 19th century, as forestry established itself as a scientific discipline and a practice, the mixed-use heterogenous European landscape where forestry and agricultural practices cohabited was separated into single-use forest land and agricultural land (Hartel, Plieninger and Varga in Kirby and Watkins ed. 2015:65-68). Throughout the 19th century and early 20th century, European forests emerged in forest engineers' thinking as intensified timber production landscapes for the realisation of which agricultural practices were banned from them (Hartel, Plieninger and Varga in Kirby and Watkins ed. 2015:66-68). The 19th and 20th century saw the realisation of such visions as forest landscapes were transformed through the introduction of single species plantations within centuries old forested landscapes, maximising timber production (Savil in Kirby and Watkins ed. 2015:98-101). The spread of the plantation across the European landscape in the XIXth century transformed both forested and a-forested landscapes. Plantations of Scottish Spruce and Nordic Pine replaced in part old-growth beech forests and were introduced in a-forested lands and soils with low productivity in Hungary and in the coastal countries (the United Kingdom, Belgium, Denmark, the Netherlands) (Savil in Kiriby and Watkins ed. 2015:99). Pine and Spruce were preferred as they could be replicated in a standardised manner even in poor soils, could be harvested a younger age than broadleaved species and grew uniform trunks that concentrated the timber mass (Savil in Kiriby and Watkins ed. 2015:100-101). In the coastal landscapes of Spain and Portugal, fast growing eucalyptus plantations were preferred (idem). What we are seeing now in Europe are the plantation landscapes we have inherited from the XVIIIth through the XXth centuries of forest management (Savil in Kirby and Watkins ed. 2015:103).

The effects of this “artificialisation” of the forest landscape emerge at the end of the XXth century and beginning of the XXIst century, as plantation landscapes are increasingly vulnerable to pest attacks and extreme weather events. Contemporary forest research envisages a reconsideration of the single species plantation landscape towards a multi-species resilient landscape.

3.2. Frontier landscapes

William Cronon’s (1992) account of the urbanisation of the American mid west and the rise of Chicago as a city of exchange is indicative of the advancement of capitalist-colonial expansion at the frontier. The advancement of urbanisation in the American landscape was paralleled by the shifting of production landscapes that were opened for extraction and exploitation. Through Cronon’s account, the concept of the frontier references both colonial expansion in the form of urbanisation and the introduction of crop plantation landscapes, and the exchange of resources, some of which were timber, but also ideas. The model of frontier expansion has been carried forward into the 1970s and 1980s, as new extraction landscapes were opened at planetary scale, particularly in East Asia (Indonesia) in conjunction with the emergence of an environmental consciousness among Western citizens and the transformation of business models into supply-chain businesses.

The concept of the frontier was first proposed by American historian Frederick Jackson Turner in 1893 as a way to justify the colonial expansion and the transformations it engendered into a landscape that was seen as free to occupy, exploit and urbanise (Cronon 1992:31). Colonial expansion, and the advancement of the British/European civilisation into indigenous lands was praised by Turner as the source of energy that fuelled American individualism and its political democracy (Cronon 1992:31) As such, the frontier is a problematic term (Cronon 1992:xvii) that was invented to create the image of the Great West as a place of colonisation. In Cronon’s account, the Great West was merely an image, a ghost of a promised land that was never there and was never theirs to take, its dismantling standing as testimony to its ghostliness. Nevertheless, the frontier altered the territory it encountered in an unprecedented way, it completely changed the relationship between people and land as it exploited land, its resources and the people that inhabited it.

Through Cronon’s account of the frontier is a place of exchange as it was first a place of trade between indigenous nations and European nations. Its expansion brought the advancement of the capitalist market into Indigenous territories. Indigenous trade was a constitutive part of the frontier, but not all things were marketable. Land was and still is not a product to trade with, in Indigenous world views, as it was not something one could own

(Cronon 1992:53, Brash 2011). With the advancement of the frontier, land entered the capitalist market as it was occupied. Cronon recounts on how speculation on land became a method of growth for emerging urban centres in the newly established frontier cities that occupied expanding resource hinterlands (Cronon 1992:35-37), and how the landscape was altered through the building of the railway (Cronon 1992:56-73). The prairie landscape of wagons and canal boats was transformed into farmland and connected to the city through roads and railways. The white pine forests bordering the Michigan lake were logged to build farms and enclose their lands. A vast proportion of them reached the urbanising East Coast as the railway connecting Chicago and New York was built (Cronon 1992:148-153). As the forest and prairie landscapes were transformed into farmland, the frontier advanced, at once opening new territories for timber extraction and making available larger surfaces of land for extending the European model of agricultural cultivation. With it, single crop plantations replaced incredibly complex, vast, heterogenous landscapes that were being cared for by indigenous nations. The environment was simplified (Cronon 1992:154) to meet expanding market demands. Chicago's growing hinterland intensified the trading of grains, timber and meat in the city, as technological innovations and a simplification of exchange transformed objects into liquid flows that moved along conveyor belts and railroads (Cronon 1992:154). The story of Chicago's rise along with the making of its hinterland was further reproduced along the advancement of the frontier. With the exhaustion of the white pine forests, the logging industry moved to the Pacific Northwest to Douglas fir and south to yellow pine by the end of the 19th century. (Cronon 1992:376) The concentration of trade and resources in the metropolis of the 19th century dispersed into its territory by the mid 20th century as the city expanded into a diffuse urban-rural territory (Cronon 1992:377).

After the second World War, the transformation of forested landscapes into plantation landscapes in the United States, and not only, ensued as an industrialised landscape project subjected to the management guidelines of scientific forestry. During the 1950s and with the entering of American timber on the Japanese market in the late 1960s, the Pacific Northwest coast of the United States was logged of its remaining standing old trees under industrially managed forestry (Tsing 2015:209-210). For a brief 30 to 40 years, industrially produced timber was traded on the internal United States market, while the global timber market was opening (Berlik, Kittredge and Foster 2002). Domestic consumption of timber decreased with the rise of an environmental awareness among United States citizens (Berlik, Kittredge and Foster 2002) in the 1980s. Without a source of income from the timber they produced, the plantation forests were left unmanaged in the US as the costs of management became prohibitive. When left unmanaged plantation forests would succumb to disease and become unsuitable for further extraction and processing. An imbalance between production and consumption areas emerged at planetary scale, as production of timber in the US decreased with 70% throughout the 1980s and 1990s, while imports from Canada, South

America, South-east Asia, South Africa and Russia increased (Berlik, Kittredge and Foster 2002). This shift in production landscapes put pressure on previously inaccessible forests situated at the tropics or within the vicinity of the Arctic circle. Discussing the difficulties of encouraging a local timber market in Massachusetts, US, Mahoney (2019) decries that the increased environmental consciousness of the forest landscape has morphed into an ethics of preservation that protects the local forest from logging while shifting logging pressure to other geolocations.

In the 1970s and 1980s, trade in timber across the Pacific ocean was facilitated through a new business model of Asian / Japanese origins that outcompeted the United States and European models of organising the production of cheap goods in a concentrated location (Tsing 2012). Supply-chain capitalism emerged in the 1970s with the "financialisation of capital" (Arboleda 2019) that transformed global markets ever since. At a planetary scale, the flexibility of supply-chains, that does not depend on any one particular location, but can source goods from various places, has increased production rates and accelerated the "life projects" (Tsing 2012) of human, plant and animal species. To Tsing (2012), characteristic of supply-chain capitalism are strategies of "*stealing, foraging, or salvaging as resource procurement*" and "*independent contracting as labor".* Entangled in supply-chains, both legal and illegal activities co-exist (Tsing 2005:21).

The tropical forests of Indonesia were one of the landscapes that opened as a resource frontier for capitalist extraction during the 1970^{s}, as Japan started to supply its growing plywood industry with timber from South-East Asian territories and the Pacific Northwest coast of the United States (Tsing 2012, Tsing 2015:210). Anna Tsing's (2005) research into frontier capitalism in Indonesia exposes the transformation of complex socio-ecological landscapes, managed as a polyculture forest by villagers employing practices of rotation and succession of forests and settlement into the single species plantation landscapes that originated in the XIXth century European territories. After the savage extraction inherent in frontier capitalism, Indonesia built its plywood industry to rely on plantation landscapes in the 1980^{s} (Tsing 2012). With the opening of a frontier, as Tsing's research shows, the scramble for resources occurs also regarding underground resources. As she recounts, in the 1990^{s} underground resources in Indonesian forests became interesting for mining companies. Tsing's view of the frontier is as a space where not only resources are exchanged, but also knowledge. In her account, conservation ethics and environmental awareness also travelled to and from Indonesia, as local village heads made alliances with international travellers and environmental NGO's to salvage their livelihoods and the forests that were their homes (Tsing 2005).

The transformations of plantation landscapes and of capitalist business models offer unintended and interesting conditions for thriving. The thriving of a species of mushroom in unmanaged, post-industrial plantation landscapes offers itself as a new way of envisaging the evolution of life in post-extractive contexts. Anna Tsing's (2015) research into the thriving of Matsutake mushrooms in the abandoned pine plantations of the Pacific Northwest coast of the United States presents the links established across the Pacific ocean and the parallel evolution of plantation landscapes in Japan and the United States. The Matsutake mushrooms are a Japanese culinary delicacy that used to grow in the peasant managed forests of Japan throughout centuries. As these have been replaced with plantation landscapes in the 1950s and 1960s, the mushroom has disappeared from the landscape. During the 1990s, it emerged on the Pacific Northwest coast of the United States in plantation forests. The specificity of the conditions for this mushroom to thrive defy any attempt to grow it in laboratory conditions. Instead, it needs vast forested landscapes with a certain amount of disturbance before it can sprout a fruiting body after 40 to 60 years. It suited perfectly the decayed plantations of the Pacific Northwest coast of the United States where it sprouted in abundance since the 1990s. Tsing's (2015) enquiry into the relations of the Matsutake mushroom with landscapes, trees, foragers, buyers, Japanese businessmen and gourmands is indicative for how capitalism operates through what she terms as cycles of ruination. It also offers a glimpse into a form of freedom within capitalist ruins for specific life forms such as mushrooms, and for people fallen out of the capitalist system or driven out of their living environment. American war veterans escaping trauma and Asian immigrants fleeing war zones co-habit the Pacific Northwest forests along with the Matsutake mushrooms they forage. Her research shows that there is some form of life beyond the capitalist system, emerging in its ruins.

3.3. An environmental consciousness

As already mentioned, an environmental consciousness emerged during the 1970s and 1980s in the United States and it spread throughout the planetary landscape through exchange at the frontier. This paralleled the shift in production landscapes that the opening of new frontier landscapes and the restructuring of the global financing allowed. The examples of the American and Indonesian frontier landscapes show that the exchange of knowledge across the frontier allowed for a more conscious consideration of the relation between production and consumer landscapes, and a deeper understanding of the intimate relation between forest, people and their livelihoods. At the same time, outside of the exchange space enabled by the frontier, the consumer landscape of the United States in particular, the rising environmental consciousness became a tool that purified the consumer landscape of what it did not want to see. As production landscapes were relegated to

distant extra-territorial locations scientists and artists developed practices to retrieve these landscapes into the public consciousness.

With the development of remote sensing technology for the analysis of satellite images, the forest has emerged as a subject of public concern as deforestation landscapes have been exposed within the planet's largest forested territories (Mayeux et al. 2005). The development of satellite technology has made visible the advancement of plantation landscapes for agricultural mono-crop cultivation, as well as the spreading of urbanisation patterns along newly opened roads in the Amazon rainforest. An understanding of deforestation through remote sensing technology alone is, however, imprecise (Mayeuz et al. 2005). The juridical and economic aspects involved in deforestation that effectively legalise land use change and the socio-ecological aspects of life within forested territories present more complex and larger phenomena at play. Particularly in the Amazon rainforest, the history of state violence against indigenous populations is intertwined with the extension of modern urbanisation in the forest landscape (see Tavares 2013(a)). Contemporary struggles in the Amazon are driven by the descendants of indigenous tribes and the afro-descendants of slave labourers that have historically found refuge in the forest and with which they have cultivated a multi-dimensional relation as a spiritual space and a place that nourishes and heals them, where they gather and cultivate food and medicine[13].

From the distance of a person living in the global consumer landscapes, the ruination of post-industrial landscapes presented by Anna Tsing and the socio-environmental struggles enfolding in distant territories gain visibility only through specific media channels and artistic practices. Since the 1990s, emerging artistic practices sought to break with the image as the unit of artistic production and redirected their gaze towards the production process (Roberts 2012). Through his series of works documenting the ocean as an industrialised extractive landscape, photographer Allan Sekula brought into visibility the ocean as a space of industrialised production. His photography documented the extractive operations and the working conditions of the global supply-chains of the fishing industry. Though initially marginal in the art field itself, Sekula's practice inscribes itself among artistic practices that were turning towards the production process obscured by the proliferation of images (Roberts 2012). Ursula Bieman's and Paulo Tavares' Forest Law (2014) documents the multi-dimensional relation of the Sarayaku people with the forest on their lands in the Amazon rainforest and their legal struggle against extractive industries. Through the documentation of the legal battle that the community pursued against an extractive company violating their lands, their spiritual relation with the forest through the connections they establish between their body and the body of the forest gains legal and artistic visibility.

[13] see Rainforest Defenders. Open Democracy. June-July 2019. https://www.opendemocracy.net/en/democraciaabierta/rainforest-defenders/ Accessed 10.12.2021.

Particularly in the western space of global capitalism, the consciousness of changing environmental conditions and the focus on the forest as the creator of the environment through its capacity to retain carbon while perspiring oxygen has fuelled contemporary debates into the implications and required actions of an impeding climatic catastrophe. The following section, *3.4. "Infrastructure space"* will present the extra-territorial government instruments that are shaping the planetary forest landscape in an effort to address deforestation and illegal logging. While forests are designed spaces, through various management techniques and relationships with consumer markets (Mahoney in Hutton, Moe, Ibañez ed. 2018:28-31), but also values (Smachylo in Hutton, Moe, Ibañez ed. 2018:67-62), the attempts at regulating carbon emissions through the regulation of the forest cover are equally shaping the global forest landscape. As Easterling (2014:34) indicates, virtual carbon trading markets regulate forest landscapes. Erik Swyngedouw's (2010) critique on the focus on the carbon molecule's presence in the atmosphere as an indicator of climatic change addresses the shift in focus from capitalist forms of exploitation of both people and nature towards the construction of complex techno-managerial apparatuses designed at maintaining the status-quo. "Environmental populism", as he names it, orchestrates the construction of techno-managerial governance outside democratic processes, as it addresses the potential victims of an impeding ecological catastrophe instead of addressing political subjects in their own rights. While climate change is debated at planetary scale, changing climate is felt at the territorial scale where the micro-climates of specific landscapes are changing due to landscape transformations. The deforestation of coastal areas and the advancement of deforestation in the in-land territories interrupt continental water cycles that depend on the continuity of forested landscapes. Carbon storing as a financial instrument in the face of climate change only increases global inequalities. As Letham (in Kirby and Watkins ed. 2015:313) notes, there is a correlation between a low GDP and a high value of the timber market, further accentuating the extractive landscapes of planetary urbanisation.

3.4. "Infrastructure space" (Easterling 2014)

Although timber trade has co-evolved with the trade of other resources, such as grain, the establishment of regulatory bodies, that for grain happened in the XIXth century, as Cronon (1992) recounts, are only happening since the 1990^{s} for timber. In the XIXth century, The Chicago Board of Trade rose to prominence with the increase of grain exports during the Crimea War (1856), as it introduced standards for grains and was particularly instrumental in managing market collapses due to speculations on the virtual market that did not match the real grain stock (see Cronon 1992:111-119). Timber exports, on the other hand, have been some of the least recorded among industries (Savil in Kirby and Watkins 2015:93).

Keller Easterling's (2014:19) concept of an "infrastructure space" addresses the extra-territorial forms of government that give rise to spaces outside state control where resources can flow free from their socio-ecological relations. In her account, the "infrastructure space" is both the space where specially designated urban development zones emerge in the sea and in the desert, designed for specific business communities that can afford them, as well as the space of international standards for products in the form of certification schemes that guarantee that a certain process was followed in their production and sourcing (Easterling 2014:25-32. The "infrastructure space" shapes the landscapes of production and consumption. The "infrastructure space" is a space of uncertainty, where a landscape of risk mitigation emerges. Risk landscapes emerge in the gaps opened by deregulation or ill regulated territories. While the state aspires to cover its whole territory, global regulatory mechanisms leave blank spaces outside of regulation where illegal and illicit trade can proliferate. These landscapes make business strategies possible that are specifically oriented towards profiting from the unregulated spaces where illegal activity proliferates. The example of sand trade in the Asian Pacific region is one where urban expansion and economic growth proliferate in the gaps opened by regulations and the difference between state control and territorial opportunities. Milica Topalovic's (Yabuka and Topalovic 2014) research into Singapore's outsourcing of production landscapes since the 1970s, for water, sand, food, energy and labour, takes a wider look at the relation between intensified urbanisation within the city-state island and the urbanisation processes of its resource hinterlands. Particularly the relation between land and sea proved to be important in the way the sea historically provided a pathway for the movement of people and goods between mainland and islands, a relation that is shaping Singapore's regional status as a metropolis. The urbanisation of the sea through land reclamation as happens in Singapore and Malaysia, to name but a few examples, is creating the conditions for a dramatically different territorial expansion strategy than the opening of new frontier landscapes, a "de facto transfer of territory from other territories" (Comaroff 2014). As Comaroff (2014) presents, the trade of sand to Singapore, protected by state secrecy, is sourced from neighbouring countries through potentially illicit networks navigating the political landscapes of countries that have placed a ban on sand exports (Malaysia, Indonesia, Vietnam, Cambodia) and the countries that have not done so (the Philippines and Myanmar). In his account, sand storages are deliberately extracted out of the state territory, under special security, and "taken off the map", creating an extra-territorial space of resource accumulation.

Until after the Second World War, the recorded history of timber trade was primarily a European affair, as the first European Timber Statistics 1913-1950, published by the UN-FAO in Geneva in 1953 shows. Timber transportation in Europe, as in the United States happened on water ways until the construction of the railway at the end of the XIXth century,

beginning of the XXth. With the construction of the railway, the transportation of timber logs on waterways was banned across Europe and the United States. Logs continued to be sent by water only in the most remote landscapes, like in parts of the Carpathian mountains where the practice persisted until the 1950^{s} and 1960^{s} (see Ţelman 2008:58-64), and even then only until they reached the nearest railway. During the XXth century, timber extraction became mechanised across the European landscape while light railways specifically designed for timber transportation were constructed across the Carpathian mountains reaching the depths of the forests.

While assembling a post World War II global economy, The European Timber Statistics 1913-1950 was the first record of timber production, domestic consumption and international trade that gathered in retrospect data from 1913 to 1950 based on country reports and estimates. Due to the lack of data, it excluded the periods of the First and the Second World Wars (1914-1919 / 1939-1945). The way this Euro-centric statistic was assembled, it classified a group A of European countries which primarily imported timber products, and a group B of European countries which primarily exported timber and its products. Group A comprises the maritime countries of Western Europe, while Group B comprises the nordic countries where the boreal forests are situated, Norway, Sweden, Finland, and the countries that host the forests of the Carpathian mountains, the Austro-Hungarian Empire, Poland, Czechoslovakia, Austria, Yugoslavia, Romania. Next to intra-continental relations, trade partners of European countries during 1913-1950 involved the import of timber logs form the Russian Empire / the USSR, the US and Canada and the export of timber products to Estonia, Lithuania and Latvia, on the continent, and Syria, Lebanon, Palestine/Israel, Egypt and French North Africa across the Mediterranean sea. The statistics are consistent with the development of timber processing technologies and the appearance of new products, as well as with the industrial needs of countries with low timber production that supplied their domestic markets with imports. The maritime countries of Western Europe imported a growing quantity of pitprops for mines, processed wood as plywood and veneer, and pulpwood for paper production and newsprint. Towards the end of the 1930s and throughout the 1940s, hardboard and insulating board from the nordic countries had made their trade routes to Western Europe. In this statistic the intra-continental production landscapes of the European economy is evidenced in the boreal forests of northern Europe and the forests of the Carpathian mountains.

Post World War II economics relied on timber production landscapes for the paying off of war debts in the 1950s and 1960s. The specialisation of the economy on differentiated industrialised sectors implied that until the 1970s natural resources were mostly capitalised on internal markets, in an effort to rebuild what the war had destroyed. With the shift in economic model from the American to the Asian / Japanese model, and the emergence of

an environmental consciousness in Western countries, resource outsourcing became an economic strategy in the so-called developed countries. These shifts, along with the exposure of vast deforestation landscapes where illicit and illegal activities co-exist in the 1980s and 1990s, have forwarded forest loss as a matter of concern in the global political arena. The 1992 Rio Summit, where an environmental awareness was confronted to the extraction projects that fuel urban expansion and territorial transformation, was concluded with, among others, a set of forest management principles that were, however, non-legally binding. They contributed to the development of an international debate on the faith of forests, but they had little application into territory and actually existing forests. The establishment of regulatory bodies on timber trade created the "infrastructure space" for contemporary timber flows in the early 1990s, in the backdrop of what was considered not satisfactory political engagement. The 1993 Forest Stewardship Council was specifically founded as a regulatory body to supplement this lack of decisive political action through the certification of businesses involved in timber supply chains[14]. Since then, it grew to diversify its certification products to both businesses and forested territories. Since the 1990s, some countries also adopted legislation to trace timber through the market and minimise illegal sourcing. The 2008 amended Lacey Act of the United States is considered to be the first piece of legislation adopted at a global level prohibiting the trade in illegally sourced timber. It extends the prohibition of wildlife trade instituted through the initial 1900 law, to plant species, including trees[15]. The European Forest Law Enforcement, Government and Trade / EUFLEGT (2003) initiative and action plan, out of which the FLEGT (2007) international cooperation scheme and the European Timber Regulation (Regulation no. 995 adopted by the European Parliament in 2010) emerged is considered unique in the landscape of timber regulations through its timber tracing system aimed at tracking the flow of timber since its first economic transaction on the market. In 2012, Australia adopted the Australian Illegal Logging Prohibition Act and in 2016 Japan adopted a very controversial legislation promoting the use of legally sourced timber through instituting a voluntary tracing mechanism. The 2018 negotiations for a trade agreement between the European Union and Japan have been critiqued precisely for offering Japanese companies an "unfair competitive advantage" in trading illegally sourced timber.[16]

The difference between independent market regulations and country specific regulations resides in the consequences of illegal and illicit activity. While at the level of the state, the consequences for illegally sourcing timber are in the legal domain, as charges can be made,

[14] Forest Stewardship Council. *Our history. From Roots to Forest Canopy.* https://fsc.org/en/our-history Accessed 21.02.2020.

[15] "All you need to know about the US Lacey Act, the EU Timber Regulation, and the Australian Illegal Logging Prohibition Bill" download from http://europa.eu. Accessed 21.02.2020.

[16] Fournier, Perrine. EU-Japan free trade deal threatens the fight for legal timber. 12 Sept 2018. https://www.euractiv.com/section/energy-environment/opinion/eu-japan-free-trade-deal-threatens-the-fight-for-legal-timber/ Accessed 21.02.2020

fines can be applied and people can be convicted, at the level of business regulations, the consequences are in the public domain, contributing to or affecting the image of a business. While the legal can aspire to regain what was unlawfully appropriated, independent regulatory bodies can not. As timber flows through the infrastructure space of international regulations, differentiated consumer landscapes emerge, where ethical and non-ethical practices make the difference.

3.5. Conclusion

This chapter has looked into the creation of specific spaces that have enabled timber flows to reach the planetary scale. From the creation of the plantation as a laboratory like space in real life setting where increasing quantities of timber could be produced for industrial production in late XVIIIth century, to the opening of new resource territories at the frontier space of capitalist colonial expansion where plantation spaces could be replicated throughout the XIXth and XXth centuries, and the late inscription of timber flows within the space of international regulations in the early 1990^{s}, I have looked at the ways in which these spaces have and continue to transform forested landscapes. The profound transformations of landscapes for intense production in the form of plantation landscapes replacing incredibly complex and diverse ecosystems with a simplified version of a single crop plantation have altered the planetary terrain as well as the planetary atmosphere. The hybrid conditions they have fostered speak about an artificialisation of the planetary terrain, a condition, nevertheless incomplete, and where the possibilities of life thriving in the “capitalist ruins” (see Tsing 2015) still exists. The alteration of the planetary forest landscape has come with changes in the water regime, the fire regime, and the physicochemical composition of the atmosphere.

4. Shifting consciousness on forested landscapes

Contemporary society has normalised a set of images of the forest, while at the same time erasing the evolutionary histories of forested landscapes. With the advancement of the capitalist-colonial frontier, the complex inter-dependency between humans and forests has fallen on the "modernisation front" (Latour 2013:22). The capitalist-colonial economy has completely transformed ways of life that were and to some extent still are land-based and for whom forested territories are a home. The most circulated images of the forest we have are those of a resource extraction site, of a recreational site, and of a wild place, untouched by human hands. As has been previously argued, the separation between forests and human settlements where the cultivation of crops on plantation landscapes has become the primary form of human inhabitation has occurred throughout the XIXth and XXth centuries, with the introduction of scientific forestry and the intensification of agricultural cultivation in Europe. In his latest book, "Against the Grain", James Scott (2017) opposes the view that human settlement and agricultural land cultivation through crop plantation is "the" civilising act of humanity, and shows that throughout evolutionary history, this way of life was not the dominant one, but because it made itself present in archeological findings, modern history has reconstructed the evolution of civilisation based on these findings (Scott 2017:8-12).

How to conceive of the forest as integral to humanity and to our survival on this planet is a contemporary challenge. Conceiving of the forest as part of our home and naming the threads of interdependency that connect us and the forest requires changing these normalised images. At stake are our abilities to inhabit the planet together, and to inhabit the forest once more. In philosophical thought, the separation between forests and human inhabitation patterns has been pursued at the expense of the different meanings ecology and economy have acquired in modern science. Though the two ways of looking at forests as either through an economical lens or through an ecological lens stand apart in contemporary scientific practice and popular understanding, the meanings of ecology and economy are intrinsically linked through their root, "Oikos", the greek word for home (Latour 2004:131). In modern scientific practice, the concept of economy has preceded the concept of ecology by centuries. Foucault traces the evolution of the concept of "economy" to the economy of a household as a foundational principle in XVIth century Italian philosophy (Foucault 2006). Ecology, on the other hand emerged in the late XIXth century and early XXth century as biologists attempted to explain the relations between animal and plant species in their natural environment. To look at the forest in an ecological way, in order to conceive of a new economy as a way of life (Gibson-Graham and Miller 2015) is a requisite of change in our contemporary society. This chapter looks into three threads of investigation that aim to reconsider the normalised images of the forest.

4.1. Forest intelligence: from trees to forest bodies looks into contemporary scientific debates in the field of plant communication and forest ecology that are increasingly providing evidence for individual and collective intelligence among plants. Recognising plants as intelligent beings, endowed with the capacity to think, to have a memory of past events and to learn from their experiences comes with an ethical obligation to grant them equal rights as human beings have. In western scientific knowledge, this recognition remains, however, confined to philosophical thought and the sciences of plant biology and ecology. Recognising trees and forests as beings invites for more care towards them and the cycles of life that sustain them and us.

4.2. Forest governance: from inter-action to inter-dependency further elaborates on the implications of granting plants and other non-human bodies legal rights. As will be presented, the emergence of the rights of nature in both philosophical thought and legal practice is redefining the structures of government of natural landscapes. Both indigenous ways of governing natural territories and modern, western ways of governing natural territories are presented. The two ways of government differ in conceiving of the relation between humans and landscapes. While indigenous forms of government view the relation with the landscape as an inter-dependent relation, where there is mutual exchange and reciprocity, western forms of government at their most successful in preserving and contributing to the diversity of life forms within natural landscapes have privileged collective organisation in the form of sharing of common resources.

4.3. Forest wilderness: between wild and managed presents the histories of three forested landscapes: the Białowieża forest in Europe, the Australian bush landscape and the United States Natural Parks. It challenges the images of the forest that dominate popular culture, and portray the forest at the extremes, between totally wild and totally managed (Peters 2018:18). Through these examples, what is now considered as wild forest landscape emerges as a landscape that has evolved through centuries of human intervention and non-intervention. On European soil, the Białowieża forest in contemporary Polish and Byelorussian territories has been identified as one of the oldest European forests, having withstood centuries of changing human inhabitation patterns. In the United States forested landscape, as well as in the Australian bush landscape, contemporary land management approaches are reintroducing indigenous land management techniques into landscapes particularly vulnerable to high intensity fires. Through the indigenous approach to management, the concept of land stewardship is redefining land management. Revisiting their histories, a multitude of forested landscapes emerge associated to multiple ways of

use. Beyond wild and managed, the forest is a heterogenous landscape, that varies in both space and time[17].

The chapter ends with visualising *The Planetary Forest Landscape (4.4)* through the maps offered by the globalforestwatch.org platform. The focus lies on understanding the inherent dynamic of the forested landscape beyond the fixing of forests into plantations and undisturbed, intact, natural landscapes.

4.1. Forest intelligence: from trees to forest bodies

Modern scientists are now becoming attuned to the language of nature, a language that generations of First Nations cultures have learned to listen and to respond to. Through this attuning, the modern paradigm on animal and plant species is changing. Evolving paradigms with a trans-disciplinary approach are converging with ancestral knowledge. They are no longer aiming to erase, but to integrate different systems of knowledge. One of the important pathways of scientific knowledge that are converging with ancestral knowledge is that of plant communication, that modern sciences have experimented with, since the XVIIIth century. New findings in both experimental settings and in real life forest environments are pointing towards the sentience of plant species, and trees in particular. That plants are sentient beings, and can be thought of as persons in their own rights is deeply ingrained in First Nations cultures inhabiting the Canadian forested landscapes (Simard 2017). The recognition of First Nations, their territories, world views and concepts as they converge with Western scientific paradigms is essential to dealing with the challenges posed by the change in climates, both political and environmental.

As researchers recount, the differences between the bodies of plants and those of animals and humans have been an obstacle in western science to conceive of plants as sentient beings and of their bodies as endowed with intelligence. Modern science treats the brain as the locus where human intelligence resides through the multitude of neuronal processes involved. However, as Gagliano (2018) underlines, the mind is “a powerful conceptual framework for exploring processes like memory, anticipation, awareness, decision-making and more”, all of which have been experimentally documented for plant as well as animal and human bodies. Beyond the difference between animal and plant bodies, the evolutionary history of plant development has distributed neural processes accounting for the formation of memory pathways, decision-making, environmental awareness and

[17] For an analysis of the evolution of the European forested landscape and the ways in which forest composition and use vary across history and throughout the forested landscape see Kirby and Watkins “The Forest Landscape Before Farming” in Kirby and Watkins ed. Europe’s Changing Woods and Forests: From Wildwood to Cultural Landscapes. Boston, MA: CAB International: 33-45) and Kirby and Watkins “Evolution of Modern Landscapes” in Kirby and Watkins ed. Europe’s Changing Woods and Forests: From Wildwood to Cultural Landscapes. Boston, MA: CAB International: 46-58.

awareness of other beings throughout their whole bodies (Mancuso 2018:5). Plants also have the ability to build communities, interconnected through underground fungal networks with their kin and non-kin neighbours (Simard 2018, Wohlleben 2016:25-26). Thinking of the intelligence of plants as residing their root system is an idea that also Charles and Francis Darwin entertained in 1880 with their hypothesis that the roots of plants function in an analogous way to the human brain (Simard 2018, Mancuso 2018:25). The fungal networks that connect individual plant species are called mycorrhiza, meaning fungal roots in latin. They are the underground bodies of forest mushrooms. Trees and mycorrhiza have a symbiotic and mutualistic relationship based on the exchange of nutrients (Simard 2017, 2018). It is such networks that make fruit the Matsutake mushrooms in the ruined forests of the Pacific Northwest coast of the United States. Plants communicate between them through underground networks, but also above the ground through scents containing chemical compounds to attract certain species they welcome, like pollinators, or to repel certain species threatening their bodily integrity (Wohlleben 2016:31-32).

Suzanne Simard's research into forest ecology and tree communication networks is paradigmatic for a field of knowledge that has evolved in scientific laboratory where plants have been isolated from their living environments and from human beings and their practices of care. Simard's (2018) forest experiments involved following the transmission of carbon molecules from one tree to another within a delimited plot in the forests of British Columbia in Canada. Paraphrasing Hayla and Dyke, Simard's team have listened to trees' speech. What she and her team have intercepted, represents but a fraction of the entire network that connect trees and plant species within a forest (Simard 2018). Modelling the pathways of communication, Simard's team have discovered that the networks they encountered are akin to what in neuroscience is termed a "scale-free network" (Simard 2018). Such networks, where old trees are highly connected between themselves and with younger ones provide the most efficient way for information and communication to travel, while their "*dynamic flexibility* […] *underlies the diverse intelligence present among humans and forests*" (Simard 2018). Through a trans-disciplinary approach, listening to First Nations stories about the way of life of indigenous people in the Canadian forested landscape, Simard's research offers an ecological understanding of the interconnectedness and interdependence between people, forests, salmon, bears and rivers. Her conception of the cycle of life that brings them together through processes of nutrient exchange and nutrient storage views the forest as a common home, where all species are part of a wider intelligent network. The older trees become a storage for nutrients centuries old through absorbing the decaying leftovers abandoned by bears feasting on salmon under their crown (Simard 2018). The salmon are themselves fed through the cycle of nutrients that enrich the waters where they swim as humans through the leftover salmons in the water to decay and feed aquatic life (Simard 2018). Nutrients from these trees, that Simard calls "mother trees" are further transmitted to

nurture the younger trees and the entire forest (Simard 2018). If this cycle of life is interrupted through logging particularly old trees, as has been the case in recent extraction history, this makes the whole forest vulnerable (Simard 2018).

To think of trees as sentient beings, and of forests as collective bodies interconnected through underground pathways of communication, helps visualise forests as greater than humans and see us humans as part of the cycle of life. The forest is, in many cases, older than the individual trees as sustained by underground mycorrhiza networks irrigating the soil. Mycorrhiza networks are among the largest organisms on Earth and can be thousands of years old (Wohlleben 2016:97-98). New life is infused through them. As older beings, forests have lived through major climatic changes and have adapted to survive. Even though each individual tree is different, and some individuals may be lost, the forest itself has withstood the challenge of time.

Inhabiting the landscape as trees and forest bodies do, is, in its own respect another form of being in the world, defined by Emanuele Coccia (2019:32-39) as “immersion”. As he recalls, a plant has no other way of being other than to be fully immersed in its environment (Coccia 2019:5), sensing its every change and responding to it in a particular way. As he further argues, the atmosphere which we all inhabit is made through the breath of plants (Coccia 2019:47-53). They are immersed in the air they breath. Through responding to day and night cycles when they bloom and rearrange their leaves, to seasonal changes when they come to life and when they shed their leaves, to the closeness and distancing of the moon when they draw water through their bodies, plants connect to both the earth through their rooting systems and to other celestial bodies. To be a plant is also to be a witness (Coccia 2019:5) to ever changing environmental conditions, to respond to and to experience life’s cycles of nurture and rest in one’s own rhythm of growth. The capacity to bear witness to one’s own life is linked in philosophy and psychology to the emergence of consciousness, of a becoming conscious of one’s actions in a given situation.

This way of being into the world that plants exhibit is paradigmatic for the way we think of intelligent networks and their formation from emerging collective bodies of knowledge (see Mancuso 2018:67-94). As Mancuso recounts, through their interconnected fungal partners, plants are capable of reaching great distances underground to acquire nutrients and information (Mancuso 2018:77). Research on plant communication is providing a scientific explanation on what it means for a forest to be resilient. Through centuries of nutrient exchange and knowledge formation, old trees, which for them means 700, 900 years of age or even beyond, are valuable as nutrient storages and as archives of our collective history. They are living knowledge and hold an abundance of nourishment feeding whole forests.

4.2. Forest governance: the emerging rights of nature

From a western philosophical perspective, the sentience of plants and their ability to be conscious, to think and process information entitles them to the quality of personhood and calls forth an ethical responsibility to grant them the same legal rights that humans enjoy (Gagliano 2018). While this is an emerging subject in western science and philosophy, the rights of nature have been formulated in legal scholarship in the 1940s and 1970s and current environmental law is mobilising them in practice (O'Donnell and Talbot-Jones 2018). In philosophical thought, Michelle Serres' "The Natural Contract" (1995) calls for the reconsideration of the social contract bonding human beings into a society through the expansion of the collective body of our society to include non-human beings.

The idea that nature and natural beings should benefit from rights inscribed in constitutional and / or civil law shifts the ground of territorial governance. With this shift, new actors belonging to what Latour (2018:40) termed "the terrestrial" enter the sphere of governance. So far, governance, in the modern acceptance of the term, has been a sphere reserved to human beings. Foucault's writings on the emergence of a governmentality accompanying the formation of the modern European state are indicative of such exclusivity (see Foucault 2006). Through the emergence of a European governmentality, territory, previously conceived of as a body (Corboz 1985) was sectioned into land as surface, nature as resource and human beings as governed subjects. As Foucault (2006) argues, the emergence of the population state in the European history of government, comprising the sum of its subjects, gave rise to a biopolitical rationality through which government actions directed towards the population were conducted in an indirect manner through actions within the subjects' living environment. In the XIXth century, when the population state was emerging, the term "milieu" emerged in physics and biology to designate an abstraction of the environment from its inhabiting beings (Foucault 2006). Foucault (2006) refers to the space of action of biopolitics as the "milieu", the abstracted space where a governmentality directs its actions. Throughout the XIXth and XXth centuries, a biopolitical rationality inscribed itself in territory as territory was abstracted in tables, charts and maps. With the banning of human agricultural activity from forested territories, a biopolitics inscribed itself in both the territories inhabited by human beings and in the territory inhabited by trees, forest beings. While charts, table and maps were drawn to account for the territories of expanding cities, the same were drawn to account for the territories of European forests. The evolution of cartography with the expanding reach of the empire states was instrumental in the extraction of the population and the abstraction of its living environment into functional landscapes to be used as forests, as crop cultivation lands or as cattle and sheep grazing landscapes.

The way governance was framed throughout history is a reflection of the way the relation between humans and nature was seen. In the early XIXth century European tradition, when the separation between human beings and natural beings laid the ground for the emergence of the modern state's technologies of government, the relation between humans and nature sought to attribute shaping agency to the natural environment (Katsikis 2014). By the end of the XIXth century, European thinkers shifted the paradigm towards attributing shaping agency to humans, irrespective of environmental conditions (Katsikis 2014). The technologies and the unprecedented alteration of the landscape through urbanisation in the XIXth century was proof to such capabilities. The history of geography indexes these lenses as determinism, possibilism and adaptationism (Katsikis 2014, Moran in Moran and Ostrom eds. 2005:10). In the XXth century, with the expanding technologies of the post world-war economy, geographers went further to support the idea that the human created environment was independent of the natural environment (Katsikis 2014).The 1970s debate on the limits of growth echoed Malthusian theories of the late XIXth century that viewed environmental degradation as a consequence of population growth (VanWey, Ostrom, and Meretsky in Moran and Ostrom eds. 2005:27). In other words, it portrayed people as lacking the intelligence to govern over their lands so as to make all living beings thrive. While de-growth movements have emerged out of this debate, in the scientific and political field, the advancement of theories concerning technological innovation, such as Boserup's 1980^{s} reviewing of technological change that intensified agricultural production in the second half of the XXth century pushed aside Malthusian arguments in favour of technological fixes (VanWey, Ostrom, and Meretsky in Moran and Ostrom eds. 2005:27-29). As the consequences of the massive landscape transformations that became state policy after the second world-war were making themselves present in environmental change, the dominating paradigms of the 1960s and 1980s receded while new paradigms were being advanced, seeing in these changes an inter-action between humans and the natural environment (Moran in Moran and Ostrom eds. 2005:8-12). Throughout the evolution of thinking of the relation between humans and nature, nature was objectified, dispossessed of its 'being'.

When 'nature' becomes 'being', *the affirmation of the rights of nature* shifts a governmentality directed towards a collective of human subjects to a governmentality directed towards a collective subject comprising human and natural beings. As O'Donnell and Talbot-Jones (2018) present, there have been two pathways through which nature has been given rights at the beginning of the 21st century. One pathway has been walked by First Nation people through their interlinked social and environmental struggles to reclaim and restore their ancestral lands. As a result, a general recognition of nature as mother nature has been inscribed in the constitution of several states - Ecuador (2008), Bolivia (2010) and some of the States in the United States (2014) (O'Donnell and Talbot-Jones

2018). The emergence of the rights of nature in legislation in these countries is indebted to indigenous communities who have transmitted through generations a world view that recognises land as a nurturing being. The indigenous world view sees the relation between human and non-human beings as an inter-dependent relation based on mutualistic respect and reciprocity (O'Donnell and Talbot-Jones, 2018). This kind of inter-dependency is seen as dependency in Western and European thought (O'Donnell and Talbot-Jones, 2018). Such a view pervades international policy, including that of the UN[18], which makes direct reference to the dependence of local communities on forest resources rather than stressing the interdependence of all beings to the environment that sustains us. From this perspective, the emergence of nature's rights in constitutional law is a cornerstone for transforming the relation with nature from one of resource exploitation to one of mutualistic respect and reciprocal exchange. The other pathway has led to the recognition of nature's rights in the deepening of the environmental crisis called upon by the neoliberalization of nature (O'Donnell 2018 (a)). Emerging out of deep crisis, four rivers have been granted legal rights in 2017 in New Zealand (the Whanganui), Colombia (Rio Alto) and India (Ganga and Yamuna) (O'Donnell 2018 (a), (b)). The environmental crisis was triggered by a shift in perspective on water's relationship with the environment. From seeing water as belonging to the environment, through the neoliberalization of water management in Australia and the United States in the 1990s and 2000s, the environment has been seen as another competitor on the market where water rights are being traded (O'Donnell 2018 (a)). O'Donnell and Talbot-Jones (2018) suggests that in order to be effective, the rights of nature need to redefine the structures of government of natural landscapes. Emerging models of how to conceptualise a natural personhood have been grounded in the concept of stewardship driven by indigenous world views and eco-centrism (O'Donnell and Talbot-Jones, 2018).

The European model of governance of natural bodies has historically been organised as a form of social cooperation for the sharing of common resources, the commons. Historical commons comprises both natural resources and the social organisation around them. Common property is a prerequisite of the commons. As a concept, the commons has become a lens through which scientists have viewed the government of natural resources in other locations on the planetary terrain. The re-emergence of the commons in the early 1990s, at the backdrop of dismembering state capital and state property has argued for this third kind of property, a shared property over commonly used resources. Elinor Ostrom's work in the 1980s and 1990s has been paradigmatic for reconceptualising governance at community level. Against the dominant governmental paradigm infusing scientific discourse, policy, and practice throughout the 1960s and 1980s, that saw subjects incapable of governing and justified state intervention, Ostrom's studies of communal governance

[18] see Food and Agriculture Organisation of the United Nations. "Forest Pathways to Sustainable Development. State of the World's Forests 2018. Executive Summary. Rome: FAO, 2018: 11-27, for how the narrative of dependency is inscribed in international policy.

repositioned the community as a collective subject able to govern over its shared resources. Ostrom's research and the research commissioned through the Centre for the Study of institutions, Populations and Environmental Change at Indiana University in the United States advanced the importance of social technologies of government for the government of the commons. Though the cases they have analysed have not all been successful, in those cases where a communal organisation around shared resources has succeeded have been those where a local institutionalised governmental practice, with clearly drawn rules and responsibilities has been put in place, and where the density of the population has allowed for the land to be known in its depths (Moran 2005).

The hypothesis of the commons as a modality of governance has emerged as centralised governmental control over forested landscapes is being dismantled since the early 1990s. Though this process has an unequal distribution across the globe, reports estimate that between 28 and 25% of forested land is managed by private entities, either individual or community owners, though not all of it may be recognised as such by state governments (State of the Word's Forests 2018:12). The challenge of finding new forms of government is posed by the impossibility of managing all of the planetary forested territories under the current neoliberal economic paradigm, as has been seen with the Pacific Northwest ruined forests. The increasing numbers of local, indigenous and afro-descendant communities that have and are in the process of having their rights over forested territories legally recognised, often as a way to defend their lands from capitalist extractive interests, equally calls for a renewed approach to government.

While nature is considered a non-being and its voice is silenced, the central question of government from a European perspective has not necessarily been how to extend the range of subjects beyond the human, but, as Foucault points out, whether government was good or bad (Foucault 2006). With this question, the act of government, in the European tradition belongs to the moral domain where good and bad are assigned by the human mind. While an ethics is attached to the morality of the governmental act, shifting the focus from thought to action, from the mind to the body, practice becomes a domain of ethics. In practice, the focus lies on righteous or wrongful action, and in practice, governmental actions can be assessed as thriving or destructive for the collective formed by all beings being governed. In contrast, the question of the emerging modes of governing the commons and of land stewardship, as directed through practice appears to be how to govern for interdependency and abundance?

Fig. 4. Indigenous and Community Lands, offered through the Global Forest Watch platform presents Indigenous and Community Lands that have been acknowledged by governments worldwide, or that are in indigenous and community hands without official recognition. As it

appears on the map, Indigenous and Community Lands, that are not only recognised with title but that also have specific forms of governance in place, that make them commons, are rarely present in Europe, Asia and Central and Northern Africa. While the commons, as a specific form of governance belonged also to Europe, in historical time, it is absent from what could be conceptualised as a contemporary map of the commons. Specifically in the territory of Romania, the commons have a dual origin, and they have been integrated into the state. In the part of Romania that was under Habsburg and Austro-Hungarian rule prior to 1918, as is the case also in the Maramureș region, the commons emerged as joint associations of individual owners that pulled their resources together, closer to western European historical commons. Claiming property was key to the constitution of the commons with the introduction of the cadaster register in the XIXth century. In the part of Romania that constituted the Romanian territory prior to 1918, the commons, specifically the forested commons, had, until the early XXth century, an autonomous form of organisation that was grounded in presence, not in property (Gowdy and Mesner 1998), much closer to a contemporary indigenous understanding of the commons. Grounding the commons in presence meant that everyone who was present in the territory of the village had rights to use it for resources (Gowdy and Mesner 1998). Communal property was the legal translation of an ancient governance system, in the first half of the XXth century, with the adoption of legislation, including the first Forestry Code to be applied over the whole territory, and with the opening of larger territories for capitalist extractive interests (Mateescu 2011 (a), (b)).

Fig. 4. Indigenous and community lands (2019)
SOURCE: www.globalforestwatch.org

4.3. Forest wilderness: between wild and managed

The idea of wilderness is a Western artefact. As research shows, it would be more accurately portrayed as left to wilderness. Wilderness is a space outside the domesticated garden space of European culture, inherently othering that which is not inside the boundaries of civic order. In wilderness there is another history that is being stored not in books, but in the strata of the soil and its inhabiting plant species. The evolutionary history of forested landscapes, immersed in deep time bear witness not only to plant and animal species' evolution, but also to the evolution of human use and care for the landscape. Modern scientists are making use of a wide range of methods and technologies to retrieve these histories. Their findings point towards forested landscapes as being far from wild, but transformed through human practices of fire management, game management and agricultural use.

Wilderness conservation has, since the second half of the XIXth century, marked environmental activism at planetary scale. In the face of expanding planetary urbanisation and climate change, scientists and local activists argue for the protection of wilderness areas as part of an important planetary bio-climatic regulatory system. The idea of wilderness conservation, however, was built on the emptying out of territory, devoid of human interference, where the only species left were the animal and plant species (see Brash 2014). It originated in the United States, with the creation of National Parks and the forced displacement of indigenous populations inhabiting the lands.

On the European continent, the diversity of landscape management practices has given rise to a variety of heterogenous landscapes. Management practices differentiate the heterogeneity of forested landscapes. As Hartel, Plieninger and Varga (in Kirby and Watkins ed. 2015:69) note, landscape use is impossible to visualise from the distance of satellite images. Corine Land Cover interpretations confronted by Hartel and his team with real life forests resulted in errors in categorising differently used forested landscapes. While satellite images categorise forests according to the canopy that trees form, management practices and forest use are an integral part of how forested landscapes have and still are evolving into the forests we know today. From a canopy point of view, forests can be categorised as open canopy and close canopy. Open canopy forests, such as European oak forests, have been used for centuries as wood-pastures, coppiced landscapes and grazing lands. In central European territories, oak forests have been used in the XVIIIth and XIXth century as pig grazing landscapes from September through November, the value of such a forest being evaluated in the amounts of pigs it could keep (Hartel, Plieninger and Varga in Kirby and Watkins ed. 2015:65). A great extent of closed canopy forested landscapes in Europe and particularly in the Carpathian mountains are beech forests. The soil of such deciduous

forests is rich in nutrients and in species, as it is 'cultivated' by earthworms and other organisms out of the fallen leaves trees shed every year and other biological material. Spruce and pine species were introduced for their exploitability and their capacity to adapt even in poor soils in the XVIIIth and XIXth centuries throughout Central European territories (Savill in Kirby and Watkins ed. 2015:94).

As one of the oldest forests in Europe to enjoy a state of protection as a hunting ground over the centuries, serving various monarchs and in the last decades, state diplomats, The Białowieża forest, divided between the Polish and the Byelorussian states, has become a place of nature conservation and biological research. It has come to public attention in 2016 after the exposure of logging plans from the Polish government, threatening its core protected area, and protests[19]. As Latałowa's et al. (in Kirby and Watkins ed. 2015:252-255) recount, it was used as a hunting ground for the dukes of Poland and Lithuania from the XIVth through the XVIIIth century, for the Russian tsar at the end of the 19th century, and during the XXth century it was protected as a national reserve and a hunting ground of the Polish state. Game management involved eliminating the wolf as man's competitor and supporting more wild animals than would normally survive in the forest though feeding programs (Latałowa's et al. in Kirby and Watkins ed. 2015:254). Bison, brown bear, red deer and moose were cared for during the XIVth and XVIIIth century (idem). With the disappearance of the bison in the aftermath of the first world war, it was reintroduced in 1954[20]. The analysis of Latałowa's et al. (in Kirby and Watkins ed. 2015:243-264) of the Białowieża forest, spanning over 10 years and confronting laboratory data with archival and historical documents shows the succession of multiple forests different in their species composition, evidencing periods of intense human-forest interaction and periods when the forest was mostly left for natural, biological processes to unfold. Their analysis indexes 4 different forests in their evolutionary succession to which the core of the Białowieża forest, currently protected as a natural reserve, bore witness and registered as memory into its soil and trees. With the use of carbon dating and pollen analysis they were able to retrieve this history from the forest's soil. A first phase is represented by the indicators of slash-and-burn practices throughout the Roman Iron age and into the Vth century. A second phase of lower human activity when the forest regenerated on abandoned patches, spanned from the VIth to the Xth centuries, with intensifying human activity of grazing and fire use towards the XVIth century. The XVIIth and XVIIIth centuries period they qualify as the most destructive phase for the Białowieża forest, marked by the intense use of the forest for timber extraction, the cultivation of pine forests through fire practice and the introduction of commercial logging in

[19] Nelsen, Arthur. *Poland starts logging primeval Białowieża forest despite protests.* The Guardian. 25 May 2016. https://www.theguardian.com/world/2016/may/25/poland-starts-logging-primeval-bialowieza-forest-despite-protests. Accessed 20.10.2022.

[20] Rewilding Europe. *Bringing back the bison. Europe's largest wild land mammal.* https://rewildingeurope.com/rewilding-in-action/wildlife-comeback/bison/. Accessed 05.05.2021.

the second half of the XVIIIth century (1765). During this time, agricultural practices and the burning of the forest for charcoal and tar coexisted with forest exploitation practices. Latałowa's et al. evidenced beekeeping in the forest, grazing in river valleys and the cultivation of rye, buckwheat, hemp and corn around the contemporary core protected area of the forest. With the introduction of scientific forestry in the XIXth century, and the separation of forest from the agricultural fields of nearby human settlements, the forest underwent a period of less intense exploitation until the mid XXth century. The evidence of intense agricultural cultivation correlated with an increase in human population during this period challenges theories that correlate increased forest exploitation with population growth. The newly introduced territorial order, the restrictions in using the forest for agricultural practices and the banning of fire cultivation in the forest allowed the forest to recolonise areas abandoned by human use, and regrow the characteristic oak, carpen and linden forest (Carpinus-Quercus-Tilia). In the second half of the XXth century, with the industrial paradigm, the Białowieża forest was managed for extraction with plantations replacing the logged forest, until the abandonment of plantations in the 1990s. After the 1990s, the forest again entered a phase of regeneration. The Białowieża forest stands as one of Europe's wildest forests, yet its evolutionary history shows the cycles of use and abandonment giving rise to qualitatively different forests in specific periods of time.

Implicit in Latałowa's et al.'s analysis is a western scientific approach of discussing the complex interrelations between humans and forests as forest disturbance and the absence of human's interfering practices in unfolding biological processes as forest regeneration. This way of seeing human and forest interactions is indebted to the co-evolution of scientific practices and European forested landscapes that throughout the XVIIIth and XIXth centuries have separated human agricultural practices and forests through the exclusion of cultivation practices from forests, all the while intensively using forested landscapes for timber production.

Unlike Western scientific and management practices, that see humans' interactions with the forest as disturbance and forest regeneration as happening outside of such interference with biological processes, indigenous forest management practices envisage humans as active agents in forest regeneration. Victor Steffensen's book "Fire Country. How Indigenous Fire Management could Help Save Australia" (2020) recounts the revival of Australian aboriginal land management practices through cultural burning, all the while presenting it from an immersive perspective, intimately connected with the land and its inhabiting plant and animal beings. More than careful observation and directed action, aboriginal cultural burning is an act of care for the land(scape). Through Steffensen's account of fire practice in the Australian bush landscape, grounded in a practice of deeply listening to what the land(scape) says and to seeing what different practices do to the landscape, a consciousness of the

interdependency between human beings and animal and plant beings emerges. His personal journey through learning fire practice from two elders and learning how to listen and learn from the landscape itself is a much needed account for understanding how a practice of care for the land enables a deeper connection with land, a deeper knowledge of differentiated landscape ecologies, and ultimately a different world view. The resurfacing of such practices is particularly important in landscapes deeply altered through colonisation, urbanisation and industrialisation that have broken the intimate relations between people and landscape and have eliminated cultural practices from land management practices, like cultural burnings in fires-sensitive landscapes. In Steffenssen's account fire practice is a constitutive part of aboriginal land management. With colonisation, fire practice ceased to be a land management practice and became a weapon against the colonisers (Steffenen 2020:163-64). It was abandoned by indigenous populations so as not to give away their position to the early colonisers while at the same time it was used to arson their military posts (Steffenen 2020:163-64). Eventually it was banned by federal governments throughout Australia (Steffenen 2020:170). These fire sustained ecosystems that have been shielded from fire for the last 200 years are now particularly vulnerable to wildfires, that have increased in frequency, in surface and in power (Steffenen 2020:163,170). The application of low-intensity fire becomes a solution to wildfires when the land is cared for in such a way as to stimulate new growth and green vegetation. Such a practice tends to the need of the landscape to burn while not leaving fire to chance. Low intensity fire implies burning only the dry grass and activating the seeds in the soil that need the heat of fire to germinate. In its correct application, white smoke from dry grass rises in the air. If the smoke is black, the oils trapped in tree trunks are released into the atmosphere. Indigenous non-indigenous animals that have lived in fire managed landscapes, know that the white smoke is not harming, so they take refuge in high trees or leave the area to be burned (Steffenen 2020:155-156). They are also warned by aboriginal fire practitioners through their singing to the land, to the spirits and to the animals (Steffensen 2020:155). Cultural burning is timed according to the state of the different ecosystems, so as to successively burn different areas (Steffensen 2020:154). In this way, there is always sufficient land for animals to take refuge from the burning area (Steffensen 2020:155). Through his account, Steffensen makes a case for indigenous land stewardship as a practice of the terrestrials, in Latourian terms. The terrestrials are many, the people, the land, the seeds in the soil, the trees, the grasses, the animals, all connected through fire in a carefully orchestrated choreography that leaves nothing to chance, while providing for everybody.

In such cosmopolitan societies like Australia and Canada where European and First Nation cultures have been in close contact with each other, and where, despite colonial violence, knowledge practices have also crossed the frontier, the emergence of such indigenous concepts for land management is of interest also among researchers and landscape

designers. Suzanne Simard's trans-disciplinary research is an example. Also in Steffensen's account, a collaboration with a female researcher of an Australian University interested in cultural burning has been of mutual benefit (see Steffensen 2020:106). In the United States as well, the emergence of such concepts of land stewardship, embedded in a mutualistic and reciprocal relationship between land and people, is happening within a wider intellectual agenda to re-value the landscape through an ecological lens driven by female landscape designers. The work of landscape designer Kate Orff and the research of landscape designer Jane Hutton open towards such concepts.

A reconsideration and re-valuing of landscape has been a constant throughout the history of democratic America. The revaluing of landscape as productive land through the expansion of the colonial frontier presented earlier is but one way this has occurred. A reconsideration of the landscape for recreational value, attached to the democratic principles that guarantee free access to a land that through the institution of a 'social contract' was ceded to the federal government is another way through which vast and scenic landscapes have been valued and reserved as Natural Parks (Brash 2011). The first Natural Parks to be established in the United States in the 19th century, Hot Springs (1832), Yellowstone (1872), Niagara Falls (1885), and Yosemite (1890) valued the landscape for such democratic and recreational values and for the mental health benefits it promoted (Brash 2011). Such reconsideration of landscape taken from indigenous nations and their cultural practices has not necessarily addressed neither the needs of the landscapes, nor the needs of all its citizens, particularly those belonging to indigenous nations. As O'Neill (2006:265) recounts, the Yosemite Natural Park was taken under federal government control from the Ahwahneechee nation, who were decimated and driven off their land in 1851. Their landscape management practices involved the application of low intensity fire to the grasslands stimulating meadow regeneration for the benefit of animals they hunted and of black oak trees from which they collected acorn (O'Neill 2006:265). Having broken the interdependent relation between people and land, through 'reserving' it as a landscape to be contemplated rather than cared for, federal government interrupted the cycles of landscape regeneration. The landscapes of the natural parks of the United States changed dramatically in the XXth century, and not for their best. A reconsideration of human intervention in areas designated as natural reserves followed with the emergence of the concept of wilderness through Aldo Leopold's life long work. A 1963 report by Leopold evaluating the state of the Yosemite Natural Park led to the introduction of selective cutting and burning practices to reinvigorate the sequoia groves where the accumulation of dead branches on the soil inhibited the growth of young seedlings and the regeneration of the forest (O'Neill 2006:265-266).

Leopold's conception of wilderness, developed in the first half of the XXth century, was one attuned to indigenous knowledge, while he valued wilderness as something to be conserved

for science and politics alike, for he saw it going beyond the limits of representative democracy and beyond any economic project. Akin to indigenous concepts of care for the land(scape) and of the mutualistic relation established between the health of land and the health of people, he approached wilderness as a multidimensional concept. He defined the health of the land as its capacity to regenerate itself and conservation as a continuous effort to understand and to preserve it (Leopold 1990:258). His proposition for a "land ethics" had a more than human approach, rooted in the interdependency of human and non-human beings (Leopold 1990:238-239). Through his ethical approach of land(scape) conservation, he proposed to think of "the land as a community" (Leopold 1990:243) enlarging the community of ethical subjects, to include, next to human beings, "soil, water, plants and animals, or collectively: the land" (Leopold 1990:239). While the concept of ecology developed at the beginning of the XXth century extracting the human out of the ecology of the landscape as the observer extracted himself out of the observed community, ecology in Leopold's (1990:345) understanding goes beyond the biological community established by the interdependence of soil, water, plants and animas, to include human beings as well. Delimiting and preserving an area of wilderness outside economic productivity became a ground to transform the democratic project through expanding the community to include animal and plant species, and a ground for personal transformation through experiencing it. To him, wilderness areas were real life laboratories (Leopold 1992:289). He conceived a new "ecological consciousness" (Leopold 1992:) emerging out of the experience of such wild lands that could infuse a new ethics of conservation through a deep ecological knowledge of how whole communities lived (see Leopold 1992:338-346). An ecological consciousness, in his view should infuse the ethics of a practice of conservation aimed at understanding the whole community of life, rather than favouring one species over the other (Leopold 1992:345).

The 1960s saw a reconsideration of human induced landscape transformations and the value of the natural landscape when the cumulative effects of large-scale chemical use on landscapes began to appear. Rachel Carson's (1965) "Silent Spring" was a cornerstone for reading the otherwise invisible phenomena that linked chemical spraying with sudden and chronic illness and even death among birds, animals and humans. Carson's account offers a deep understanding of the cycles of nutrient exchange between animal, plant and human beings passing through the water we drink and the soil upon which we feed on. It also scientifically argued that unlike natural chemical compounds that exist freely in nature, most of the human produced chemicals deriving from the development of weapons and war technologies, that, in the aftermath of World War II have acceded to commercial markets, accumulate in the bodies of animals, plants and humans. With Carson's ecological argumentation, the science of ecology grew in importance along side rising public concern

linking health and larger environmental processes exposed by Carson's research (Lister and Reed 2020:28).

After economic exhaustion and ecological neglect, much of the American landscape at the end of the XXth century was in need of landscape restoration projects. As Lister and Reed (2020:31) indicate, a paradigmatic shift into land management emerged in the 1980^{s} in the United States in the aftermath of large scale forest destruction due to uncontrollable forest fires in Yellowstone National Park that ecologists argued had been the result of "a century of fire suppression" policy in National Parks throughout the United States. The reintroduction of controlled small-scale burnings in Yellowstone and other National Parks and even urban areas in the last four decades, as Lister and Reed (2020:31) argue, represents a shift in our way of trying to manage large scale ecosystems towards managing our activities in these landscapes. New scientific studies on grassland regeneration in the United States point towards a renewed reconsideration of landscape regeneration, viewed through their historical evolution. McGranahan et al. (2012) argue towards the reconciliation of agriculture and conservation efforts through the use of an analogous land management practice as the one the landscapes had historically evolved with. As they develop, though the combined use of burning practices and grazing in the most recently burned areas, a heterogenous landscape emerges with increased biodiversity. The heterogeneity of landscape, however, is highly sensitive to overgrazing and invasive species both of which can be controlled with reducing the population of animals and burning practices that inhibit the growth of invasive species while favouring the natives (McGranahan et al. 2012). Their findings suggest that specific species may not be as important for landscape regeneration, as has been suggested with the introduction of the wolf in the Yellowstone Natural Park in the 1990s, as the combined effects of human management through burning practices and animal population control.

Through the reconsideration of the American landscape in democratic history its wilderness was continuously reevaluated, from a landscape devoid of human interference, to a landscape where human interference is necessary.

The way of seeing landscape in contemporary thought is shifting as the ideas of landscape wilderness and landscape management are being challenged. The cases presented, of the Białowieża forest in Europe, the Australian bush landscape and the North American forested landscape challenge the ideas of both wilderness and managed landscapes. Instead, out of their evolutionary history emerges their inter-dependence with human practices of care. The idea of care for the landscape comes from both indigenous world views, as those presented by Victor Steffensen (2020) and from early conservation practices in the United States, as shown in Aldo Leopold's (1992) thinking. Drawing on an indigenous world view, the practice of care for the Australian bush landscape through fire practice that Steffensen presents

already starts from the premise of human-landscape inter-dependence. The evolutionary history of the Białowieża forest presented through scientific eyes shows the wild part of the forest as the one that preserves a living knowledge of the times and ways in which human and plant histories intertwined. Going beyond the view that humans are a disturbing factor in the forest, its history can also be read as the story of the inter-dependence between people and forest. The American example, with its shifting paradigms, shows that contemporary landscape management does better in following the guidance of the landscape, listening to what the landscape says, to what it needs, to where it is exploited beyond its caring capacities.

4.4. The planetary forest landscape

In satellite image interpretation, "tree cover" is defined as closed canopy vegetation taller than 5m (Kirby and Watkins in Kirby and Watkins ed. 2015:4, Global Forest Change 2000-2021 Data Download[21]). A "tree cover" as defined makes no distinction between urban and non-urban areas (Global Forest Resource Assessment 2020:20). From the perspective of resource management, forest use of land, where there is either a tree cover and / or use of the land as a managed forested landscape with closed or open canopy is a category of analysis for forest scientists and FAO experts (Kirby and Watkins in Kirby and Watkins ed. 2015:4). Kirby and Watkins (in Kirby and Watkins ed. 2015:4) detail the forest used landscapes as: tree-covered forest lands, forests as lands managed by "forest law" in medieval times where the law regulated hunting on a forested landscape, wood-pastures with scattered trees, coppiced lands, where trees were regularly cut down to produce multiple stems and branches, plantation landscapes, ancient woods as continuously forested areas since the XVIIIth century. Along with the separation of landscapes for production and human inhabitation, trees in urban and urbanised areas are not considered as forest lands. While in the category forest use there is an implicit presence of humans in the landscape through their management practices, in separating human inhabited areas from areas used by humans for production purposes such as forests humans extract themselves out of the landscape. It is no longer part of their inhabited and living space. It is other.

While satellite image visualisation and interpretation through which human presence becomes visible only at large scale landscape transformation operates another form of extraction of the human out of the landscape, visualising forested landscapes in their continuity highlights the importance of such continuity for the flows of bird, animal and plant migration. That birds and animals migrate is widely known, unlike the migration of plants

[21] University of Maryland, Department of Geographical Sciences. *Global Forest Change 2000-2021 Data Download*. 28 April 2022. https://data.globalforestwatch.org/documents/tree-cover-loss/explore. Accessed 20.05.2021.

which is known only to scientific circles and to those interested in it. Plant migration is visible in deep time, in the evolution of forested landscapes over millennia. It is also visible in a human lifetime, in the way trees colonise bare lands. The European forested landscape, for example, the one we currently inhabit, has evolved in thousands of years since the last ice age through plant migration from glacial refugia (Kirby and Watkins in Kirby and Watkins ed. 2015:33). The lightness of their seeds that can be carried by the wind for long distances (like the seeds of Scots pine and birch), the way animals gather the seeds of trees and burry them further away from the mother tree (oak and beech), contribute to plant migration and the evolution of the forested landscape (Kirby and Watkins in Kirby and Watkins ed. 2015:36). In the face of climate-change, plants are continuing their migration in search of favourable climatic conditions, and also towards refugia that would safeguard their existence in the eventuality of climate collapse and/or catastrophic destruction.

For the purpose of going beyond the boundary of the mental object that the forest is, I refer to the planetary tree cover as the *Planetary Forest Landscape* (Fig. 5). Looked at it as such, our cities inhabit forested landscapes. From such a perspective, the planetary forest landscape is a multi-species landscape where humans and their delimited inhabited areas are a part of. The maps on the following pages present the global forest landscape through reading the satellite images offered through the globalforestwatch.org platform. The Global Forest Watch platform offers the possibility to extract what they categorise as intact forest landscapes (Fig. 6) and plantation landscapes (Fig. 7) out of the planetary forest landscape (Fig. 5). Intact forest landscapes comprise large scale continuous and unaltered forest landscapes, mostly situated at the tropics and in the boreal region, where the depths of the forest have not yet been reached by extractive projects and wide-spread human settlements. Plantation landscapes comprises a variety of planted forests used for timber, wood fibre, rubber, palm oil and fruit. Though separated, and visibly distinct in species composition and geographical location, the intact forest landscapes and the plantation landscapes are interconnected. Again, the static representation of these landscapes misrepresents their dynamics and the transformations in which they are engaged in, at planetary scale. A fourth map, of the concessions (Fig. 8) made by governments for the logging of forested lands, for mining of underground resources, for the replacement or planting of new forests and agricultural crop cultivation illustrates the transformation of forested landscapes into barren lands or plantation forests. As it appears in the maps, concessions for resource extraction are threatening the continuity of forested landscapes in space and time, and consequently the continuity of the flows they sustain. The restitution of lands to indigenous communities, as has been the case since the 1990s is posing great responsibility and also great hope in their hands. These landscapes also have internal dynamics that are influenced by large scale processes of climate change. Donna Haraway (2015) refers to the extent of landscape transformation through erasing complex ecological

and socio-ecological landscapes and replacing them with plantation landscapes and extended patterns of human inhabitation as the plantatioscene. The advancement of the plantatioscene posits a life threatening event: that in the face of climate collapse, there would be no more refuge / refugia where to retreat and from where to recolonise the land once again (Tsing 2015(b)). The flows of species migration that are engendered through the sheer spread of plantation landscapes spill out into the planetary landscape. The ecology of the plantation is not confined to the designated space of the plantation. The Feral Atlas (2020), an interdisciplinary and open access research project coordinated by Anna Tsing, documents in part what escapes the logic of the plantation, as it looks into the unintended effects and the clandestine passengers of the grand infrastructural projects of landscape transformation. They present what spills out of the governmental infrastructures, the transportation infrastructures and the financial infrastructures of global capital. The stories deliberately search for the proliferation of multi-species encounters made possible within the infrastructure of capital and colonization. To them, we depend on these feral encounters that escape human control, for if the material world would have been transformed as imagined by the planners of such infrastructures reaching the planetary scale, the world would have become uninhabitable (Tsing et. al. 2020). The maps accompanying the stories in the feral atlas are maps of flows where the focus lies not on the reproduction of what is visible with the human eye, but in the production of deep drawings, that attempt to capture the invisible flows that make species, parasites, toxic waste spill out of their constructed infrastructures of storing, cultivating, extracting, transporting. The flows describe "*blockages, agitations, transformations, combinations, relations, processes, and entanglements of the worlds in active formation"* (Carr 2020).

The separation of territory, from a whole body to the abstractions that land, resources and populations represent, has made such grand, life threatening infrastructural projects possible. With respect to the planetary forest landscape, the realised and projected infrastructural projects aiming to access the depths of the forest for resource extraction, to exhaust the underground deposits and the above ground living beings nurturing and contributing to these deposits threaten its continuity and its intactness in horizontal space, in vertical space, and in evolutionary time. To look at territory as a body, where the land holds the above ground plant, animal and human communities, the underground communities and nutrient deposits, and the flows of water, nutrients and energy that traverse the two grounds, would be a paradigmatic shift in the way we see it with potential implications of our use of it. From the proliferation of extractive violence against nature, we might transform our relation to nature into a mutually nurturing and reciprocal one. For indigenous cultures, this would be a restorative shift in paradigms, in alignment with their world view.

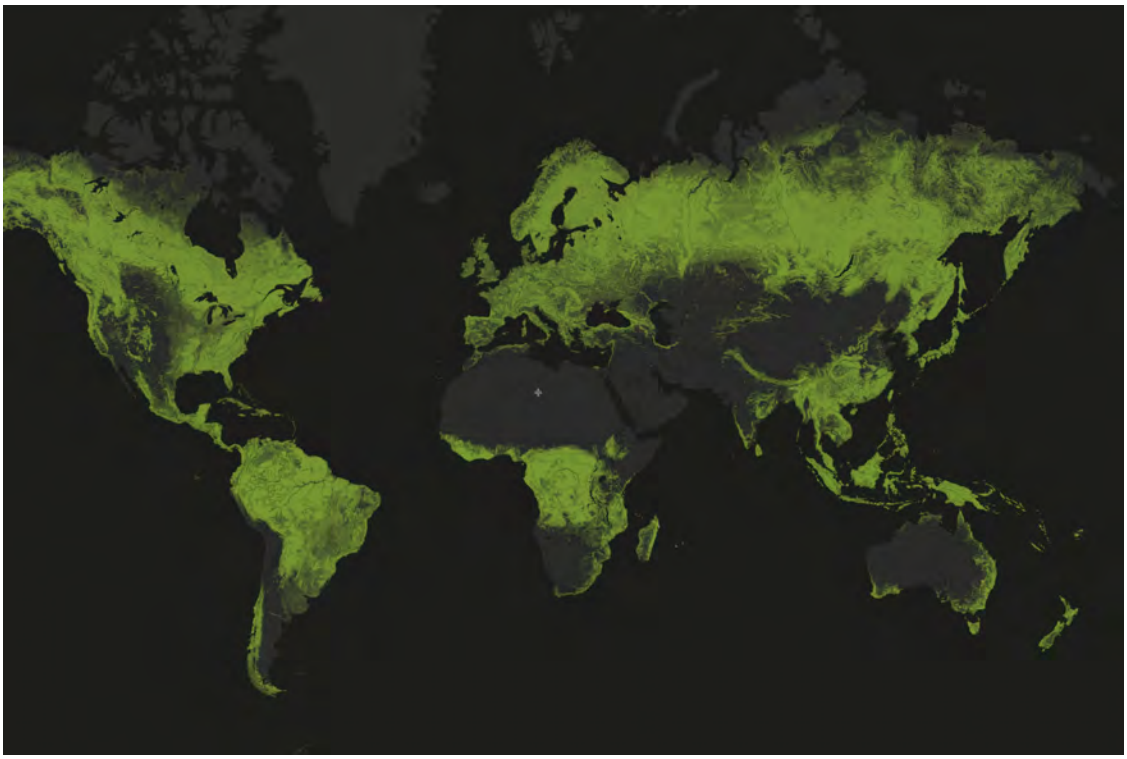


Fig. 5. Planetary forest landscape
Worl Tree Cover >30% canopy density (2000)
SOURCE: www.globalforestwatch.org

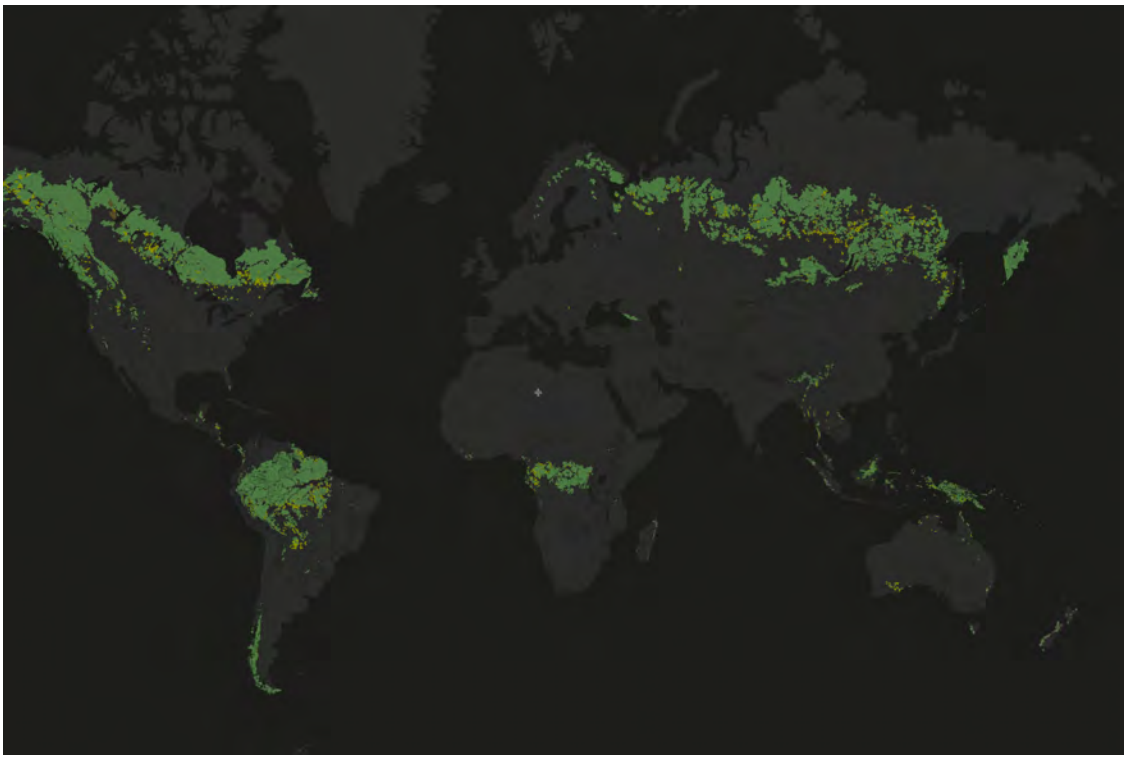


Fig. 6. World Intact Forest Landscapes > 50,000ha, > 10km wide (2016)
SOURCE: www.globalforestwatch.org

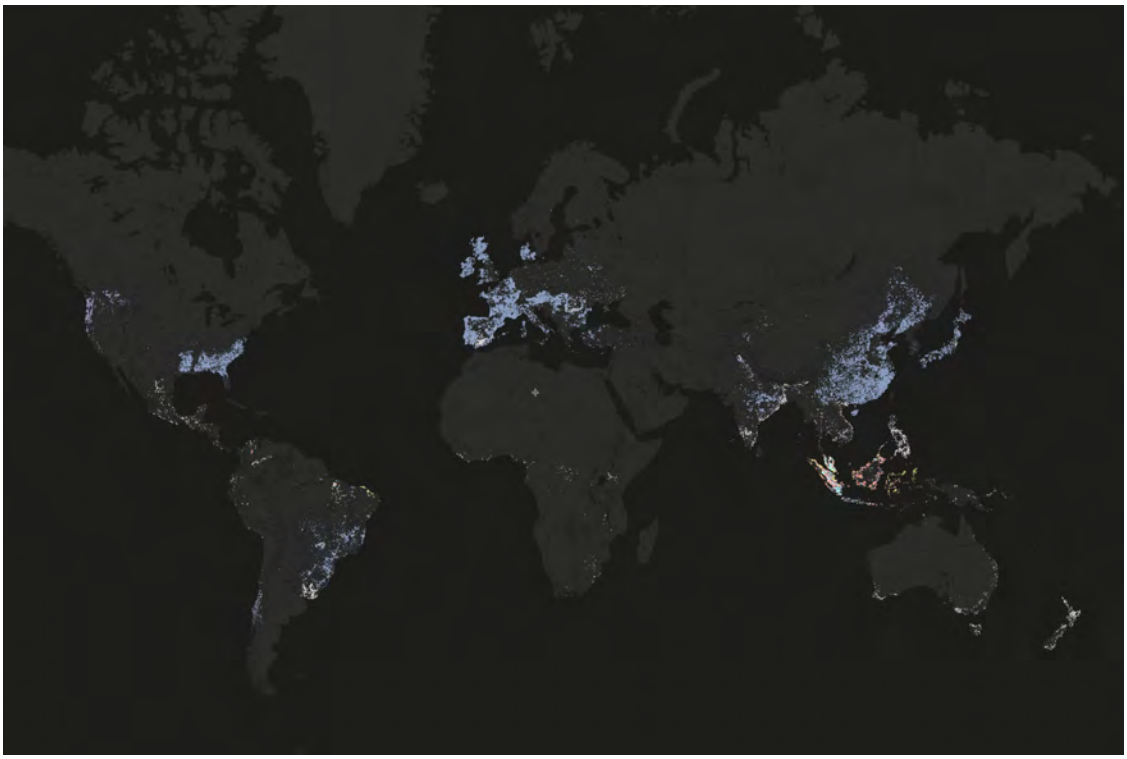


Fig. 7. World Tree Plantation Landscapes (2015)
amounting to 82% of the total surface of planted forest
SOURCE: www.globalforestwatch.org

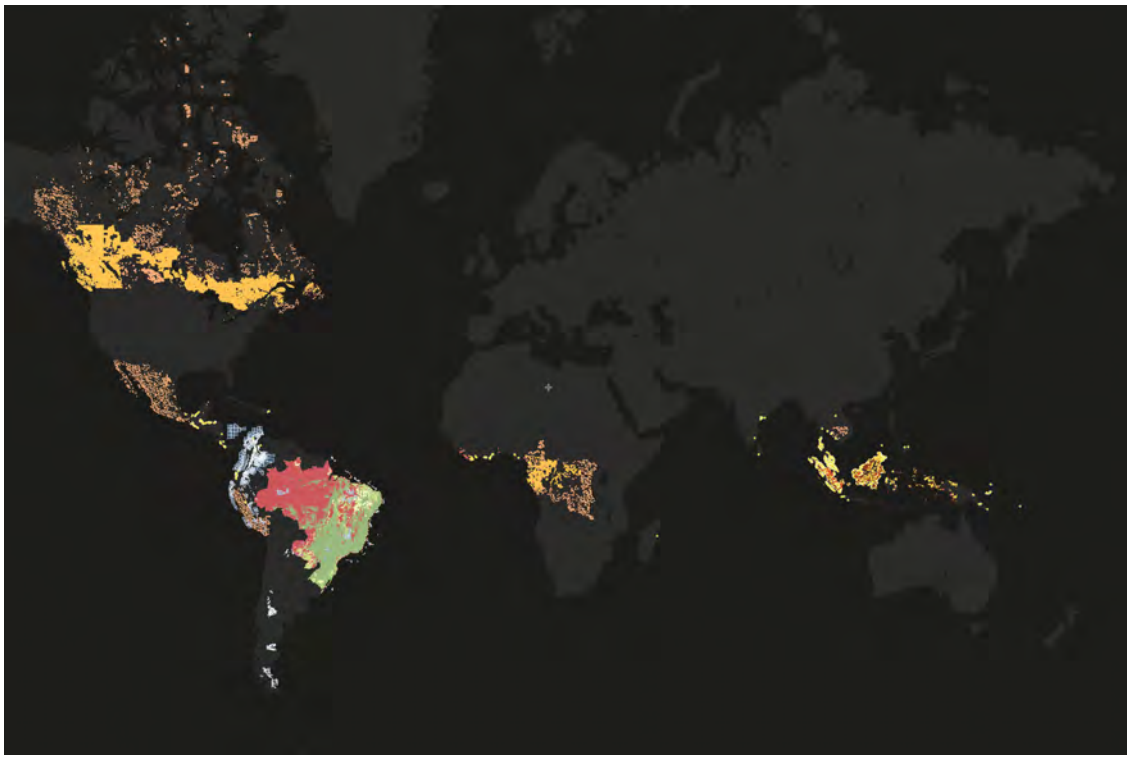


Fig. 8. World Concessions landscapes.
SOURCE: www.globalforestwatch.org

4.5. Conclusion

Going beyond the definition of the forest as a designated piece of land and its associated use as a timber production site, this chapter has revised emerging scientific paradigms, indigenous forest governance practices and world views, and contemporary legal scholarship and practice concerned with the rights of nature. The themes discussed, of forest intelligence, forest governance, forest wilderness and forest management have served to introduce a more nuanced discussion of the contemporary planetary forested landscape. They serve to rethink the relation we have with forested landscape beyond the use we attribute to them. Thinking of trees and forests as intelligent beings is both an invitation to rethink our ways of interacting with them and an ethical and legal argument for a more than human society.

Visualising the planetary forested landscape comes with the realisation that the opposition between the forest and the urban is a false opposition. A more just way of seeing the relation between forests and urban settlements is to expand our conception of the space we inhabit, from the confinements of a settlement, urban or rural, to the planetary forest landscape. In viewing that we inhabit forested landscapes, at stake is the rethinking of our management and government practices and approaches towards learning to read and listen to what the plants are communicating and tending to the landscapes with reciprocity and mutual exchange in mind.

5. Shifting paradigms on urbanisation processes

The following chapter looks into specific urbanism, landscape urbanism and ecological design approaches in order to trace an intellectual history of thinking beyond the boundaries of the city within the disciplines of architecture and urbanism. In XVIth century Renaissance Italy, as the disciplinary tools of contemporary disciplines were being developed, architecture, geography and anatomy shared tools and principles, and a cosmological view of the world and of the human in the world (Mezzadra and Nielsen 2013(a)). Geographical principles and ways of thinking have been influencing architectural and urban thinking since the early XIXth century (Katsikis 2014). Since the beginning of the XXth century, when the discipline of ecology emerged as a sub-field of biology, principles and ideas of ecological thinking and particular approaches of biological ecology have influenced the practice and discourse of architects and urbanists[22]. More than interdisciplinary exchanges, the pressing issues of contemporary phenomena are pushing architects and urbanists to develop new hypotheses. These have shifted paradigms, ways of seeing, thinking and acting in the world.

The following chapter traces some of the shifts that have occurred in architectural and urban disciplines in the last century, with particular focus on the tools and concepts that can be of use for thinking beyond the city / forest division and for working *with* and *with*in forested landscapes. The focus lies on post World War II debates on urbanisation and the dominance the tools of the second half of the XXth century have had over planning and design since the setting of an urban agenda by the UN and the numerical definition of the city (see Brenner and Schmid 2014). Beyond the particular histories that have made urban planning and urbanism, and scientific forestry distinct disciplines dealing with distinct landscapes, they have made use of the same tools of zoning and infrastructural expansion. Inspired by the socio-economic changes brought about by the shift and expansion of resource landscapes and the perceived freedom that the availability of resources transported from any part of the world had, architects and urbanists started to think urbanisation at the scale of the whole planet. The first part of the chapter, *5.1. Urbanisation at planetary scale* revisits some of urban thinkers and their visions of urbanisation reaching the planetary scale through the tools of zoning and infrastructural equipment.

At the same time, the transformation of cities was driving some architects and urban planners to reconsider the relation between city and nature, with the dissolution of the

[22] Biologist and urban planner Patrick Geddes translated principles of biological organisation to the socio-economic organisation of human settlements, developing an incipient concept of the region at the beginning of the XXth century. More recently, ecology is influencing the discourse of urban ecology both in theory (see Marina Albert. *Cities That Think like Planets: Complexity, Resilience, and Innovation in Hybrid Ecosystems*. Seattle: London: University of Washington Press. 2016) and in practice (see for example Kate Orff. *Toward an Urban Ecology*. New York, New York: The Monacelli Press. 2016).

traditional boundaries of cities. *5.2. Urbanisation beyond the rural / urban divide* presents relevant debates within the American and European approaches to urbanisation processes beyond the boundaries of the urban. It highlights the horizontality of urban expansion in its two distinct forms in Europe, as constructed on the previous road network, and in America as reinventing the landscape through new grid like structures.

5.3. Cosmopolitical ecologies focusses on the challenges and approaches of the XXIst century that an ecological way of seeing and studying landscapes is illuminating. While acknowledging the persistence of ecological concepts in urban thinking and design throughout the XXth century, contemporary urban design practices and research projects look at the landscape as a multi-species inhabited landscape.

5.4. The forest landscape as a living space proposes thinking urbanisation from the vantage point the planetary forest landscape. As such, it reviews emerging design approaches, new forms of stewardship, and opportunities to rethink the extractive relation we have with forested landscape on more socially and environmentally just terms.

5.1. Urbanisation at planetary scale

Post World War II reconstruction specifically enlisted the visionary thinking of architects and urban planners in redesigning cities and landscapes. Among them, Abercrombie's Greater London Plan (1943) stands as an example in reconsidering the relation between the urban and the natural, in the importance it gave to open spaces, parks and forests in the re-organisation of the city. Abercrombie's plan follows in the British tradition of reconsidering the relation between the urban and the rural expressed at the beginning of the XXth century by Ebenezer Howards' proposition for the creation of a green belt around London, with lower density inhabitation patterns where the contact of urban inhabitants with the rural landscape would take place.

From city to landscape, traditional planning approaches constructed on the distinction between urban, rural and natural have shaped the planning field and the landscapes we inhabit in the aftermath of the Second World War. Alberti (2016:212) sees the distinction between humans and nature and the ways in which they have been appropriated by scientific disciplines and studied separately, as hindering our imaginative capacities to envision other possible and desirable futures. Going beyond 'traditional' planning approaches requires that we think differently about the future. For the landscape at large, the 1950s and 1960s brought about a reorganisation of production landscapes as the rural was assimilated to the urban's "constitutive outside" (Brenner and Schmid 2012, Topalovic 2016(b)), its productive hinterland, and as natural territories were appropriated for resource

extraction and consumption. What was left, was left to wilderness, constantly under threat of potentially being exploited as resource landscapes. Urban growth has been sustained by the expansion of productive landscapes into wilderness areas and the intensification of production. In the 1960s and 1970s the planning discourse was dominated by a fascination towards what were believed to be the abstract laws that direct the urbanisation process, much like physicists were fascinated by the laws of nature they were trying to unveil (Katsikis 2014). The fascination of the laws of urban growth prompted thinkers of the urban to follow progressive growth to a 'finite' state they attempted to project for the future. In what follows, I revise the approaches to expanding urbanisation and territorial transformation that Henri Lefebvre (1970), Le Corbusier (1945) and Constantinos Doxiadis (1968, 1974) entertained. In a way, their approaches can be thought of as bringing forth a cosmological vision of world-making.

Le Corbusier's not so famous project of territorial reconstruction, presented in *Les Trois Etablissements Humains* (1945), "The Three Human Establishments" is a declared cosmological project, in the aftermath of the Second World War, infused by a the collective desire for a better world. The book starts with an ample exposé on the relation between man, nature, and cosmos that has been broken by the speed of the machine. In his view, mechanic speed has altered the inherent balance existing in all forms of nature with the appearance of radio waves, bio-chemical synthesis, and industrial production. His proposed three models of urbanization, the linear industrial city, the agricultural production unit, and the radio-concentric city of exchange are all projected based on the cohabitation of the speed of the machine and the speed of man. In the industrial city, this cohabitation generates a longitudinal section corresponding to the 100 km ratio of the speed of automotive transportation, and a transversal section adapted to the speed of walking on foot, corresponding to a 4km ratio. This linear model of a generic industrial city allows le Corbusier to reach the scale of the nation state, of France in particular, as he envisages connecting the raw material production sites with their industrial processing sites. Exchange cities were projected at the crossroads, while the agricultural production units were also connected to the road infrastructure. Through this connection, the village transforms into the city, in le Corbusier's proposals, as it becomes another form of city, a 'radiant' village, reckoning his 'radiant' city. Through bringing urban infrastructures in the vicinity of villages, in the newly projected agricultural production units, village life is transformed into urban life. The rationality that stands besides this urban transformation of the village is that of 'catching behind', a form of 'colonisation' of the rural, whereby the assumption is for the villagers not to lose any of the benefits of urban life, as the cities were increasingly becoming attractive for rural to urban migration. In the final pages of the manuscript le Corbusier (1945:235-239) envisages the extension of his proposals to the continental scale of Europe, as he foresees the speed of aeronautical transportation as a generating force of the future. The

geographical landscape appears here as a supporting strata for human civilization, one that, as Le Corbusier (1945:218) envisaged it "precedes, subsists and will outlast our civilisations that are passing". More than an aesthetic (Sarkis 2014), the proposals advanced in "The Three Human Establishments" are a recognition that there is something greater than man that provides the medium for human inhabitation. The recognition of the forces that shape the human establishments, both 'natural' and mechanical appears as the ground for a cohabitation project between man and machine, between the 'natural' and the 'artificial'.

In his 1970 book "La révolution urbaine", Henri Lefebvre anticipated the total urbanisation of society. The dominance of the urban appeared to him as a rather subtle dominance through the extension of an urban way of life that gained priority over rural life. Lefebvre's analysis of the evolution of urban life in historical time views it as a discontinuous evolution marked by definite breaks between the models of urbanity that prevailed in certain historical periods. The XVIIIth century is for him marked by a break between the urban and the rural, as he sees a change of perception in historical accounts of urban inhabitants, that privilege an urban way of life over a rural one (Lefebvre 2003:11-12). As dialectical concepts in Kantian terms, the urban and the rural co-exist in their "phenomenal domain", while they oppose each other in thought. From such a vantage point, Lefebvre denounces the lack of an epistemology of the urban and the "institutional and ideological" drive of urbanism as a science (Lefebvre 1970:6). He questions the evolution of the urban from the rural, and if so, he grounds it to the European model of urbanisation (Lefebvre 2003:8). The urban stands for Lefebvre as the urban society, a term he prefers to the postindustrial society, and other such terms, as he does not see the envisioned urban society evolving from previous models of urbanisation, such as the industrial society (Lefebvre in Brenner ed. 2014:37). While the rural had been integrated in the industrial society (Lefebvre 2003:3), he sees the form of urbanisation characteristic to the industrial society as a "critical zone", where the dual process of implosion of urban life into the city and the explosion of the city, projecting fragments of the urban fabric in territory is apparent (Lefebvre in Brenner ed. 2014:42). As he approached the limits of computation, an emerging field that attempted to compile global data, urbanization seemed to him out of empirical grasp. His shift in focus from the distinction between urban and rural to urbanisation as a phenomena allowed him to think of the co-existence of rural and urban ways of living and of the urban as a virtual possibility towards which the 1970s society he was living in was heading to (Lefebvre in Brenner ed. 2014:43).

In his propositions for Ecumenopolis, a global urban society, and Ecumenokepos, the global garden, Constantinos Doxiadis (1974(a)) predicted in the late 1960s and early 1970s urbanisation at planetary scale. His view was marked by anticipating the ecological challenges such a society would pose on the planetary ecosystem. Doxiadis understood urbanity as a way of living in human settlements, not taking into account the size of the

population, the form and function of the city. Urbanity for him went beyond the urban / rural divide as he thought of the conditions of life in rural settlements in the future to be unknown. He integrated rural settlements into his wider concept of urbanity. Ecumenopolis, for him, already existed in the late 1960s, as a condition of interconnectivity between growing cities and urban metropolitan areas. To counter the effects of uncontrolled growth over the natural surroundings and the conditions of living in urban settlements, he proposed 12 zones of gradual contact between the wild natural areas, the cultivated areas of food production, the densely inhabited areas and their corresponding industrial processing of materials and waste. His proposed zoning was to be replicated both for land and for water territories, that extended to the atmosphere, through the cycle of water in the atmosphere. Water territories for him comprised not only oceans and seas, but the inland water beds of rivers that needed protection from human intrusion or were already part of an urban way of living by providing drinking water to settlements. As land was colonised for settlements and food production, he thought to preserve about 65-70% as “continuous wildlife” while he also thought it necessary to think of wildlife areas at a global scale and redistribute resources for their protection from countries that had destroyed their wildlife to countries that needed to protect theirs (Doxiadis 1974(b)). Only a very small percentage of land, 2.5% was thought to be needed for human settlements, while the rest was projected for recreation, agricultural production and industrial processing. Ecumenokepos was thought of as Ecumenopolis’ complementary global garden. In a 1974 text, “Marriage between Nature and City”, Doxiadis further develops the interconnectivity between the two. As he revisits propositions for bringing nature into urban settlements, through bringing nature on top of buildings, as Le Corbusier proposed, or introducing green belts around cities, as Ebenezer Howard thought to do, he judges them as unnatural and unwelcoming, too artificial in contrast to his inspirational landscapes. Inspired by the experience of the Greek mountain landscapes, he envisages a blue and green infrastructure penetrating the city as paths that connect wildlife areas to inner city areas. Doxiadis warns that the “extra-human” dimension of urbanisation is threatening the future of urban settlements, and his propositions are made with the intention of making Ecumenopolis a humane city to live in.

Moving from projections of an urbanised world to come, like Le Corbusier and Doxiadis attempted, to mapping, analysing and compiling global data in order to understand the complexity of the processes, continuing Lefebvre’s interrupted attempt, contemporary scholars have proposed a shift in paradigm, from thinking of urbanisation as a growing phenomena, to thinking it as having already reached the planetary scale. Recent scholarly interest has brought attention on the trans-scalarity of the urbanisation process, the need to integrate different disciplinary knowledge and practices, the rising inequalities within urban and urbanising areas, as well as the need to limit and mitigate the consequences of the unprecedented processes of territorial transformation engendered by urbanisation at

planetary scale. As the non-urban is operationalised to sustain urban growth, the non-city becomes “an essential terrain of capitalist urbanisation” (Brenner 2016).

Nikos Katsikis’ (2016) PhD dissertation represents, to a certain extent, an assessment of Doxiadis’ Ecumenopolis at the beginning of the XXth century and a step further in the global computation of urbanisation data. Katsikis’ project is no longer a project of a world in making, projecting a future for human inhabitation, envisaging an Anthropocosmos, as Doxiadis (1974b) thought of. Instead, he uses satellite image interpretation to assess the state of urbanisation at planetary scale, by conceptualising the resource landscapes necessary to sustain urban life and increased urbanisation as the “Hintergloble”. From Doxiadis’ 1970s projection to Katsikis’ 2016 assessment, the percentage of production landscapes, thought of as the Hinterglobe dramatically increased, while the percentage of densely inhabited urban areas, urban agglomerations, as Katsikis conceptualises them, grew only slightly, from 2.5% to 3%. In his thesis, Katsikis assesses the operationalised territories of urbanisation, the Hinterglobe, at 70% of the total global terrain, a percentage Doxiadis thought necessary for the preservation of “continuous wildlife” areas. Planetary urbanisation, through this lens, is a condition of increased exploitation and infrastructural extension, that connects the 3% of densely inhabited urban areas to 70% of the planetary terrain (Katsikis 2016:4). As Katsikis (2016:234) notes, most of contemporary infrastructural connections equip the operationalised landscapes of urbanisation. From thinking of the city’s resource hinterland, Katsikis’ (2016:5) assessment of the contemporary conditions of interconnectivity that characterise “planetary urbanisation” prompt him to advance the hypothesis that the urbanisation process at planetary scale has produced a vast resource hinterland, the Hinterglobe. If for Doxiadis, zoning was an important tool to attempt to control the process of urbanisation at the scale of the planet, Katsikis’ assessment shows that at the scale of the territory, zoning has produced a hybrid landscape where densely inhabited areas co-exist with resource landscapes in what he terms as “the composite geographies of urbanization” (Katsikis 2016:24). Through zoning, Doxiadis thought to reserve wildlife areas for wildlife preservation. Katsikis, however, draws attention on the way many sparsely populated, scarcely urbanised and inaccessible landscapes, internalized by planetary urbanisation (Brenner and Schmid 2012), are only thought of as untapped potential resource landscapes. Katsikis’ mapping of the global terrain revisits the image of urbanisation dominating since the 1960s that takes on the population threshold as a mapping index.

Among planetary visionaries, French landscape designer Gilles Clément distinguishes himself in envisaging the world as a planetary garden, where the organisation of all forms of life takes precedence over the socio-political and economic organisation of human life. To a certain extent, Clément’s vision amplifies Doxiadis’ Ecumenokepos, by bringing it at the

centre of a way of life that is earthly before it is urban. The world as a planetary garden is hypothetically reorganised according to climatic conditions and life spaces instead of state borders and continental divides (Clément 2015:25-32). His proposition is based on the assessment of the current state of heterogeneity and hybridity of landscapes at the planetary scale as the result of three processes: endemism, intermingling and assemblage (Clément 2015:32). For Clément (2015:4), not only plants are endemic, but also ideas. Every human community has specific practices of tending to the landscape, specific world views and specific myths and stories related to the landscape it inhabits (Clément 2015:11). Intermingling represents for Clément, the combined effects resulting out of the evolutionary processes of life that is driven by the mixing of genetic diversity and the increased mobility of plants between plants that is driven by human transporting and transplanting of seeds and plants (Clément 2015:20). Extending the practice of the gardener from the confined place of the garden to the planetary space of nature requires "an intimate knowledge of the environment" (Clément 2015:37), in order to exploit while preserving the abundance of nature. Clément (2015:34) proposes two practices necessary to planetary gardeners, "working with" matter and elements (fire, wind, water, soil and seed), and "observing in order to act". The vision Clément entertains is similar to the ways in which indigenous inhabitants were inhabiting the landscape before colonial contact and colonisation as a form of landscape cultivation that works with the landscape rather than trying to domesticate, enclose and exploit it.

5.2. Urbanisation beyond the rural / urban divide

The dissolution of the urban / rural boundary that comes with thinking of urbanisation as a planetary scale phenomena, is marked by the dissolution of the form of the city and its dispersion into territory (Secchi in Viganò, Fabian, Secchi ed. 2016:35). Lefebvre's prophecy of planetary urbanisation, predicated upon the implosion of industrial production in the city and the explosion of the city outside of its traditional boundaries already implied that urbanisation processes have and will have an impact on the traditional form of the city and its surrounding territory. A territorial reorganisation of both city and territory was paralleled by a restructuring of the city's hinterland into what Katsikis (2016) calls the "Hinterglobe". Contemporary approaches to expanding urbanisation look into the infinite possibilities of the horizontal plane, as manifested by infrastructural expansion and increased interconnectivity. At the same time, a shift in paradigm from the city to urbanisation processes, comes with a rethinking of the urban in terms of resource flows and infrastructural equipment, instead of thinking it in the static terms of set physical boundaries and the political processes associated to boundary-tracing (Sordi 2016:53).

At the planetary scale, the process of urbanisation, as we experience it in the present, and as urbanisation has been unfolding in the XXth century is intrinsically linked to capitalist-colonial practices of territorial expansion, exploitation and occupation. The way urbanisation is thought of, is also modelled on the continental European and Anglo-Saxon models of the city, and the relation with its hinterland, that have been replicated through colonial expansion. The specificity of the European territory of urbanisation is however, different from the American form of territorial occupation (Viganò 2016), both in their historical evolution and in their contemporary challenges.

In Europe, the debates on the city, its form and the form of its territory have evolved from more traditional debates on the centrality of the city in relation to its wider territory of resources, conceptualised in terms of centre and periphery, towards looking at the way urbanisation has diffused along the networks of connection between and within territories. Already at the beginning of the XXth century, the model of centrality was being questioned, particularly in Patrick Geddes' conception of the region. Geddes' region was modelled on the geography of territory that allowed for cities to expand and interconnect along the corridors opened by water ways and the paths they carved deeper in territory and further away from the city centre. Early XXth century models of metropolitan expansion thought of cities in analogy to an octopus, stretching their networks in their surrounding territory (Reclus 1895, Geddes 1915). For Geddes, who trained as a biologist, the analogy to the octopus allowed him to conceptualise the city's expansion in terms of neural networks and to see the region as a living territory, irrigated by paths of mobility and trade. Mid century European debates conceptualised territory as anthropo-geographical (Gregotti 1966) and were interested into the forms of territorial occupation that persisted through time, the permanence of patters of territorial settlement and the way the landscape was transformed through management practices.

Beyond the centre and periphery way of thinking of the relation between the city and its territory, the last century of urbanisation of the European territory has been characterised by a diffuse urbanisation (Viganò in Viganò, Fabian, Secchi ed. 2016:13). Constructed on ancient settlements and the road and water ways that connected them, European urbanisation expanded as a densification of previously settled territories, where the isotropic network of roads and waters is key to understanding its organisational form (Viganò in Viganò, Fabian, Secchi ed. 2016:15). The dissolution of the form of the city, and the dispersion of the city in territory are part of the evolution of the European city at the end of the XXth century. Specific to the European territory of urbanisation is a mixing of functions, where living and working spaces co-exist with spaces destined for industrial and agricultural production, recreation and education (Viganò in Viganò, Fabian, Secchi ed. 2016:13). Paola Viganò's research project on the European city conceives the metropolitan space in a

different way, looking at its horizontality not its centrality, and it's diffusion into the surrounding territory. The hypothesis of the Horizontal Metropolis as a transformative agent is that it can be "considered as an original urban ecology" (Barcelloni and Cavalieri 2015:6). At the planetary scale, the conditions offered by horizontality, as a way to think of both the material infrastructural expansion that increases the hybridization of agricultural rural and urban landscapes and the interconnectivity of ways of life and human relations have fostered the emergence of several models of urbanisation each with its particular challenges, the Zwischenstadt in Germany, Desakota cities in Asia, Citta diffusa (Diffuse city) in Northern Italy (idem). Specific to the European territory of urbanisation, and the Veneto region in Northern Italy, the hypothesis of isotropy, developed by Secchi and Viganò is both an analytical tool and a projective device (Viganò in Viganò, Fabian, Secchi ed. 2016:13). Isotropy changes the spatial relation between the different fragments of the urban, as they become interconnected by the infrastructure network that developed to accommodate them (Secchi in Viganò, Fabian, Secchi ed. 2016:35).

At a planetary scale, the increased interconnectivity of urbanisation landscapes and the generalisation of an economic and an ecological crisis as a living condition, have prompted the development of new research agendas attempting to interpret and find solutions to emerging phenomena. Berrando Secchi's New Urban Question (Secchi 2014 "*La nuova questione Urbana*"), growing out of and expanding the field of research into diffuse urbanisation highlights the challenges that increased interconnectivity and horizontal expansion pose on the landscapes of urbanisation as the interdependent issues of increasing social inequalities, environmental degradation and the consequences that approaching the planetary boundaries of our current ecosystem bring. Secchi's (2014) plea is for the need of urban thinking and design to tackle these challenges that are not solely questions of governance, but also of spatial policies, practices and projects. As urbanisation is not only a planetary scale phenomena but a lived experience for an increasing number of people, Secchi (2014) focusses on the spatial dimension of urbanisation as the medium where these challenges can be addressed through policy, practice and design projects.

The territorial agenda of European research and practice, and the continuous exchange of ideas between researchers and practitioners in Europe and the United States, have led to the emergence of landscape as an important actor in the making of the city and in dealing with the challenges posed by the conditions of planetary urbanisation (Sordi 2016:8-9). The dispersion of production at planetary scale that came with the assembly of supply chains created similar conditions in both Western Europe and the United States. They fostered the transition from city to landscape in architectural and urban thinking, as architects and urban thinkers approached the transition of the landscape from a land-based economy to the industrial landscape of the XXth century and the post-industrial wastelands of the XXIst

century (Furlan 2019). Post-industrial cities, and the post-industrial (waste)lands that emerged with them, constituted grounds for experimentation with new city forms and new forms of life, as landscape architects and urbanists retrieved the landscape as the prime layer of our existence and our dwelling on the Earth. The 'traditional' tools of planning proved to be inadequate to deal with the conditions they posed. The paradigm of growth through territorial expansion at the peripheries, and zoning as a tool of planning were challenged by the emerging conditions of the post-industrial city (Sordi 2016:107). In the United States, Landscape Urbanism emerged in the material and conceptual voids left by the Fordist model of economic development and the environmental crisis associated to the "petrochemical age" (Orff 2016). Sordi (2016) traces the emergence of Landscape Urbanism as a distinct field of study and design within the American school of Landscape Design. However, while inscribed in a tradition of landscape architecture and urban design, "Landscape urbanism" as a term introduced by Charles Waldheim through a 1997 conference and exhibition, was an emerging condition of urbanisation in post-industrial societies (Sordi 2016:91-92).

As a way of thinking of contemporary urbanisation, Landscape Urbanism moves away from models of urban density based on the development of the centre, at the expense of the periphery, and introduces the matrix as a spatial form, characterised by fragmentation and the discontinuous use of land (Mossop 2006:164). Though they have been assimilated to the same discourse of Landscape Urbanism due to the intense intercontinental exchange of ideas, Landscape Urbanism in the United States, and in Europe have taken two distinct yet intertwined trajectories (Shannon 2006). While in the United States, the advancement of a theory of landscape urbanism led to the emergence of a distinct disciplinary field, in Europe, landscape has been mostly used as a tool for design in emerging urban environments (idem). Within Europe, Paola Viganò and Bernardo Secchi's research programme and designs are among the most representative for their characterisation of European urbanisation models.

The publication "Water and Asphalt. The Project of Isotropy" (2016), assembling research conducted by Paola Viganò and Bernardo Secchi from 2005 presents the territory of the Metropolitan Venice region through the lens of the matrix of infrastructural use and equipment. By looking at the interconnected networks of roads and water systems within the larger watershed of the region, and the way in which contemporary metropolitan projects contradict the capillarity of the water and road networks that had co-evolved since the Roman empire, landscape emerges as an artefact, touched by some form of human intervention since historical times. Specific to the Veneto region and to similar densely inhabited territories within Europe is the co-existence of industrial production units, urban centres and agricultural fields that carry forward traditional agro-ecological agricultural

practices (Ferrario in Viganò, Fabian and Secchi ed. 2016:63). The publication is indicative for the challenges that are posed on such a densely inhabited territory, in terms of accessibility and the capacity of its watershed to provide its inhabitants with clean water. Through scenario planning, exploring the themes of water availability and the generalised accessibility of territory without the use of motorised vehicles, the publication offers visionary thinking for the future of metropolitan regions.

In the United States, where the history of colonial occupation sought to erase indigenous populations and their forms of territorial government and settlement, the introduction of the grid cutting across the continental territory to delimit the States of the United States and the parcels of land for settling the land according to the European model of the city, already created the horizontal conditions for the multiplication of both the city and the plantation in the XIXth century. Unlike the European territory of urbanisation, characterised by the diffusion and co-habitation of functions within the horizontal matrix, the separation of functions is a characteristic of American cities whose model of territorial expansion produced new structures, the landscapes of sprawl, and the vertical cities representative of American financial power (Viganò in Viganò, Fabian and Secchi ed. 2016:13).

Among Landscape Urbanists in the United States and Canada, Pierre Bélanger's approach of the landscapes of urbanisation highlights the horizontality of the American landscape as a "synthetic ecology" (Bélanger 2017) that accommodates "different flows, materials and processes, extensive and intensive, combining waste and water, fuel and food, mobility and power" (Bélanger 2017:107). As characterised by Bélanger, the horizontality of the American landscape is manifested in the standardisation of mono-functional landscapes leading to spatial, ecological and socio-economical segregation made permanent through the engineering of infrastructures (Bélanger 2017:942-944). Bélanger's look at urbanisation though the lens of asphalt as the horizontal correspondent of the verticality of concrete (Bélanger in Sordi 2016:151) brings the focus on the ubiquity of infrastructures that entertain an "illusion of safety" through their materiality and the delivery of services, while being highly vulnerable to unpredictable events like storms, floods, hurricanes and wildfires (Bélanger 2017:947). To Bélanger, infrastructure goes beyond the traditional meaning of the term, as civil engineered infrastructural projects, to integrate the supporting biophysical layer and its life processes. As failing infrastructure is driving architects to rethink its role, Bélanger (2017:136) extends the concept of infrastructure to account for the whole landscape, that cannot be ignored anymore in the planning process.

As a "synthetic ecology", the landscape is a hybrid of engineered and natural flows, that encompass freshwater lakes, coastal estuaries, resource deposits, continental shelves, agricultural soils, fossil fuels, underground aquifers, aboveground airspace, micro-climate

and macrobiotics (Bélanger 2017:138). Approaching the landscape as infrastructure, he envisages a paradigmatic shift from engineering landscapes that operate outside natural systems, by mimicking and replacing natural processes, to working with natural systems, like water sheds, soil cycles, use-reuse and waste cycles. In looking beyond the urban at the networks of infrastructure and territorial transformation that unfold in the landscape with the urbanisation process, the region is recast as the locus of urbanisation. Bélanger (2017:68) walks the paths of his predecessors that conceived of the geographical region as the basis of the organisation of life. Patrick Geddes conception of the bio-geographical region, at the beginning of the 20th century, and landscape architect Ian McHarg's and ecologist Richard Forman's formulation of the watershed as a "unit of development" in the second half of the XXth century have preceded his thinking. In his view, geography and ecology are re-emerging as organising principles of life, against the backdrop of a century of engineering and planning (Bélanger 2017:142). With this shift, new urban ecologies are emerging around new urban economies. In the wastelands of XXth century industries, surrounding the Great Lakes, new green industries for biofuels and ecological food production have emerged, along with new financial, technical and ecological mechanisms to return land to 'nature', restraining the reach of infrastructural networks that used to support previously urbanised areas.

Moving away from the standardization of processes that has characterised XXth century planning, working with the landscape allows for flexible and overlapping strategies of maintenance "that privilege ecological systems while enabling tidal fluctuations, moisture variations, climactic regimes, biodiversity, and social functions to flourish and grow" (Bélanger 2017:1007). No longer aspiring to project a finite state of the urbanisation process, landscape urbanism operates with how the landscape performs (Sordi 2016:9), integrating ecological flows into the overall design and reclaiming biophysical processes as important agencies in design.

5.3. Cosmopolitical ecologies

The parallel developments of and interdisciplinary engagements with understanding ecological models of organisation in the natural sciences, the humanities, and the arts and design practices over the last 25 years have opened the concept of the ecosystem from a stable understanding where change is the result of an outside disturbance to an understanding of inherently dynamic and uncertain ecosystems (Reed and Lister in Lister and Reed ed. 2020:27-29). In turn, this reconsideration has brought about a reconsideration of the role of the human in ecosystems. From the point of view of continuously evolving and dynamic ecosystems, the human perspective of the stability of an ecosystem is given by the "time-limited perception" that we have, and the way we identify a state as being of use to us

and consequently managing it as such (Reed and Lister in Lister and Reed ed. 2020:30). From thinking of the human as outside of nature's ecology, ecological systems thinking has moved to advance the human as part of the ecology we inhabit (Reed and Lister in Lister and Reed ed. 2020:30). For the design practices, this reconsideration has brought about notions of flows and performativity specifically through the development of new disciplines, such as landscape urbanism (Sordi 2016:9).

As urbanisation increasingly addresses the metabolic fluxes of energy, food, waste and the infrastructural networks that support urban life, the boundaries of ecology, initially used to describe the relations of nonhumans to their living environment, have been expanded to include humans and their technologies of government (Orff 2016:10). The complex ecologies that provide for our hybrid living environments, the synthetic ecologies Bélanger (2017) speaks of, have prompted landscape and urban designers to develop new ways of studying them, engaging a trans-disciplinary body of knowledge, including ecological sciences and involving the local inhabitants. The advancements in the science of ecological modelling have pushed forward our understanding of the complex interactions between humans and ecological systems (Brocki and Lister 2014). Though the modelling of future scenarios of ecological evolution has gained more accuracy, it has also come with the realisation that evolution in ecological terms is highly dependent on the evolution of human forms of intervention, governance and landscape management. In other words, future scenarios are saying that evolution is co-evolution, that we are part of the ecological systems we inhabit, and that we bear responsibility for the management of our activities within these complex ecosystems (Lister and Reed 2020:31). From the XXth century view of controlling and managing natural and artificial systems, XXIst century systems ecology brings responsibility at the level of human activities. The shifts in ecological thinking contribute to "a growing recognition that what is needed are more flexible, adaptive approaches to managing human activities and designing within the systems that sustain us" (Lister and Reed 2020:32).

Way (2016) argues that applying ecological principles to urban design is not a new practice, it rather builds on approaches developed over the last 100 years by professionals both male and female that have adopted a feminist approach to the study and design of urban landscapes. Way (2016) makes the distinction between urban ecological design as a practice informed by a century of ecological knowledge and the 'new' practices of landscape urbanism and ecological urbanism. In her view, the practice of urban ecological design is not confined to the disciplinary practice of urbanism and it's role into a capitalist system, but draws on wider ecological knowledge and ecological movements in an effort "to steward the future and the long term view over immediate gratification while simultaneously appealing to the senses" (Way 2016). Urban ecological design as thought of by Way and

Orff, is grounded in the consciousness of the present moment, situated at the intersection of the growing knowledge on ecological systems over the last 100 years and the thought of the consequences our actions and designs might have upon the generations to come (Way 2016). From a feminist perspective, as Way argues, urban thinkers and practitioners have engaged the urban through “the body, as the primary site by which we come to know the world”. Women in particular have been involved in campaigns for public health in the US and in Europe, and have made a substantial contribution to the understanding of change in ecological systems and the exchanges between humans and their environments. Rachel Carson’s (1962) Silent Spring, as one of the most influential books of the environmental movement in the 1960s (Way 2016) is one particular example. As already mentioned in 4.3. Forest Wilderness: between wild and managed, Carson’s narrative follows the bio-chemical exchanges of nutrients and particles going on within and between the bodies of the soil, the plants, the animals and the humans, linking chemical pollution of the environment with rising public health issues.

While paradigm shifts inform new scientific and design approaches, engineered approaches to dealing with the challenges of extreme weather events within complex ecological systems are still widespread. Jane Wolff’s (2020) analysis of the 100 years old system coupling infrastructural development and institutional frameworks for the draining of marsh landscapes that provided for urbanisation lands in New Orleans, draws attention on the disappearance from the collective consciousness of the ecology of the delta landscape that continues to shape the city of New Orleans, even as it was drained of its waters. Her account tells the interdependent stories of technological innovation for draining swamp landscapes and the response of the swamps that had ceased to produce new soil, thus leading to the collapse of the drained lands below the 1900 level of the swamp. Furthermore, with the development of pipeline infrastructure for the transportation of oil and gas and the Mississippi River - Gulf Outlet, functional between the 1950s and 2011, erosion along these lines allowed for the infiltration of saltwater in the swamp landscapes. The swamps provided protection against storms through slowing the speed of waves. The infiltrations led to the loss of a substantial amount of marshes and cypress swamps. New Orlean’s example is indicative of the unintended consequences of attempting to control complex ecosystems while creating the conditions for Hurricane Katrina to produce irreparable damage to the urbanised landscape. Still, while initial efforts bringing community and designers together had produced an array of constructive solutions to post-Katrina reconstruction, they had not materialised in long term projects and approaches. As Wolff (2020) accounts, government funding is still directed towards engineered approaches that construct walls against high waters instead of working with the landscape to build resilience from within.

Kate Orff's research and practice is particularly infused with an ecological thinking. Petrochemical America (Misrach and Orff 2014) is a trans-scalar study of the flows of petrol derived substances that have been used in the United States over decades and the ecological consequences of their accumulation in human and non-human bodies, including the body of the Mississippi river and the delta landscape it creates at its flowing into the ocean. The research project looks at the Mississippi river delta and the transformations it has been subjected to since the mid XIXth century with the opening of the landscape for cotton plantations, and its XXth century transformation into an enclave of the petrochemical industry and the consequences of living within such a polluted environment. Through scaling up to the cycles of nutrients and water that spread to much of the continental landscape as the catchment basin of the river, and down to specific sites in the Delta where the livelihoods of people, wetlands, plants, marine creatures, birds and animals are being endangered by chemical pollution, the book exposes the dangerous consequences of a petrochemical lifestyle. As Orff (2016:197) notes, scaling up to ecological cycles and down to specific sites, "is a powerful tool to get beyond the paralysis of "global" and "local". By juxtaposing the evolution of the natural landscape of the river delta and its wetland loss with the constructed petrochemical infrastructure of extraction sites, pipelines, refineries and processing facilities, the image of an ongoing war on nature and of a delta landscape "under siege" emerges. At the same time, Orff's research enlists all the members of the community, some of whom are petrochemical substances, pipelines and resource corridors, living next to plants, animals, fish, birds, humans and the river. Orff's and Wolff's independent research projects shed light on the consequences of a century long of designing against nature. Petrochemical America (Misrach and Orff 2014) ends with a "glossary of terms for a post-petrochemical culture" where civic engagement propositions intertwine with ecological and environmental monitoring practices.

Through her design practice, Kate Orff's ecological thinking is re-valuing landscapes differently, according to the challenges and changes needed for the XXIst century. Her practice draws on the century old histories of ecological thinking and landscape conservation and the more brief history of landscape restoration in the United States, adopting nature-based solutions for restoring damaged post-industrialised landscapes in urban settings. Her projects and visions call forth a cosmo-political ecology, acknowledging and taking responsibility for the whole landscape as a multi species inhabited landscape (Orff 2011:67). Through the involvement of the public in data collection, designing, building and monitoring the evolution of the projected landscape, she is changing the way in which landscapes are managed and taken care of, moving away from a bureaucratised central control towards a new concept of stewardship (idem). Two of her projects at the boundary between city and ocean in New York City are redefining and shaping the landscape, creating a more resilient landscape and more resilient communities. Her participation in restoring the

post-industrial sewage landscape of New York City at Jamaica Bay into the Gateway Natural Park, is an opportunity to revisit the value of the Natural Park and of the marsh landscape of the Bay. By acknowledging the hybridity of the bay as a "natural watershed and an urban sewershed" (Orff 2011:70) all the institutional actors are called forth, and more honest conversations about the quality of water, the challenges of climate change and the biodiversity of the landscape cat take place. Beyond the administrative reach of regulatory bodies, the interest in the landscape and the challenges it is facing are calling for a new stewardship to take form, conducing the bay landscape towards resilience in the XXIst century. Oyster-tecture aims to create a resilient water front towards the ocean by colonising concrete breakwater barriers with oysters, they do so through involving the local community in designing, building and monitoring the new constructed landscape. Breakwater and Oyster-tecture are projects combining the material presence of hard engineered structures with soft ecological networks, both biological and public, that reinterpret "infrastructure as a connector rather than barrier" (Scott 2016:187). As Orff (2016:202) notes, the infrastructure of the XXIst century "will be simultaneously technical and political, social and ecological, pragmatic and empowering" as it will be reinterpreted through an urban ecology lens.

5.4. The forested landscape as a living space

While urging urban theorists and practitioners to expand the realm of the urban to include the non-urban, Brenner and Schmid's paradigm of planetary urbanisation (2012) also holds the vision of more that just one form of urbanisation, that are more socially and environmentally just (Brenner 2016). Looked at from the planetary scale, we inhabit forested landscapes. As Fig. 5. Planetary forest landscape (in *4.4. The planetary forest landscape*) shows, we cohabit the planet with trees and forests. They comprise not only what we perceive as being forested landscapes, outside of the cities we inhabit, but also the forested landscapes within our cities. Conceiving of the planetary forest landscape as an urbanised space, and consequently as our living space requires rethinking design approaches (see De Meulder, Shannon, Nguyen 2019), questions of rights (touched upon in *4.2. Forest governance: the emerging rights of nature*), the extractive economies of the capitalist system with their infrastructural spaces (see *3.4. "Infrastructure Space" (Keller Easterling 2014)*), and developing new forms of "ecological stewardship" (Brenner 2016).

While the city and the forest have been defined in opposition in European thought, European cities have customarily had forests that they have and still are managing (Konijnendijk 2008:1). Furthermore, with city growth and expansion, driven by the urbanisation process, the meaning of the urban forest has changed, to include street trees, parks, and larger forest areas in the wider geographical territory of cities and urbanised territories (Konijnendijk 2008:1). Rethinking the relation between the urban and the forest in the context of the

European urbanised landscape, the emerging paradigm of “forest urbanism” (De Meulder, Shannon, Nguyen 2019, Wambecq 2019) is reconsidering the role the forest has played in the urbanisation of the Western European territory and proposing design strategies for revaluing and better living with the remaining fragments of the forested landscape of Western Europe. Wambecq’s (2015) research on forest urbanism presents a dynamic Belgian forested landscape that has been continuously adapting to owner’s needs, market opportunities, wars and famine throughout the XVIIIth to the beginning of the XXIth century. Accommodating increased agricultural land and settlements as single-family housing developments in an orthogonal grid structure, land-use policy in Belgium and throughout Europe has diminished the actual forests in favour of the urbanisation of the landscape (Wambecq 2015). The extension of the isotropic grid of urban development driven by the reconstruction efforts in the aftermath of the Second World War encountered resistance only in difficult to access forests occupying flood areas, steep slopes, and areas that were being valued as natural reserves. In flat lands, like Belgium, the remains of Europe’s forests are now integrated into the grid landscape of the “horizontal metropolis” (Viganò in Viganò, Fabian, Secchi ed. 2016:13). De Meulder, Shannon, and Nguyen (2019) argue that forestry and urbanism developed in parallel throughout history, and in the instance of the Belgian Sonian forest they intertwined into a particular form of forest urbanism, where the forest provided the structural element of the inhabited territory over centuries of urban development and urbanisation. They delineate the intertwined history of the Sonian forest and the becoming of the Brussels metropolis where the city came to gradually inhabit the forest through leisure, dwelling and mobility since the XVIIIth century, while proposing the transformation of the mobility network into a decentralised network of multiple modalities of transportation, and the re-naturalisation of the forests’ fringes through reforestation, asphalt reclamation and redesign of settlements. In envisaging the transformation of the Sonian forest into a National Park the forest is repositioned “as a counterfigure of the city” (De Meulder, Shannon, Nguyen 2019).

Gilles Clément’s vision of a planetary garden (2015:34) where we become a particular kind of gardeners of the planetary landscape, that are observing of the changes and *working with* the landscape and emerging approaches of landscape urbanism such as Kate Orff’s urban ecology practice offer new models of ecological stewardship. Next to them, the return of forested landscapes taken during the colonisation process to indigenous populations over the last three decades (see *4.2. Forest governance: form inter-action to inter-dependence*) is promising in fostering “ecological stewardship” (Brenner 2016) and redesigning the extractive relation with forested landscapes. However, while the landscapes under indigenous government contain 80% of the planetary diversity of life forms, indigenous

populations only represent 5% of the total human population of the globe[23]. As discussed in *2.1. Mapping as a living project*, forested territories have been urbanised as living spaces by indigenous populations prior to colonial contact. From Steffensen's account presented in *4.3. Forest wilderness: between wild and managed* their perceived wilderness is more likely a result of colonial violence than an inherent quality as to how these territories were being inhabited by indigenous populations. As these territories are seen as potential resource territories, and are under threat of being exploited by capitalist extractive projects, another vision of development is necessary to preserve the diversity of life forms. As Clément (2015:46) concludes, the development of economies centred on life's biodiversity should overcome the extractive economies that have been pursued with the colonial project.

Thinking of the forested landscape as a living space within this research project, implies thinking of our living space as a more than human inhabited landscape, a world view inherited from indigenous populations, viewing urbanised landscapes as part of forested landscapes and reconsidering the extractive relations that we have constructed with forested landscapes as part of the capitalist-colonial project. As it has a lower embedded energy than concrete (Kuittinen in Hutton, Ibañez and Moe eds. 2019:92), timber is becoming more important in building construction works. France has been one of the first countries to pass legislation for the greater use of timber in the construction industry, particularly in the public sector[24]. As Moe (in Hutton, Ibañez and Moe eds. 2019:85) argues, "the avoidance of using more fossil fuel and carbon-intensive materials, such as concrete and steel, is having the single greatest impact on contemporary timber building". In redesigning the relations we have with forested landscapes Kiel Moe (in Hutton, Ibañez and Moe eds. 2019:84-89) argues towards the taking into consideration of wider carbon cycles in the design of buildings. He envisages this into a framework of reciprocity between forests and the extracted timber, by aligning architectural and building practice "with climate-specific changes" in the cycles of forests' lives, including vulnerability to disease, for example. While extractive landscapes have historically been opened and developed outside of city boundaries, the Hanz Woodlands project in Detroit, as well as several other urban timber farms across the United States are changing this socio-ecological and spatial relation (see Susskind in Hutton, Ibañez and Moe eds. 2019:266-273). As the city of Detroit "was forced to decommission nearly half of its parks in 2011 due to restrictive management costs", and as vacant lots, resulting from housing demolition due to equally high maintenance costs, have become more common, small and interconnected urban farming projects have taken hold (Susskind in Hutton, Ibañez and Moe eds. 2019:266-227). As

[23] Blades, Meteor. *Earth Matters: Tribes working with conservation groups to protect lands.* Red Green and Blue. 9 January 2022. https://redgreenandblue.org/2022/01/09/earth-matters-tribes-working-conservation-groups-protect-lands/ Accessed 04.03.2022.

[24] Crook, Lizzie. *French public buildings to be built with 50 percent wood.* 12 February 2022. Dezeen. https://www.dezeen.com/2020/02/12/france-public-buildings-sustainability-law-50-per-cent-wood/?fbclid=IwAR3Qp89Bw0w2Ca2e-eokgGEzuafJBbZTDfAX9I5QyXYrInHpL3MoIvRmjzw. Accessed 25.02.2022.

Susskind (in Hutton, Ibañez and Moe eds. 2019:273) argues, in contrast to agricultural farming, timber farming, which occupies a big surface resulted from the grouping together of more individual plots, opens an “extensive timeline” of 30 to 60 years until the trees are ready for harvest, during which the urban forest offers itself for “productive encounters, where programatic overlaps foster the development of new social spaces and stewardship regimes”. The specificity of forested landscapes and their entanglement in capitalist-colonial cycles of exploitation varies throughout the planetary landscape. As Fernanda Rojas and Thomas Folch (in Hutton, Ibañez and Moe eds. 2019:244-251) present, the complex problematic of the techno-scientific Chilean forestry model, that has resulted in multiple socio-ecological and socio-economic crises impacting people, water and forests, is intertwined with colonial legacies of capitalist exploitation that sought to erase native forest ecologies for agricultural and industrial plantations, and separate people from the forested landscapes they inhabited, aggravated by the militarisation of life during the 1970s and 1980s. As these examples show, reconsidering the extractive relation dominating forested landscapes is intertwined with the reconsideration of capitalist-colonial practices of separation of humans from their living environments.

5.5. Conclusion

This chapter has revisited historical and contemporary discourses and practices operating beyond the boundary of the urban. It discussed the urbanisation process through challenging the distinction between urban, rural and natural, while introducing horizontality as both a concept and a condition, and an expanded understanding of infrastructure, encompassing landscapes, social infrastructures and built structures. Assessing the reach of urbanisation at the planetary scale through infrastructural expansion in natural territories seen for their extractive potential, as proposed by Katsikis (2016), raises important questions regarding the planetary boundaries of our existing planetary ecosystem, land use, land government and the possibility to think urbanisation otherwise. With the shift in thinking in ecological terms over the last 25 years across disciplines, the practice of architecture and urbanism is changing to account for socio-ecological systems as dynamic and inherently unstable (Reed and Lister in Lister and Reed ed. 2020:27-29). As the pressing challenges of the XXIst century require ways of seeing, thinking and doing that deal with the uncertainty of what is yet to come, and the complexities of interactions between us, the other inhabitants of the Earth, and the Earth itself with its geological strata, meteorological phenomena, water sheds, and atmospheric conditions, rethinking urbanisation starting from the forested landscape we inhabit can be a way to reconcile the apparent separation between forest and city.

Part II. Forest encounters

Following Katsikis' (2016:200-212) classification of urbanisation landscapes according to the degree of "geographical organisation" manifesting as accessibility and the reach of infrastructural networks connecting extraction landscapes with urbanising landscapes, the territory of the Vișeu Valley can be conceptualised as a fine scale mixture between an operational landscape and a remote landscape within Europe. Although it has been used as an operational landscape of urbanisation since the XVIIIth century, when commercial logging was first introduced, the intensity and reach of logging operations have not maximised to the whole forested landscape, leaving some patches of forests inaccessible and therefore unlogged. An infrastructure map of the European road connections (Fig. 9) shows a rarefied road network reaching into the landscapes of the Carpathian Mountains. The Vișeu Valley appears as one of the farthest points within this network. The emergence of an environmental consciousness during the 1970s, as new resource frontier territories were being opened specifically at the tropics has directed media and international academic attention towards the tropics. The Central European space of the Carpathian Mountains has come to media attention as a resource landscape since 2014 all the while its valuable forested landscapes have been threatened by illicit and illegal logging. Academic attention for this part of the world is mostly local (see Vasile 2022 and Vasile and Iordăchescu 2022). Part II of this research project presents an encounter with the forested landscape of the Vișeu Valley as an operational landscape of planetary urbanisation, as a landscape constructed for resource extraction and as a more than human landscape. Forest encounters are exercises in scaling up and down the research project, as Kate Orff (2016:195) suggests in her methodological approach to urban ecology research and design projects.

Going beyond the boundary of the urban, as Brenner and Schmid (2014) suggest, I look at the planetary timber flows and the ways in which timber from the Vișeu Valley and passing through the valley is distributed to distant geographical locations, I explore the transformations of the forested landscape of the valley as a landscape that has been historically constructed for extraction, and I present intimate connections between humans and the more than human landscape. Tracing timber flows, mapping the territory as a palimpsest and an immersive ethnographic account are used as methodologies throughout the three chapters, with particular approaches that are relevant to the scale of the investigation.

Chapter 6. The forest as material deals with the planetary scale of timber flows. Throughout it, I situate the forested landscapes of Romania and the Vișeu valley among the production landscapes sustaining urbanisation processes at planetary scale. I explore the shaping of ethical sourcing landscapes with the increasing importance, in the last 30 years, of international regulations of the timber market, and the ways in which ethical and non-ethical

landscapes emerge as timber obtained through both ethical and non-ethical practices gets mixed up in production facilities. In discussing the emergence of non-ethical sourcing practices as illegal logging in the last 15 years in Romania I shift the focus from logging for commercial purposes to care towards the forest in guiding it towards future resilience in the face of climate change.

Chapter 7. The forest as infrastructure deals with the territorial transformation of the Vișeu valley as a resource extraction territory. The chapter discusses the urbanisation of the Valley in the last 250 years with the creation of the forest as a resource extraction landscape. Through mapping territorial evolution and reading the territory as a palimpsest, I reveal the layers of infrastructural development that connected the Vișeu Valley with Central European territories throughout the XIXth century and the first half of the XXth century, and the reorganisation of infrastructure that followed during the second half of the XXth century to connect the Vișeu Valley to the interior territories of the Romanian state and later in the XXIst century with the planetary timber market. The account makes use of a distributed concept of agency (Manzini 2015 in Escobar 2018:125) with a more than human approach. Building on fieldwork experience and document analysis I look in detail at the forest administered by the Vișeu Forestry Yard (OS Vișeu) in order to discuss the evolution of forest management practices as a co-evolution of scientific and ancestral practices.

Chapter 8. The forest as a more than human landscape, introduces the landscape as a mosaic landscape and the more than human connections its carers, forestry engineers and natural park employees (biologists, forestry engineers, environmental engineers), have with the landscape. The chapter builds on fieldwork experience, a reading of the Management Plan of the Maramureș Mountains Natural Park (2014) and the writings of Aldo Leopold (1990), Peter Wohlleben (2016) and Jakob von Uexküll (2010). Through an immersive experience of mapping with my own body the forested territory of the Vișeu Valley, I introduce the landscape as a series of encounters as I discuss the concepts of the landscape as a mosaic and of an inherent harmony in nature, and their significance in the field of scientific biology, as concepts that spill into the public space and influence the way we view natural territories.

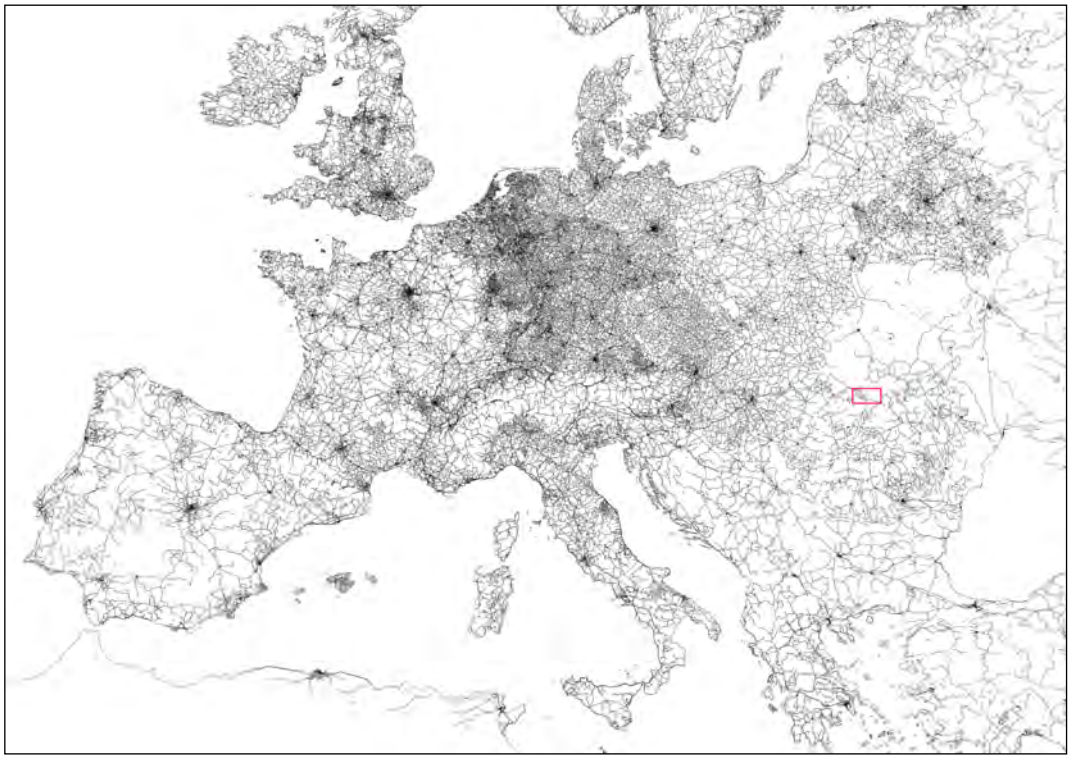


Fig. 9. European road network.
SOURCE: ArcGIS platform

6. The forest as material

The forest as material looks into the ways in which timber flows from Romania are entangled into the planetary timber flows. Making use of aggregated data from the FAO statistics database, I argue that in the contemporary organisation of production units, ethically sourced and non-ethically sourced timber from multiple national and extra-national sources are mixed up and redistributed according to market needs and regulations.

6.1. Timber flows maps the flow of timber, delving into the recorded history of timber trade to and from Romania, since 1962 to 2018 while investigating in depth some specific country to country relations and the geospatial distribution of flows in 2014. Following FAO's categorisation of timber products, that structures the way statistical data is assembled, the hypothesis advanced is that certainty regarding the origin of timber is only possible for roundwood, as the first timber product to enter the market and the manufacturing process. Based on this hypothesis it follows that all other timber products are potentially obtained through mixing ethically sourced timber with unethically sourced timber. The argumentation rests on Nicolas Georgescu Roegen's concept of the qualitative residual, as a qualitative transformation of materials that escapes economic quantification.

6.2. Matters of concern is an investigation into the way illegal logging has emerged as a subject in the public sphere. It looks into the concerns raised by illegal logging, including concerns on the integrity and preservation of natural reserves and old-growth forests, and into the possible sources of illegal timber. While focus resides on the forest as a source of illegally logged timber, I argue for a widening of the focus to encompass forested landscapes at large, including pastural landscapes with sparsely distributed trees.

6.3. Matters of care is a theoretical exploration into how to shift the focus from discussing the forest in terms of the matters of concern raised by illegal logging towards discussing the forest in terms of our reciprocal relation with it and our responsibility to care for it. The discussion builds on María Puig de la Bellacasa's proposition to go beyond Latour's matters of concern towards matters of care and Arturo Escobar's exposé on reciprocity and interdependence.

6.1. Timber flows

In his most famous work, “The Entropy Law and the Economic Process” (1971) Nicolas Georgescu-Roegen engages economy beyond the production-consumption relation. To Georgescu-Roegen, the “economic process” extends before and after a product is manufactured into a desired good. Georgescu-Roegen’s critiqued the mechanistic approach to defining the economic process for denying materials of agency (Georgescu-Roegen 1971:234). Thinking of the economic process as an entropic process, in the terms that the laws of thermodynamics defined entropy, led him to conceptualise it as a sorting process of human activity, a different kind of process than the automatic entropic process going on in nature, but inherently an entropic process itself, through which low entropy is transformed into high entropy (Georgescu-Roegen 1971:281-282). His theoretical work on expanding the field of economics to account for the flows of energy involved in the creation of living matter and the natural processes constitutive of it advocated for the qualitative aspects of living matter beyond its numerical reduction into economic data. Against the simplification and standardization that each economic equation implies, Georgescu-Roegen brought into discussion the transformation of matter going on in an autonomous way, to shed light on the role we, as humans, play, when we take resources from nature to transform them into ‘goods’, preparing them into the food we eat and the objects we use. His account takes into consideration the ‘natural’ processes through which the energy of the sun is absorbed by the earth and into the plants that grow and that feed us (Georgescu-Roeoegen 1971:302), as well as processes of tear and wear through which the objects that we use slowly degrade and decay with each use (Georgescu-Rooegen 1971:219). Through his work, Goergescu-Roegen (1971:101-103) underlined the qualitative aspects of our engagements with matter and energy, that cannot be transformed through quantification, but whose transformations are inherent in the processes of change that characterise living matter. He calls this “the qualitative residual” (Georgescu-Roegen 1971:97), as a form of qualitative transformation that persists when forms of life and matter pass through the economic process. It is residual in as much as it does not enter economic consciousness, while co-existing within it. Georgescu-Roegen’s theoretical work helped ground the field of ecological economy as an independent field of economic study. The conversations around his way of thinking and the concepts he developed continued in the decades after the release of his book and are on-going.

For the purpose of this thesis, the lens opened by Georgescu-Roegen is useful in shifting what matters in discussing the flows of timber. By looking at the entropic nature of the economic process, in Georgescu-Roegen’s terms, one cannot dissociate timber logs from the collective body of the forest from where they originate, neither from the life of the production goods that they are manufactured into, a life that is often conducted in a far

away location from the forest that they came from. In entropic terms, the processes of tree growth, nutrient circulation through underground mycelia networks and soil formation, solar energy photosynthesis and water flow, are a constitutive part of the economic process. What matters, from the economic process as defined by Georgescu-Roegen, is not solely the volume and revenue of logged timber, the ones that define economic exchange by way of statistical data, but also the quality of the harvested timber, the quality of the forest, the quality of the industrially produced timber product, and the relations that are forged to sustain the transformation of a tree into a log and then a timber product. Similarly, the requirements that are placed on forested landscapes to grow specific kinds of trees and the technologies of production matter as they shape forested landscapes. In Romania, Europe and other countries where scientific forestry is practiced, the qualitative transformation of the forest and of trees, from seed to logs is overseen by scientific forestry practice that places a series of requirements on the forested landscape, requirements that shape its future growth. Scientific forestry practice also accounts for trees in their living environment, taking into consideration aspects of the soil, water and climatic conditions. In addition to them, a series of requirements are placed on the landscape by the timber market, its technologies of production and the capacities of industrialised facilities. These multiple aspects describe the "qualitative residual" (Georgescu-Roegen 1971:97) inherent in the transformation of both landscapes and trees and hidden by the quantification of economic exchange.

The following discussion is a reading of statistical data on timber and timber products flows assembled in FAO statistics. The reading of this economic landscape shows several phenomena at play: the shifting of scientific forestry paradigms, the shifting of the economic requirements set on forested landscapes at national level, the opening of frontier landscapes of extraction along the Carpathian mountain range beginning in the early 2000s, and the evolution of manufacturing technologies and increase in manufacturing capacities. The economic landscape emerges as heterogenous, where legally and illegally sourced timber coming from and being directed towards landscapes within or without the spaces controlled by timber tracing regulations mix. I call these landscapes ethical and non-ethical landscapes, co-existing in the economic landscape of timber trade.

In FAO's categorisation system, the only timber that can be attributed to a place of origin is roundwood, the first product coming out of a forest in the form of a tree log. The opacity of the economic process going on inside industrialised production units, sorting between qualities and quantities of timber to be used on different production lines, make it so that all other timber products registered in statistics are potentially a mix of local and imported timber. The particularities of timber sourcing from within Romania, where investigative

journalists estimate that 50% of timber is illegally sourced[25], and the flows of timber traversing it place a doubt of illegality on timber and timber products. The timber inside production units in Romania emerges as a mix of legal and illegal timber, of various national and non-national sources.

The analysis integrates empirical findings from fieldwork as well as studies and investigative journalism reports with statistical data to tell a wider story related to the quantitative aspects shown. Out of all categories registered in FAO statistics, the following flows of imports to and exports from Romania were interrogated for the period 1961-2018: roundwood and the derivates sawn wood and wood-based panels, itself an aggregate comprising veneer sheets, plywood, and particle boards (OSB), and wood chips, particles and residues and the derivates wood pellets and fibreboard. (Fig. 10.) For the year 2014 a spatial distribution of flows of imported and exported timber and timber products was conducted, mapping the geography of sourcing and destination landscapes.

Since the early 2000^{s} and most prominently in the early 2010^{s} Romania has become a gateway, a frontier landscape, of the kind William Cronon (1992) described for Chicago in the mid XIXth century. Since then, Arab and Asian markets have imported an increasing amount of sawn wood for construction from Romania, and from the Carpathian Mountains. Increasingly since the early 2000^{s}, when a shift in production landscapes in Europe occurred, from central European territories to Eastern European territories, sawn wood began to be manufactured at large for export from Romania, using a mix of imported and domestic roundwood. This shift in production landscapes is evidenced by the founding of the Romanian branch of the Austrian timber processing company Schweighofer, which, in 2003, left the biggest European timber conglomerate, the Stora-Enso group, along with its operational landscapes in Austria, Poland and the Czech Republic to settle in Romania[26].

[25] Environmental Investigation Agency (EIA). 2015. *Stealing the Last Forest. Austria's Largest Timber Company, Land Rights and Corruption in Romania. pp. 4.*

[26] The company is ranked 12th timber company worldwide, 2nd in Europe, with a production capacity of 2.4 mil m^3 roundwood/year, after the Stora-Enso group, while its Sebeș (open since 2003) and Rădăuți (open since 2008) sawmills are ranked 9th and 10th in Europe, with 700.000 m^3 processed roundwood/year in 2021, representing half of their full capacity (https://www.sawmilldatabase.com/productiontoplist.php?continent_id=999 Accessed 13.04.2021). For comparison, the nearest competitor in Romania has a production capacity of only 150.000 m3 processed roundwood/year (https://www.sawmilldatabase.com/productiontoplist.php?country_id=41 Accessed 13.04.2021).

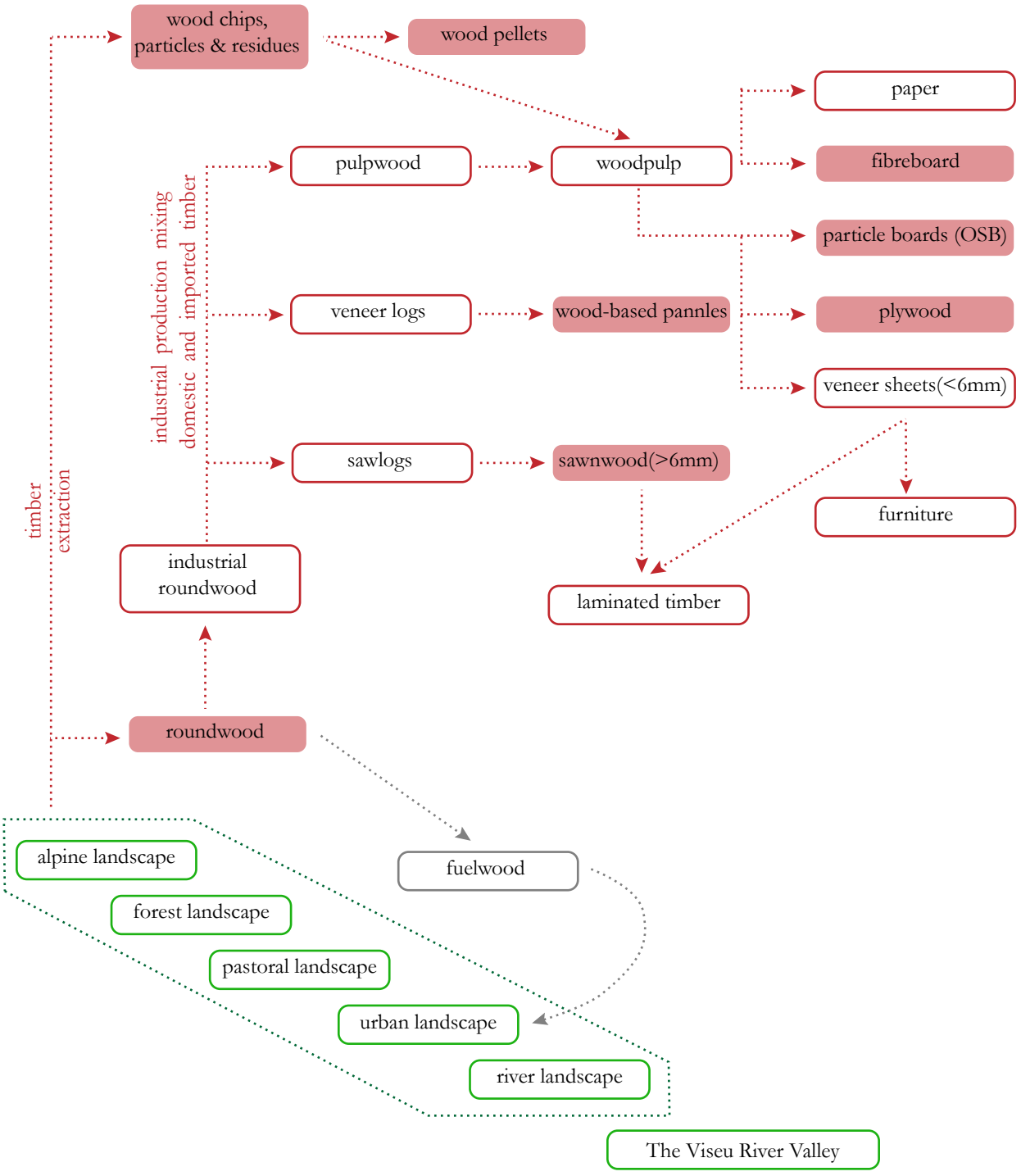


Fig. 10. International timber trade products categorisation (FAO)

In terms of operating a global timber business, Romania offers both forested landscapes and access to maritime routes through its main port city at the Black Sea, Constanța. The shift in production landscapes and the accessing of extra-EU timber through the strategic positioning of the leading company Schweighofer at the margins of the European space, coupled with the establishment of new trade routes with the Asian markets (China and Japan) since the early 2000s, can be read as the opening of a new frontier landscape in the Carpathian Mountains.

This increased timber flow is evidenced in FAO statistical data and has been investigated on the ground by investigative journalists. The 1961-2018 roundwood imports and exports chart (Fig. 11) shows a surprising inversion of import and export quantities and an increase of imported roundwood since the 2000s. For 2014, the year when concerns of illegal logging and the over exploitation of the Romanian forested landscape emerged to public attention, the graph shows that the quantity of roundwood imported from other countries was more than double the exported quantity of roundwood from Romania. The data shows an increased processing capacity in Romania, to which the Schweighofer sawmills, opened in 2003 at Sebeș[27], in 2008 at Rădăuți[28], and in 2015 at Reci[29], with a combined capacity of 3.7 mil. tones of processed roundwood, added a great deal.

[27] *Fabrica de cherestea din Sebeș*. HS Timber Group. https://hs.at/ro/compania/unitati-de-productie/sebes.html, Accessed 28 October 2022.

[28] *Fabrica de cherestea din Rădăuți*. HS Timber Group. https://hs.at/ro/compania/unitati-de-productie/radauti.html, Accessed 28 October 2022.

[29] *Fabrica de cherestea din Reci*. HS Timber Group. https://hs.at/ro/compania/unitati-de-productie/reci.html, Accessed 28 October 2022.

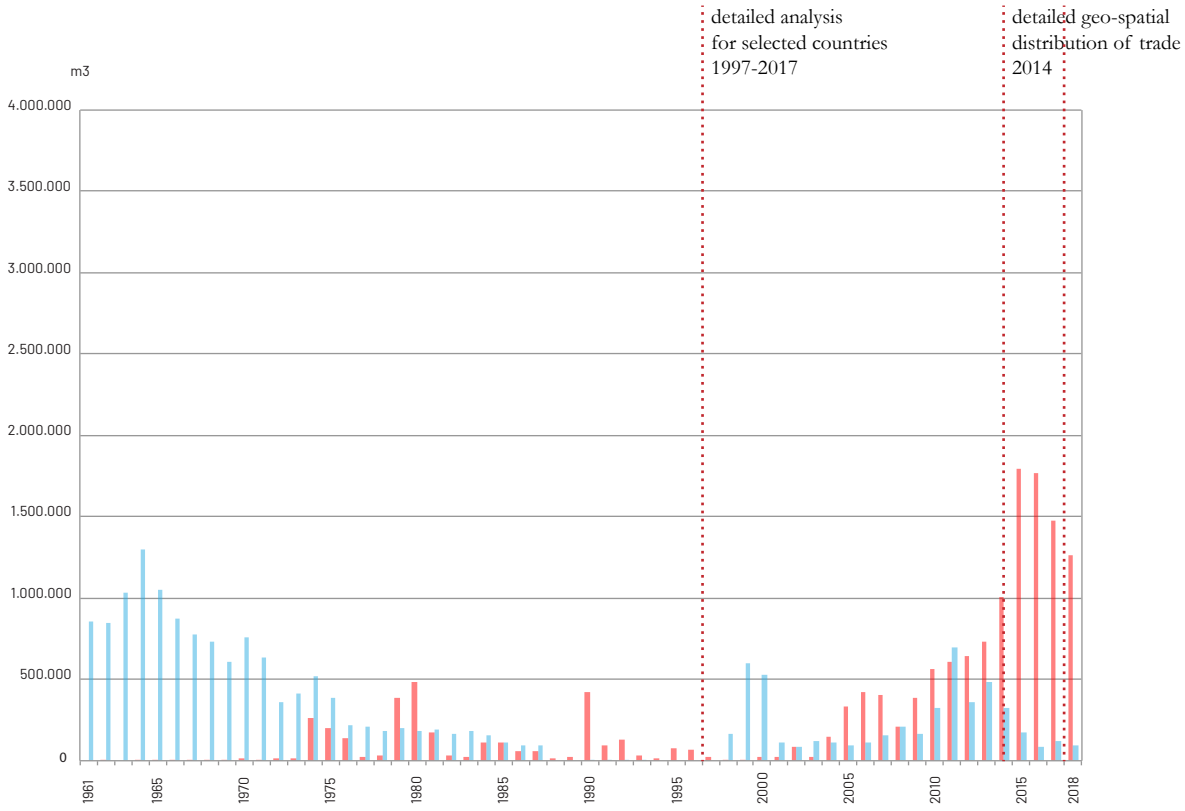


Fig. 11. Industrial roundwood import / export. Romania (1961-2018)
data source: FAOSTAT

The spatial distribution of roundwood flows for the year 2014 (Fig. 12,13) evidenced that logs were being imported primarily from European countries, with the most significant quantity being imported from Ukraine, a country outside the European Union, where the national timber market is not governed by timber tracing mechanisms. Unethically logged timber can potentially be sourced from Ukraine, a risk that processing companies should take into account and mitigate, according to both EU regulations and FSC guidelines. Looking into the detailed timber trade relations between Romania and Ukraine between 1997 and 2017 (Fig. 14,15) the increasing importance of imported coniferous logs starting from 2004 is evidenced, amounting to more than 800.000 m^3 in 2014 and almost 1.200.000 m^3 in the peak year 2015.

While timber tracking mechanisms are relatively new[30] (see *3.4. "Infrastructure space" (Easterling 2014)*), looking at the flow of timber along older and newer trade routes sheds light on the emergence of ethical and non-ethical landscapes of both sourcing and distribution. Within Europe, the EUTR has been adopted by the European Parliament in December 2014, coming into force in 2015-2016 when individual countries translated it into legislation. As ethically and unethically sourced timber logs find their way into the production units, the growing timber markets across the globe accommodate both. A sorting process, going on within production units, is responsible for distributing timber according to markets' ethical requirements.

Export of timber products from Romania particularly involved sawn wood, that was an important trade resource with European countries during the 1960s and 1970s (Fig. 16). During the 1980s and 1990s, when, on the one hand protected areas had been instituted throughout the country, leaving less exploitable forests, while on the other hand timber was exploited within Romania and capitalised on the emerging internal market, exports dropped. Since the 2000s exports of sawn wood increased exponentially, reaching highs never before achieved, nearing 3.500.000 m^3 in 2013/2014.

[30] *Regulation (EU) No 995/2010 of the European Parliament and of the Council of 20 October 2010 laying down the obligations of operators who place timber and timber products on the market*. 2010. Official Journal of the European Union L 295:23-34.

Fig. 12. Industrial roundwood import to Romania (2014)
data source: FAOSTAT

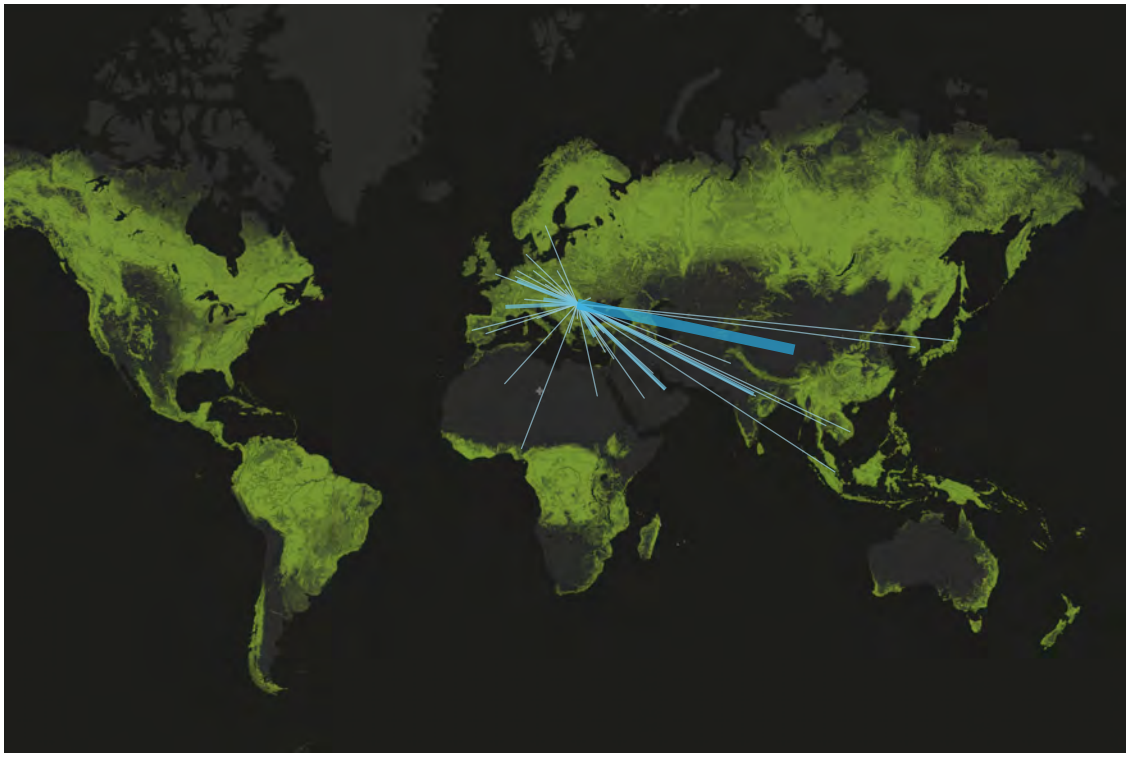


Fig. 13. Industrial roundwood export from Romania (2014)
data source: FAOSTAT

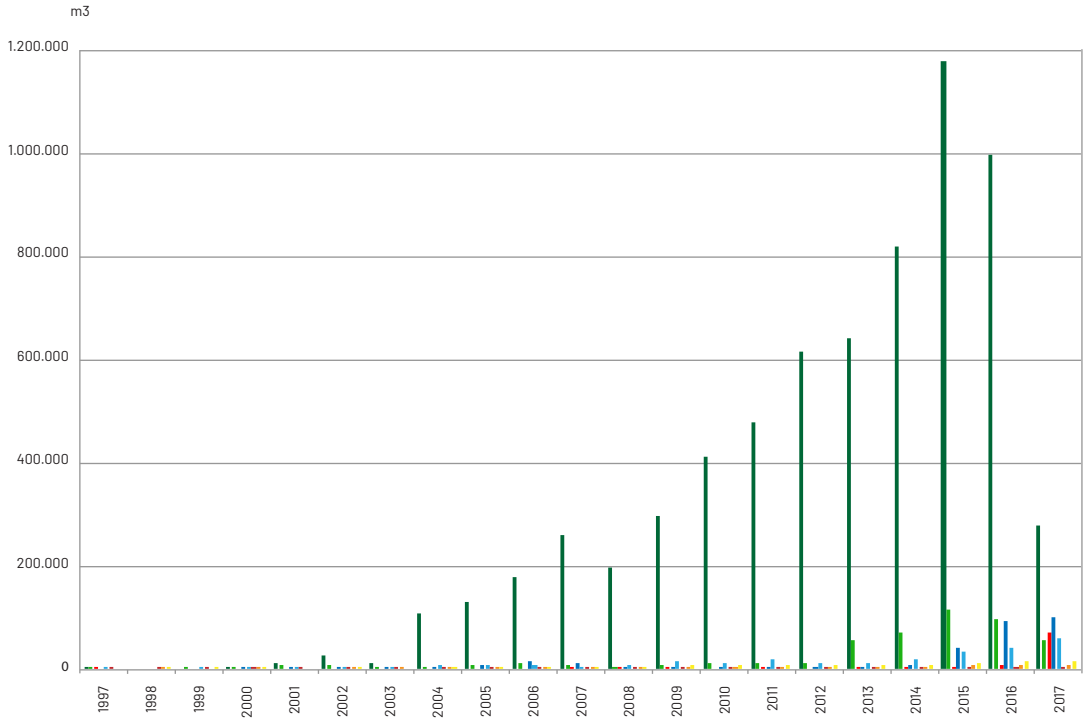


Fig. 14. Romania - Ukraine imports (1997-2017)
data source: FAOSTAT

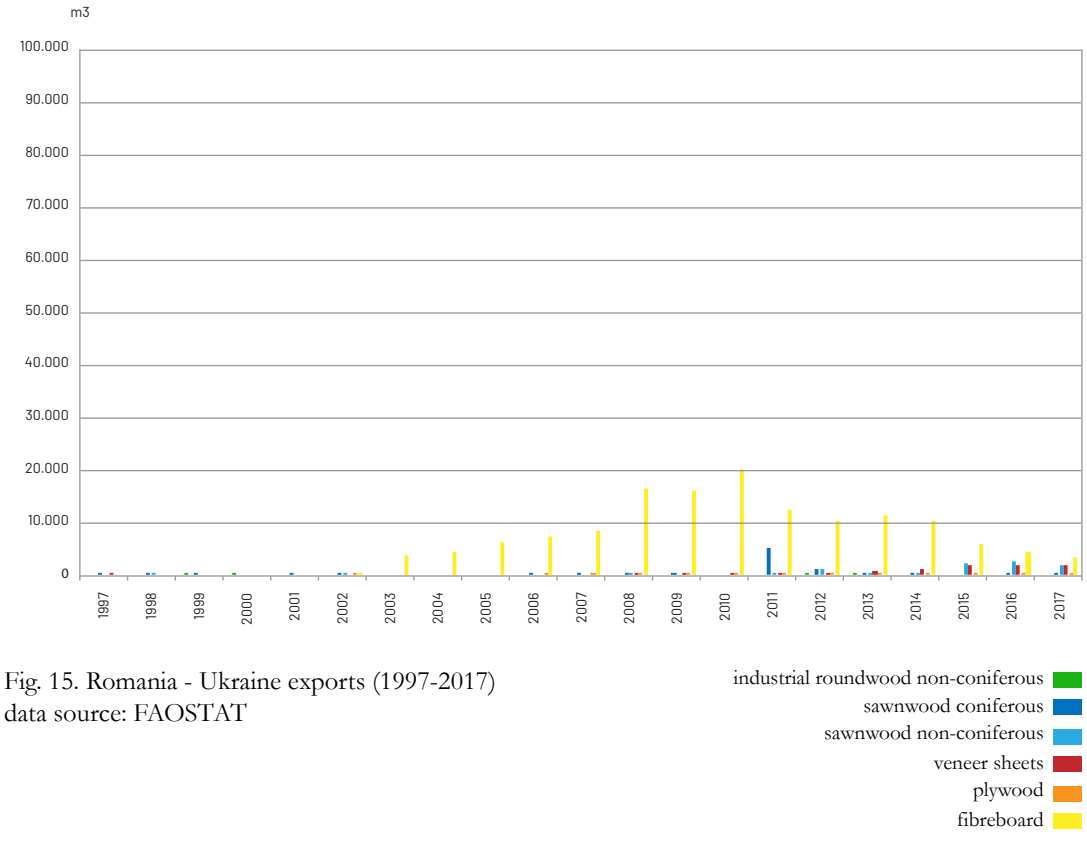


Fig. 15. Romania - Ukraine exports (1997-2017)
data source: FAOSTAT

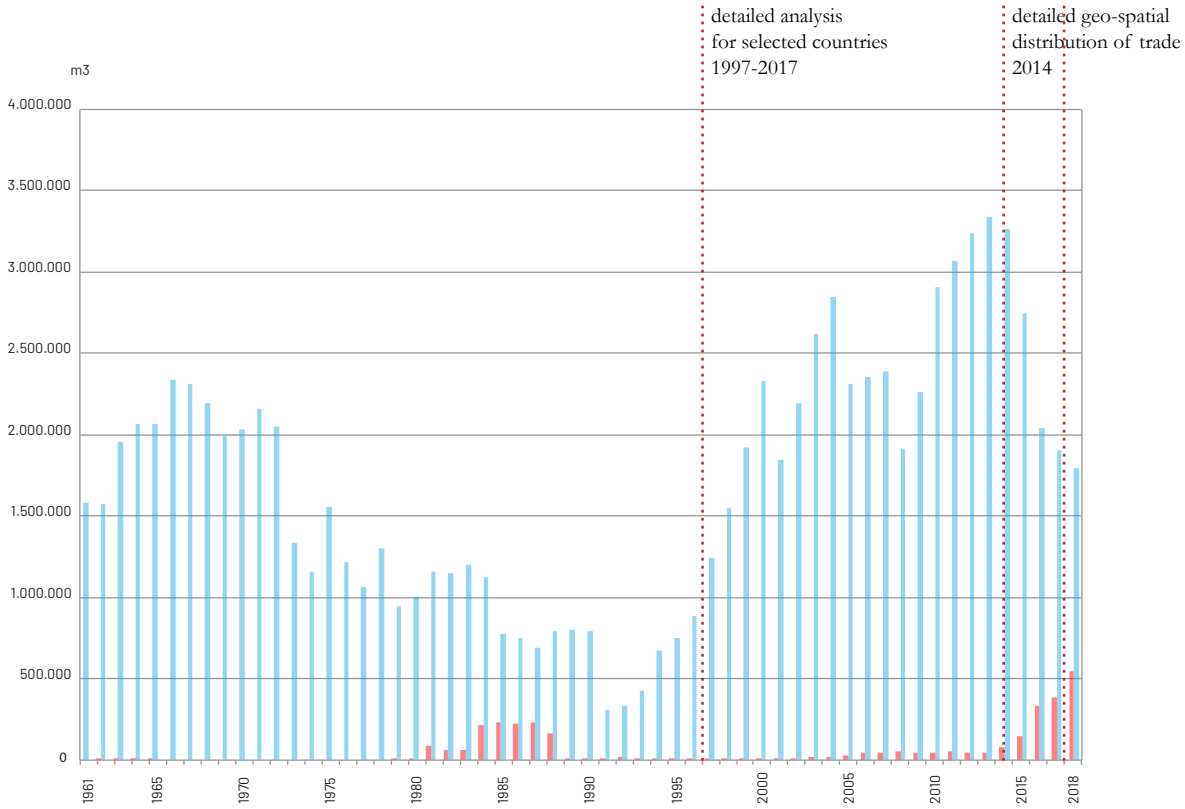


Fig. 16. Sawnwood import / export. Romania (1961-2018)
data source: FAOSTAT

Fig. 17. Sawn wood import to Romania (2014). data source: FAOSTAT

under 1 mil $
1 - 10 mil $
10-18 mil $

Fig. 18. OSB import to Romania (2014). data source: FAOSTAT

under 1 mil $
1 - 10 mil $

Fig. 19. Plywood import to Romania (2014). data source: FAOSTAT

under 1 mil $
1 - 10 mil $

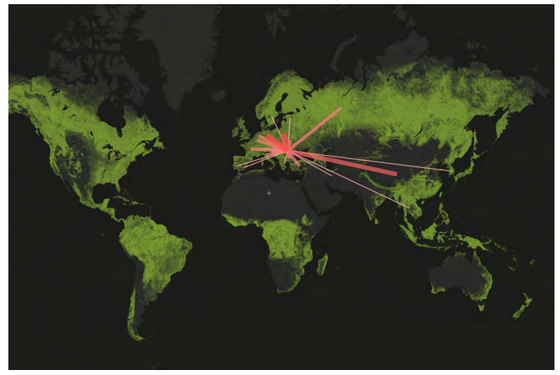


Fig. 20. Fibreboard import to Romania (2014). data source: FAOSTAT

under 1 mil $
1 - 10 mil $
10-18 mil $
19 - 59 (38) mil $

Fig. 21. Sawn wood export from Romania (2014). data source: FAOSTAT

under 1 mil $
1 - 10 mil $
10 - 18 mil $
19 - 59 (38) mil $
60 - 149 (100) mil $
over 150 mil $

Fig. 22. OSB export from Romania (2014). data source: FAOSTAT

under 1 mil $
1 - 10 mil $
10 - 18 mil $
19 - 59 (38) mil $

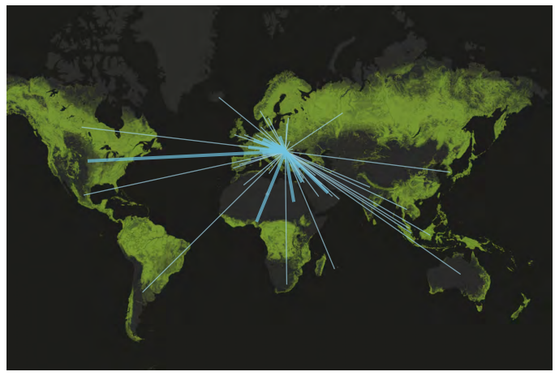


Fig. 23. Plywood export from Romania (2014). data source: FAOSTAT

under 1 mil $
1 - 10 mil $
10 - 18 mil $
19 - 59 (38) mil $

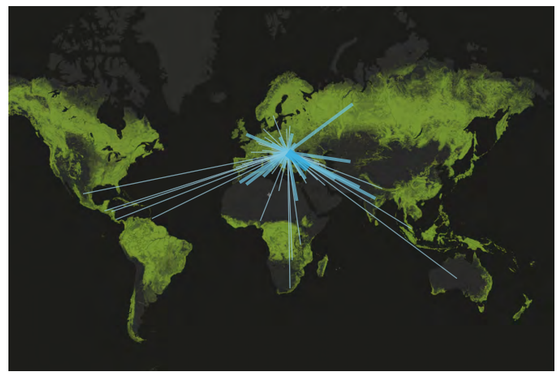


Fig. 24. Fibreboard export from Romania (2014). data source: FAOSTAT

under 1 mil $
1 - 10 mil $
10 - 18 mil $
60 - 149 (100) mil $

Fig. 17. to 24. present the geospatial distribution of timber products (sawn wood, OSB, plywood and fibreboard) that have been imported and exported from Romania in 2014. Sawn wood flows evidence European sourcing and significant exports to Asian, North African and Persian Gulf markets. The top destinations for Romanian sawn wood in 2014 were Japan, Egypt, and China. With the exception of Japan, which adopted a controversial legislation on timber tracking in 2016 (see *3.4. "Infrastructure Space" (Easterling 2014)*), the North African, Persian Gulf and Chinese markets did not prohibit illegally and unethically sourced timber by 2020. While 2014 has been a year of reference for this analysis, the trade relations identified have a longer and developing history.

While the increased flow of sawn wood evidenced from the year 2000 is partially fuelling Japan's growing housing industry that preferentially uses prefabricated timber structures, and the new cities that are being built in the Gulf countries and in China, the Romanian market of processed forms of timber for furniture and light construction is growing. Overall, Romanian exports are predominantly oriented towards roundwood and sawn wood, while considerable imports are made in processed timber products in the form of panels and boards. Technological advancement now makes it possible to obtain high quality structural elements through the combined resistances of timber and glue rather than using a 100 years old single piece of equal resistance. FAO statistics indicate that the development of manufacturing technologies for fibre boards and wood panels have made them available at large scale, increasing the amount of boards and panels on the market since the 1960s. The production and use of wood-chips for heating, on the other hand, has risen since the 2000s, particularly in Romania. Both of these technologies of manufacturing do not require high quality timber, as they can use any kind of timber available, ideally from rests of logs remaining from the processing of structural elements. As processing technologies develop to make use of any kind of timber, the quality of timber matters less and less in the contemporary landscape of timber trade.

From the distance of regulatory bodies and policy makers, the efficiency of the industrial production process in making use of every bit of wood is hailed as contributing towards the sustainability of timber resources (State of the World Forests 2018). However, the conflicting paradigms of the market and of scientific forestry, exert a pressures on the forest landscape that has never before been encountered. While for the market, the quality of timber only matters for specific structural elements, as it has found ways to make do with less quality timber and with rests of timber, for forest management, the quality of the forest, and inevitably of the timber taken out of it, matters in terms of the forest's regenerative capacities, its resilience and its future life. While for scientific forestry each tree species has a specific logging age, around or above 100 years, taking into consideration the properties of

timber and the regeneration cycles of the forest, the market can make do with younger trees (40 to 60 years old) and old-growth trees (over 120 years) for the manufacturing of laminated timber beams, furniture, pallets, and transform the rests into bio-fuel or other fibrous material. With the increase in production capacities, loggers and timber suppliers are looking for sources within and beyond the assessed capacities of the forest to produce the required timber, often shortening the life projects of trees.

In *3.1.Frontier landscapes* I traced the way the concept of the frontier has changed with the opening of new frontier landscapes. With William Cronon (1992) and Anna Tsing (2005, 2012) the space of the frontier has emerged as not merely a place of extraction and the advancement of the capitalist-colonial frontier, but also as a place of exchange, where knowledge and ideas are exchanged. In Anna Tsing's (2005, 2012) account, the frontier is also a place where legal and illegal activity mix. Adding to the established and growing markets of intra-European and North African trade, the frontier space opened in the Carpathian mountains in the last 20 years, sustained by the supply chain business model that draws significant quantities of timber resources to China, Japan, and Gulf countries, becomes a sorting place where legally and illegally sourced timber come together in processing facilities and are sorted according to the ethical requirements of their destination. In navigating the "infrastructure space" (Easterling 2014) of timber tracing mechanisms and regulations described by certification schemes such as the FSC and national and regional market regulations such as the EUTR, businesses navigate through risk landscapes that offer seemingly limitless opportunity for growth. Within these landscapes, growth means capacity expansion and increased resource flows. In the new frontier landscapes of risk, the life of the forest, its regenerative capacities, its acting as a micro- and planetary climate regulator, its active role in local economies, the maintenance of local cultural and spiritual practices, and the sustainability of timber resources are put at risk.

6.2. Matters of concern

With the increased attention on forested landscapes sustained by the multitude of information sources and digital imagery capturing their transformation, the struggle to protect the forests on the ground from disappearance is doubled by a permanent fight for access to reliable data on forest change and the implications this might hold for the future. As Topalovic (in Yabuka and Topalovic 2014) notes, information is "a securitised territory". Globally, the fight for access to reliable data on forest change has given rise to open access scientific projects such as the Global Forest Watch platform (globalforestwatch.org), and to more regional and national open access projects prospecting the changes in the forest landscape, such as the lemncontrolat.ro platform in Romania. Through such projects, the forest is becoming a data landscape. With the impossibility of knowing exactly what happens in the forest on the ground, the forest data landscape specifically in Romania is characterised by doubt and suspicion. Doubt arrises at the intersection of scientific uncertainty, public policies, and corporations' and firms' (mis)communication strategies (Bramoullé, Orset 2018). Where economic legislation and the economic view on the forest, that consider any activity in the forest a private affair, meets environmental legislation and a view of the forest as an ecosystem, data is negotiable as the conflict between environmental data that is thought of to be publicly accessible and economic data that is withheld from the public becomes apparent.

In this data landscape, there are mismatches between official reports and the data estimated by unofficial, investigative reports. The way things are defined and measured in the data landscape make a difference between what is "true" and what is "false". Legislation is a battle ground where concerns raised about the state of protection and the rate of exploitation of forested landscapes are debated, resisted, dismissed, reluctantly approved, withheld, or passed through. Official reports state that the forest surface of Romania has increased between 1990 and 2015, as was reported by the Romanian State to FAO's Global Forest Resource Assessment 2015. Compared to 1990, when the forest surface was reported to be 6371 x 1000 ha (FAO. Global Forest Resource Assessment 2015:13), in 2015 the forest surface was reported to be 6861 x 10000 ha, making for 29.8% of land (idem:7). Out of the whole forest surface, 4.1%, representing 283 x 1000 ha, was considered to be primary forest, 8.3%, representing 569 x 1000 ha, was considered to be planted forest, and 87.6%, representing 6009 x 1000 ha was considered to be naturally regenerated forest (idem:38). The extraction rate in Romania has been reported to increase from 12.61 mil m3/year in 1990 to 14.36 in 2011 (idem). While official statistics operate with the legal definition of the forest, as a piece of land designated to be used as forest, investigative journalism and environmental activists reports have drawn attention on the

diminishing of the actual forest surface (EIA 2015:3), the practices of illegal logging, and the sites where illegal logging may or is happening (EIA 2015:7, WWF 2005:8-10).

While acknowledging the limitations of government data that at that time did not allow to trace wood consumption, export and import, so that an estimation of illegal logging could have been calculated, a 2005 study on illegal logging in Romania conducted by WWF, Illegal Logging in Romania, pointed towards potential areas for the harvesting of timber outside of what is legally defined as forest land, and the existence of a space of manipulation within the practices of forest management that govern forest designated lands. Illegal logging is hereby defined as "*the harvesting, transporting, buying or selling of timber in violation of national laws*" (WWF 2005:2). In the study, WWF experts draw attention on the way the annual allowable timber cut, predicted on the base of the forest designated land, does not take into consideration timber coming from other kinds of forested landscapes, like forested pastures or abandoned agricultural land where the forest has taken over the land (WWF 2005:8). They point towards an estimated 300 to 350 x 1000 ha of heterogenous pasture land where trees could potentially be harvested from, without being calculated in the annual timber statistics (WWF 2005:9). The study also exposes issues with the transparency of reporting timber harvested from legally defined forests, and suggests that control of illegally logged timber is weak during transport on roads, railways and maritime routes (WWF 2005:11).

A 2015 Greenpeace report on illegal logging assessed an increase in cases reported by the police from a media of 30 cases per day in 2009-2010 to 50 in 2012 and 62 in 2013-2015 (Greenpeace 2015:2-3). The report interprets this increase as either an increase in efficiency of the local authorities or an increase in illegal logging activity (Greenpeace 2015:3). As statistical data analysed in the previous section indicates an increase in timber flows during this period, there is a possibility that with the increase in illegal logging activity the efficiency of the local authorities has increased. For 2013/2014, based on data reported by the police and the prosecution office they record a dramatic increase in the volume of illegally logged timber amounting to a little over 1 mil. m^3, compared to figures between 120 m^3 and 150 m^3 for 2009 to 2012 (Greenpeace 2015:4). Three counties rank first in the volume of illegally logged timber, Alba, Cluj, and Maramureș, all comprising important parts of forests in the Carpathian mountains, making up 78% of the total volume confiscated by the authorities (Greenpeace 2015:5).

Where boundaries are at risk, the protection of biodiversity is endangered. At the end of October 2020, the European Commission initiated an infringement procedure against the Romanian State for failing to protect Natura 2000 sites part of the European network designating valuable areas for biodiversity's protection. The Commission holds the state directly responsible for omitting to correctly translate EU Natura 2000 sites legislation into

Romanian legislation, particularly omitting to take into consideration the exterior causes of deterioration of protected landscapes[31]. Some of these landscapes are forested landscapes that have been under pressure for logging within and around their strictly protected areas. As diverse patches of landscapes co-exist and co-habit together in larger landscape formations, what happens in one patch influences what happens in nearby and distant patches. Boundaries are porous on the ground, they do not have the solidity they have when inscribed on paper. The Romanian state has also been criticised by the UNESCO world heritage commission for failing to protect the centuries old virgin beech forests on its territory that are part of the European wide Ancient and Primeval Beech Forests UNESCO heritage site instituted in 2007. Küpper and Hervé's 2019 report on the state of protection of the UNESCO World Heritage Site and its buffer zone identify logging in buffer zone, in the direct vicinity of the Site as a threat to conservation efforts (Küpper and Hervé's 2019:25).

While data is a landscape of doubt, the forest is a landscape of crime. The 2020 Global Witness report "*Defending Tomorrow. The climate crisis and threats against land and environmental defenders*" registered the highest number in killings of people defending land against the mining, agribusiness and logging industries' practices since the signing of the Paris climate agreement in 2016 (Global Witness 2020:6). According to the record, in 2019 alone 212 people died while defending the lands they inhabited, while crimes in the logging sector registered the highest increase, with 85% more crimes. 19 people were killed while defending forested lands, including 2 foresters in Romania (Global Witness 2020:10).

Thinking with Bruno Latour and his notion of "matters of concern" (Latour 2013:337), there are several matters concerning the forest that have and still are being intensely debated in the public space of Romania. While environmental protection and the role the forest plays in regulating the climate and the environment is more a matter discussed in niche circles that are aware of, hold knowledge about and are interested in the forest as a more than human landscape, the narrative of illegal logging has been flooding the Romanian public space since 2014, with the disclosure of illegally sourced timber particularly it being entangled in the supply chains of the biggest timber manufacturer in Romania, and Austrian founded company Schweighofer (EIA 2015). A perceived public distrust towards forest management, particularly state management, and the forestry engineers involved in it has benefited from those stories of complicity to illegal logging leaked through the press. At the same time, the narrative of nature's protection has highlighted and brought to light the very valuable old-growth, virgin forests, and those forests that benefit from extensive protection against logging through being included in specially protected areas instituted since the 1970s as National Parks. At the current moment, the narrative of illegal logging, that sheds light on the

[31] Reprezentanța României la Comisia Europeană. *Proceduri de infringement în domeniul mediului privind exploatarea forestieră ilegală.* https://romania.representation.ec.europa.eu/news/romania-proceduri-de-infringement-domeniul-mediului-privind-exploatarea-forestiera-ilegala_ro Accessed 20.04.202.

worst cases, coupled with that of strict forest protection, that sheds light on the very valuable forests, present only the extreme cases, while expert discourse[32] is focussed on the same. A change in narrative, looking at the forest in its spatiotemporal continuum, recognising the diversity of forests and the diversity of logging and forest management practices that have helped shape its current state and form, is required. While state mechanisms and legislators fail to effectively protect the forest, the efforts from the ground are most important. During the time of writing this PhD several stories of forestry engineers protecting the forest have been given media attention, particularly in their resistance to, and disclosing of illegal logging[33].

Beyond the way the narrative of illegal logging is framed in the media, the implications of illegal logging and inappropriate or inexistent forest management in forested landscape are concerning. The uncontrolled, potentially damaging change of the composition of the forest resulting from uncontrolled logging operations can have unforeseen consequences and undermines the aim of forest legislation and scientific forestry, which is to manage it in such a way as to improve its species composition and make it more resilient to the challenges of climate change in the coming decades. While the complicity of forestry engineers is implicit in cases of illegal logging in managed forests (Herța 2014), timber extraction in the absence of a management plan has unforeseen and potentially dangerous consequences for the future life of the forest, as the resiliency of the landscape as a whole is put at risk. The disappearance of primary and virgin forests is concerning as the knowledge of our joint co-evolution is being lost with them.

Fig. 25. to 30. present the valuable and at risk forest landscapes in Romania and in detail on the Vișeu Valley. Because the risk of illegal logging has been identified over very vast forested landscapes, there is a need to understand the management practices that help to maintain, preserve, and contribute to the forested landscapes' diversity for the benefit of all life forms, human, plants, animals and the soil that supports all life on Earth. *Chapter 7. The forest as infrastructure* will go in depth with presenting forest management practices on the Vaser Valley, one of Vișeu's affluents. Contrasting the protected and at risk forest landscapes invites for a reconsideration of landscape protection towards more diffuse forms of protection through constant and consistent landscape management and care.

[32] Among expert voices, those articulated by WWF and Agent Green in Romania have the most consistent interventions on policy, legislation, illegal logging and forest protection.

[33] Ciurcanu, Andrei. *Dezastru din Munții Maramureșului: 12 ani de jaf ascuns*. Rise Project. https://www.riseproject.ro/dezastrul-din-muntii-maramures-12-ani-de-jaf-ascuns/. Accessed 3.11.2022.

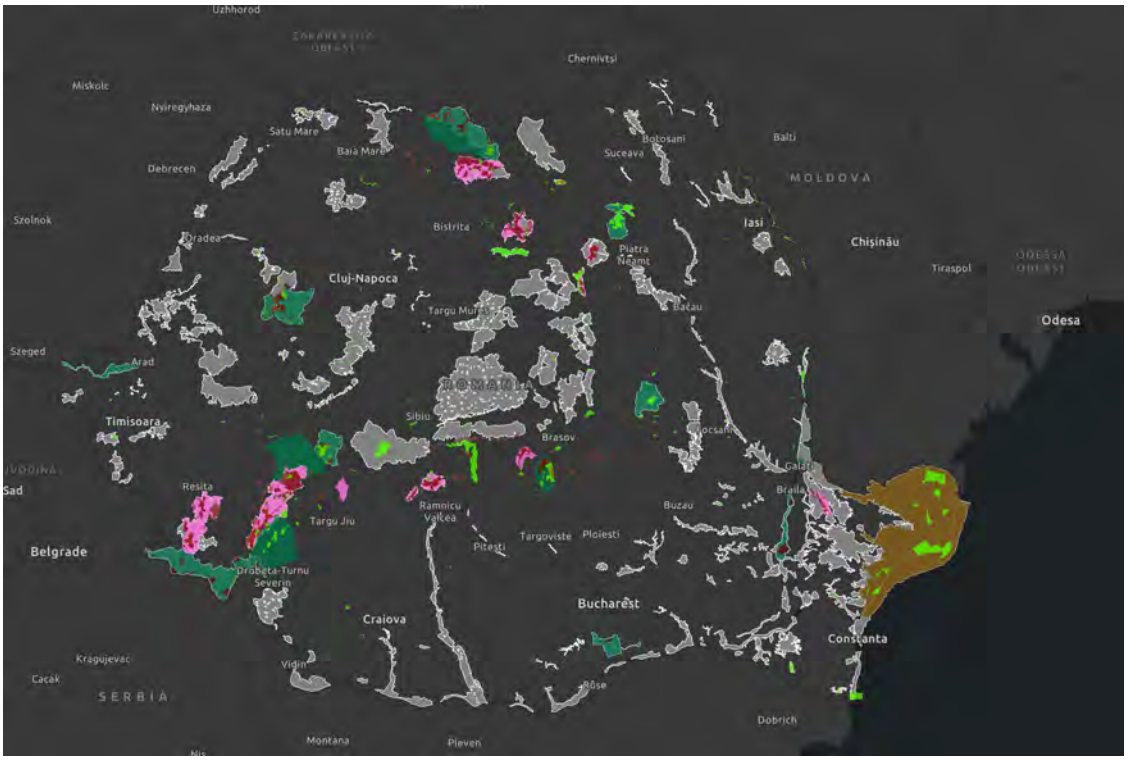


Fig. 25. Protected natural areas in Romania (2015)
SOURCE: www.lemncontrolat.ro

Natural Reserves
National Parks
Natural Parks
Special conservation areas within Natural and National Parks
The Danube Delta Biosphere Reserve
Natura 2000 (EU) sites

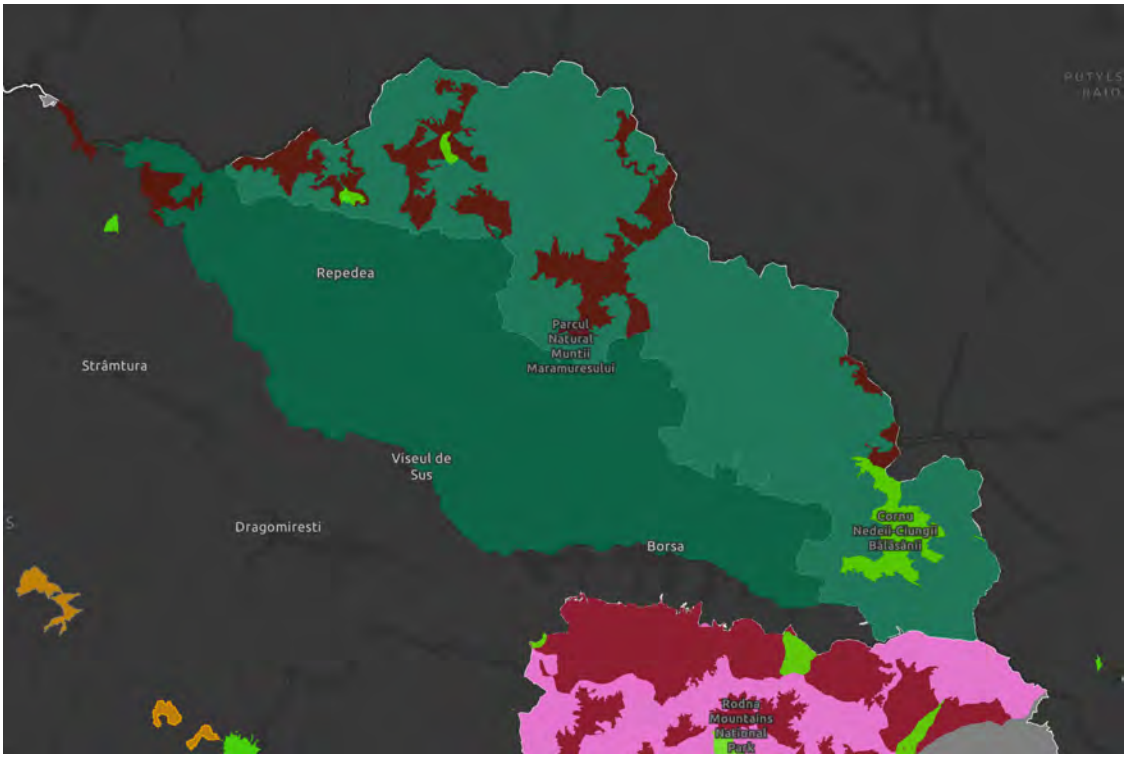


Fig. 26. Protected natural areas on the Vişeu Valley (2015)
SOURCE: www.lemncontrolat.ro

UNESCO sites Groşii Ţibleşului, Strâmbu Băiuţ

Fig. 25. Protected natural areas in Romania (2015) presents an overview over the landscapes where any kind of legal protection is instituted. *Fig. 26. Protected natural areas on the Vișeu Valley (2015)* presents in detail the area of the Maramureș Natural Park instituted on the Vișeu Valley in 2014, including natural reserves and conservation areas.

Fig. 27. Illegal logging risk in Romania (2015) presents the landscapes where a risk of illegal logging has been identified. *Fig. 28. Illegal logging risk on the Vișeu Valley (2015)* presents the assessed risk of illegal logging on the Valley.

Fig. 29. Virgin, quasi-virgin forests and UNESCO sites in Romania (2015) presents the forest landscapes that have been identified as the most valuable forests, where humans have not intervened in any visible manner in a sufficiently long period of time to be categorised as virgin and quasi-virgin forests, included or not yet in the National Catalogue of virgin forests. *Fig. 30. Virgin, quasi-virgin forests and UNESCO sites on the Vișeu Valley (2015)* presents the virgin and quasi-virgin forests on the Valley that have been included in the National Catalogue by 2015, as well as those identified that have not.

As Fig. 27 shows, the illegal logging risk on the Vișeu Valley extends over vast forested areas, some of which, on the Repedea Valley, have been reported to have no identified owner in the 2014 Management Plan of the Maramureș Mountains Natural Park, others, particularly on the Cisla Valley, have been the subject of controversial clear-cut logging and property claims[34]. The forested territory of the Vaser Valley, state owned and administered, is assessed as safe from illegal logging. The particularity of the forest on the Vaser Valley is tightly interwoven within the local community of Vișeu, its ancestral history and its imperial history of extraction, that have instituted commercial logging through innovative technologies for 250 years. The forest on the Vaser Valley still plays a very active role in the local community both in terms of jobs in the forestry, logging and timber processing, and as a tourist attraction through the joint use for the transportation of both timber logs and people on the light train line constructed in the first half of the XXth century. While the skill of the Chief of the Forestry Office and his effective authority over the territory entrusted to him for protection and management is an important factor in safeguarding the forest against illegal logging and guiding it towards resilience in the future, local histories that recognise the forest as valuable for the community are equally important for its successful management.

[34] Teremtus, Nicolae. *Cu securea deasupra pădurii Borșei*. Gazeta de Maramureș. 12 December 2005. http://www.gazetademaramures.ro/cu-securea-deasupra-padurii-borsei-8259 Accessed 08.09.2015.

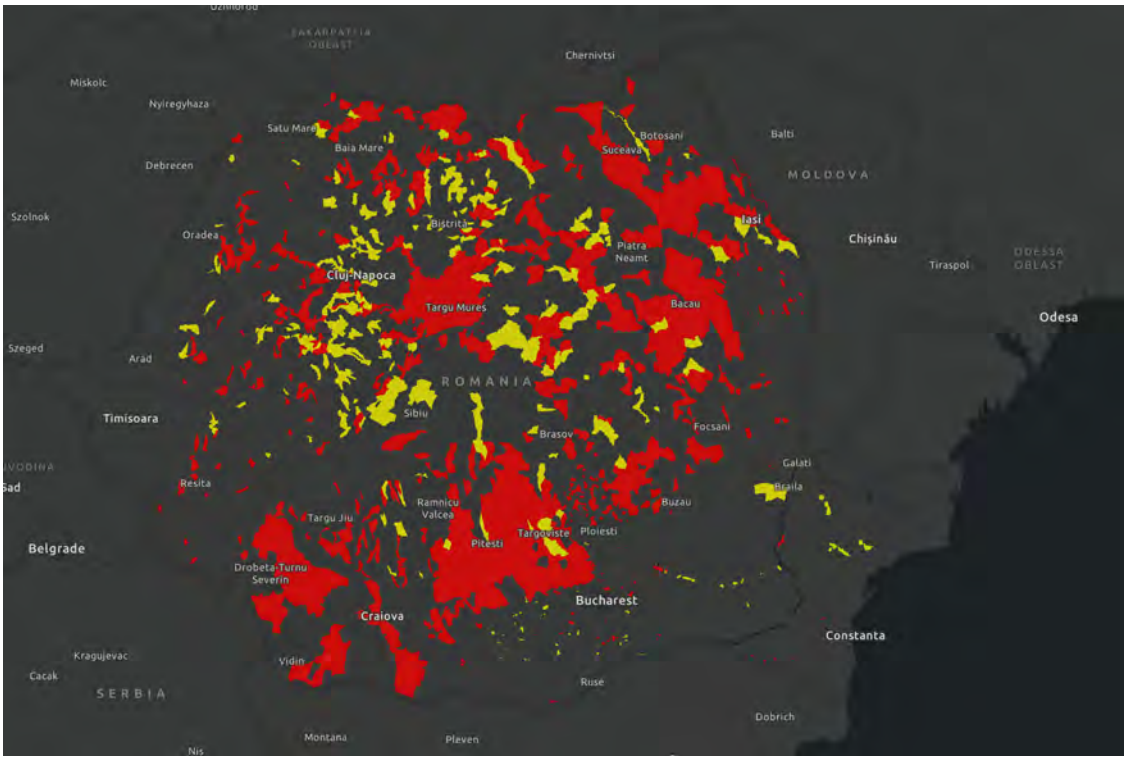


Fig. 27. Illegal logging risk in Romania (2015)
SOURCE: www.lemncontrolat.ro

high risk of illegal logging
low risk of illegal logging

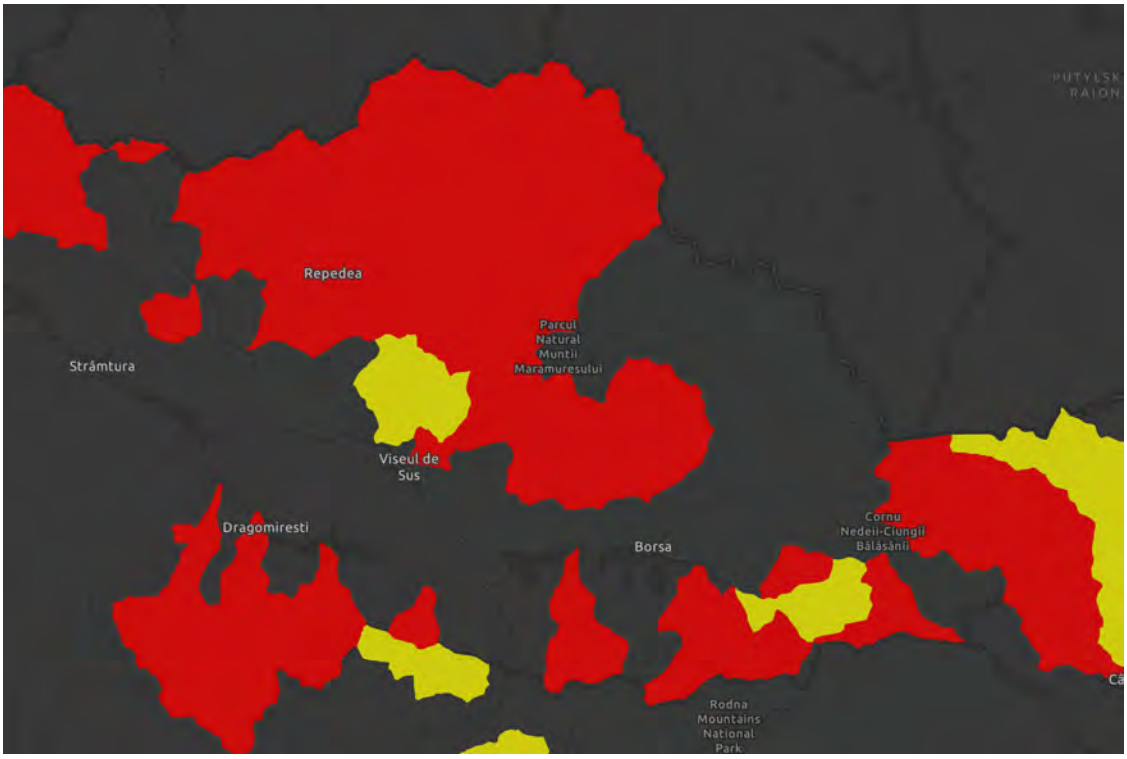


Fig. 28. Illegal logging risk on the Vişeu Valley (2015)
SOURCE: www.lemncontrolat.ro

high risk of illegal logging
low risk of illegal logging

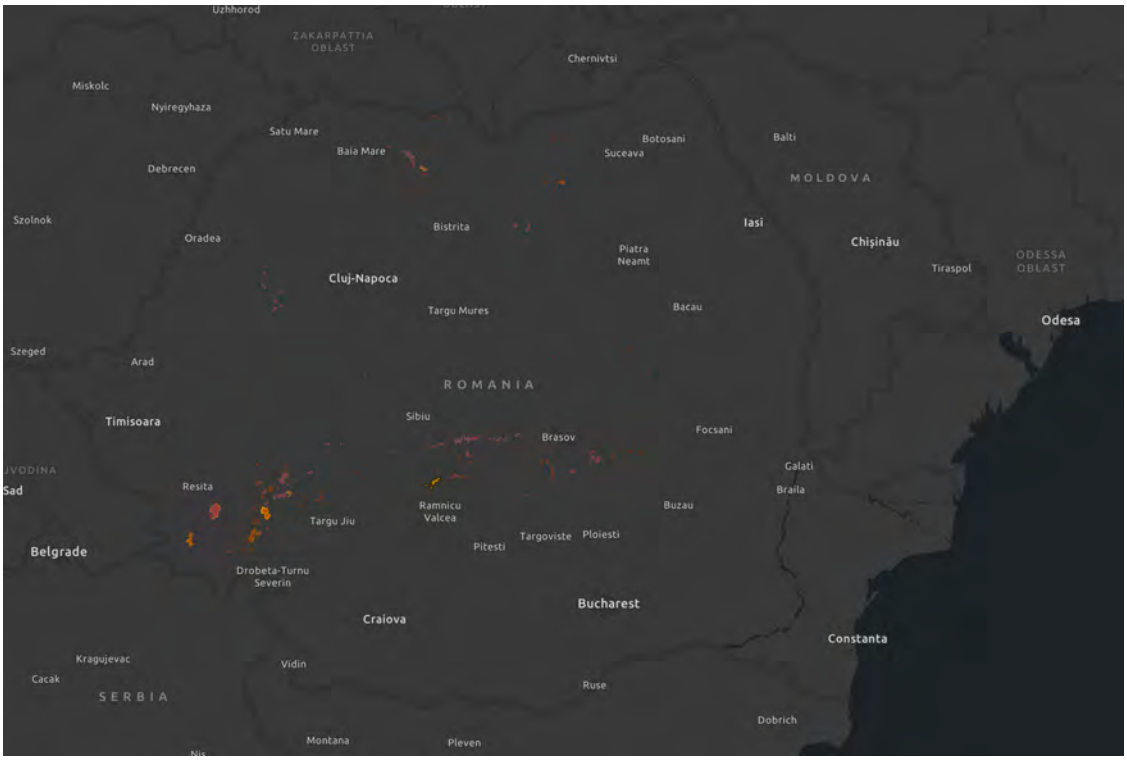


Fig. 29. Virgin, quasi-virgin forests and UNESCO sites in Romania (2015)
SOURCE: www.lemncontrolat.ro

virgin and quasivirgin forests included in the National Catalogue

virgin and quasivirgin forests identified through studies, not included in the National Catalogue

UNESCO sites

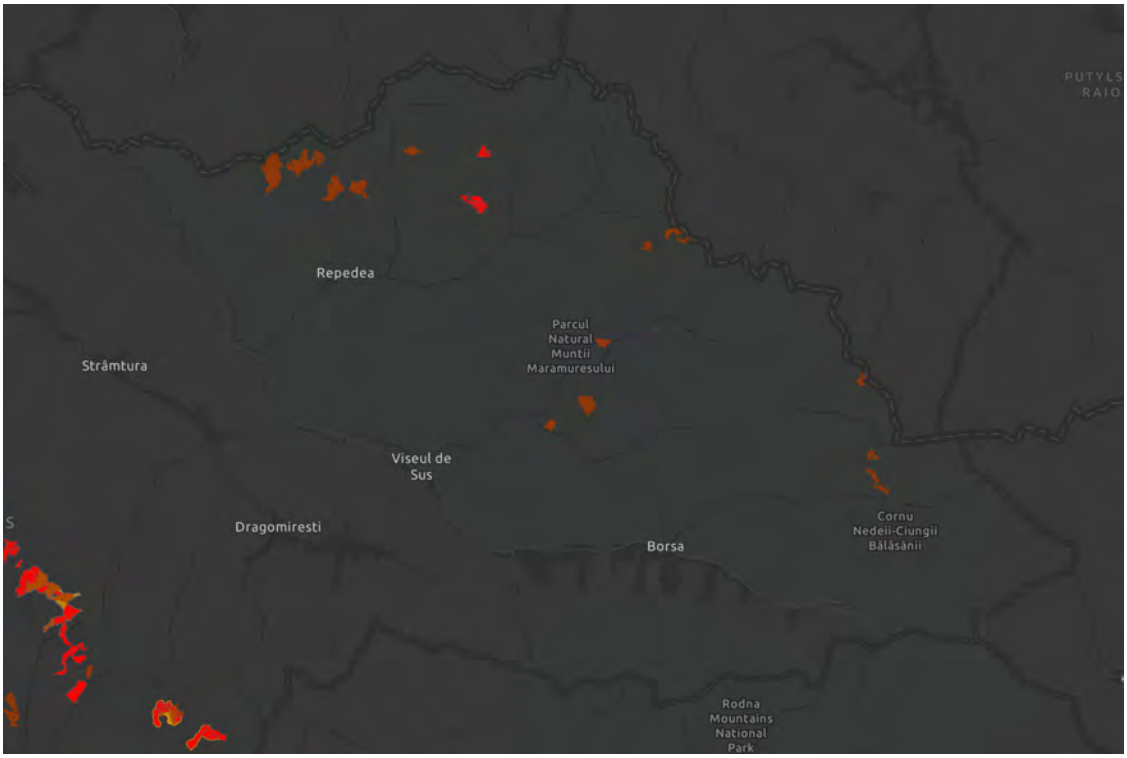


Fig. 30. Virgin, quasi-virgin forests and UNESCO siteson the Vişeu Valley (2015)
SOURCE: www.lemncontrolat.ro

UNESCO sites: Groşii Ţibleşului, Strâmbu Băiuţ

While media accounts and journalistic investigations reveal interest and chains linking businessmen and politicians to potentially illegal logging claims, the pressure of excessive logging is felt on the ground. It is felt by all beings living within forested landscapes that witness forest change, climate change, and large scale extractive operations of timber, sand, and grasses and flowers as they are being intensively grazing.

The pressure of logging is also felt by the forestry engineers that manage forests. As a job, forestry engineering is a high pressure job, as they are theoretically 24 hours in the service of the forest, being responsible for its protection against theft and fire, its safeguarding for future generations, and the unjustified disappearance of timber, qualified as illegal logging, that can be directly imputed out of their salaries. As I have encountered forestry engineers during my forest walks, and have listened to the ways in which they present the challenges of their job, they are incredibly resourceful and imaginative in providing arguments for the protection and safeguarding of the forest before logging interests. Being present in the forest, seeing the forest as a more than human being, becoming conscious of its continuation in space and time, its' rhythms of life and growth, awakens in everybody sensitive to the presence of the forest, including forestry engineers, the consciousness of the forest. The consciousness of the forest inspires in them responsible acts of taking care of the forest their ancestors have left to safeguard for future generations. Becoming conscious of the larger than human life of the forest, through walking the forest day by day, season by season, year by year, being present with it, the perspective of a human life in comparison and in relation to the forest emerges. A human in relation to the forest in such a conscious way learns to listen to her speech. Through what is left behind, and how it grows in the following decades, the forest tells whether logging was done for its benefit, or against it. While forestry engineering as practiced, allows for the direct experience of the forest and a connection to consciousness, it also leaves specific marks in the forest, that are legible to forestry engineers. In particular, Romanian logging practice require a forestry engineer to hammer with a special pentagonal hammer the trees to be logged or the perimeter in which logging will occur, making it so that illegal logging can be detected on the ground, and forest crime can only be established for sure in the forest, by looking at the ground and what is there.

6.3. “Matters of Care” (Puig de la Bellacasa 2017)

In “Matters of care: speculative ethics in more than human worlds” (2017), María Puig de la Bellacasa takes a step further from Latour’s proposition to be concerned and to discuss“things” as “matters of concern”, and invites us to care for things and approach them as “matters of care”. To her, care brings a more charged affective state and an ethical positioning, as it is more action oriented (Puig de la Bellacasa 2017:42). In her reading of Latour, he transformed scientist’s “matters of fact” into “matters of concern”, by presenting the socio-technical assemblages that sustain and bring them to life (Puig de la Bellacasa 2017:30). “Matters of care” further transforms the “matters of concern” through a feminist line of thinking (Puig de la Bellacasa 2017:29) by inquiring into whose voices are and are not represented (Puig de la Bellacasa 2017:46-47). Presenting things as “matters of care” departs from the assumed neutrality of “matters of concern” (Puig de la Bellacasa 2017:42), by introducing, through “caring standpoints” (Puig de la Bellacasa 2017:59) the non-neutral and ethically charged accounts and perspectives of the human and non-human, entangled in extended networks of care, and that cannot represent themselves. Puig de la Bellacasa invites us to look into ”*“how to care?” about the ways “things” are constructed, presented, and studied, especially when care seems to be expendable”* (Puig de la Bellacasa 2017:19). As an ethico-political thinking companion, “matters of care” (Puig de la Bellacasa 2017:66) is a proposition to think with care, to let ourselves, as researchers, be affected by the things / beings that are the subjects of our research.

> *“But the notion of “matters of care” is a proposition to think with: rather than indicating a method to “unveil” what matters of fact are, it suggests that we engage with them so that they generate more caring relationalities. It is thus not so much a notion that explains the construction of things than it addresses how we participate in their possible becomings.”* (Puig de la Bellacasa 2017:66)

There are two aspects of care that Puig de la Bellacasa highlights and that are also important for this thesis, in thinking of how to care for and with the forest: the reciprocity of care and the temporality of care. Taken in individual relations, care is rarely reciprocated, which makes it asymmetrical in its relationality. At the collective level, however, “care circulates multilaterally […]: it is shared” (Puig de la Bellacasa 2017:121). The circular reciprocity of care in a more than human world questions the human conception of agency in favour of a distributed understanding of agency (Puig de la Bellacasa 2017:16). In discussing the temporality of care, Puig de la Bellacasa looks into emerging relational conceptions of soil within soil science. From a productionist definition of soil that values the yield soil produces, contemporary soil ecologists within the field of soil science are proposing a definition of soil as a multispecies community, “from microbial to invertebrate fauna and, of course, plants, roots, and fungi” (Puig de la Bellacasa 2017:189). The notion of “living soil” as a multispecies community thought through the lens of care, where the

inhabitants of soil actively make their living environment, soil, each of them caring for specific aspects of what soil making entails, "*involves looking at the dependency of the (human) carer not so much from soil's produce or "service" but from an inherent relationality*" (Puig de la Bellacasa 2017:192). Going beyond the proposition of soil ecologists Puig de la Bellacasa (2017:192-3) proposes including the humans, as carers of soil, in the concept of soil, enlarging the soil community (Puig de la Bellacasa 2017:209). Including humans as carers in soil communities troubles the "productionist timescapes" while exposing care as necessary for the creation of "livable and lively worlds" (Puig de la Bellacasa 2017:209). Thinking soil as a more than human community introduces "multiple temporalities" (Puig de la Bellacasa 2017:201) in its caring for, including the temporality of microorganisms actively making soil.

For the current research project, a decolonial perspective as one that belongs to other worlds than the capitalist-colonial world, is useful in conceiving of the forest beyond the dominant capitalist-colonial paradigm and its extractive projects. For this I turn to Arturo Escobar's concept of the "pluriverse", the existence of more than one world. The "pluriverse" is close to Puig de la Bellacasa's speculative project, of fostering "visions of other worlds possible" (Puig de la Bellacasa 2017:110). Though coming from different directions, Puig de la Bellacasa engaged on a path of feminist thinking, and Arturo Escobar on a project of political ontology with a de-colonial perspective, the two converge on the need to foster visions as a pre-requisite for calling other worlds into being. Puig de la Bellacasa's feminist ethics and Arturo Escobar's decoloniality share a relational understanding of worlds, where interdependency is a constitutive relation. A critic of what John Law called "One-World World" (Law 2011 cited by Escobar 2018:66), Escobar proposes we think in terms of a pluriversality of worlds as an alternative to the singular World created through the capitalist-colonial project, and an alternative to the Anthropocene that derives out of it as a human creation (Escobar 2018:190). In order for there to be other possible future alternatives, and for them to manifest in a pluriversal world, it is necessary, as Escobar presents it, to rethink the role, the modes and the cultural background of design, understood as a broader activity of organising a world. In *Chapter 3. In the Background of Our Culture. Rationalism, Ontological Dualism, and Relationality* Escobar (2018:79-104) builds on critiques to the "rationalistic tradition" (Escobar 2018:80) in design and world making in order to shift design thinking from a mode of viewing 'things' in isolation and separated from each other, to viewing entire worlds constructed in a relational mode where 'things' are interdependent with each other. As Escobar makes note, interdependency has been studies in western sciences, through not named as such, particularly in anthropological studies of other cultures that ever since the 1960s have shown how "In many cultures […] rather than separation there is continuity between what moderns categorise as the biophysical, human, and supernatural domains" (Escobar 2018:102). From a decolonial perspective, our capacity to think of things as being in interdependent relations with each other, and to think of

interdependence as that which connects us to our selves, our bodies, and the other beings (in their bodies) inhabiting this Earth, has been hindered by the “colonial divide” (Escobar 2018:93). As a system of enforcing difference, that lead to the suppression and destruction of non-conforming ways of being and of knowing, coloniality has changed the ways in which we relate to other beings of the Earth that are inherently different from us. Escobar (2018:93) enlists “three fundamental dualisms” characteristic to “the dominant form of Euro-modernity”, the nature-culture divide, the us and them divide, and the subject-object or mind-body divide, to see beyond the ways in which dualisms exist and multiply in the world. Dualisms, as Escobar (2018:94) notes, were treated in a non-hierarchical way, as “the complementarity of non-hierarchical pairs” in non-modern worlds. Through the renowned interest in the western world towards “emotions, feelings, the spiritual, matter, nonscientific knowledges, body and place, nonhumans, nonorganic life, death and so forth” Escobar sees as the emergence of an “ontological-political field with the potential to reorient cultural and social practice in ways that clearly foster the intersecting goals of ecological sustainability, social justice, and pluriversality**.**” (Escobar 2018:95).

The separation of city and forest (see chapter *3. Shifting production landscapes*) stems from the capitalist-colonial and western ways of isolating the individual from the community of living beings. The forest, in this sense, teaches us about how to be in relation to each other, how to live in a collective, and how to live collectively. As we now know what indigenous cultures living in forested landscapes have known for millennia, that trees communicate underground through mycelia networks, sharing resources and signalling to each other potential dangers, we can leave aside the crude Darwinian view on evolution as a fight for individual survival, and see survival and living as a collective endeavour. As trees in a forest teach us, one tree cannot survive alone as best as it can in a community of trees living in an inter-species / inter-being collective, comprising other plants, flowers, shrubs, animals, the soil and the water together with their microorganisms that carry nutrients. At the core, the concept of the inter-dependence of all living beings is exemplified in the forest. As a new concept entering the western way of conceiving life and the design of livable worlds, interdependence is a much needed change to how we perceive our collective survival and collective life, increasingly important in the face of irreversible climate change. It is a concept that helps us connect with our selves, with our bodies, with other beings, with trees, flowers, mountains, and the Earth as a living being. Naming it as such highlights a new way of relating to the other beings of the Earth.

Seeing the relations between forests, pastures, rivers, mountains, and our ways of living as interdependent relations, in the ways presented by Arturo Escobar (2018) and María Puig de la Bellacasa (2017) calls for a situated approach to caring for the forested landscape, one where ancient and modern practices converge on the best ways to protect the interwoven

fabric of the landscape in the face of irreversible climate change. Understanding the forest as a living being, with living trees, a living soil and other living beings, allows for an entry point into the life sustaining processes of the forest, and the ways in which the forest's life enters into relation with our own life. It reminds us that life of Earth as we know it is possible because plants breathe, and that we breathe in this breath. Forests are among the largest plant communities living among us, far larger and greater than our own communities, with a history reaching far back into the glacial era and beyond it. They will for sure outlive most of us, but with the pressure of irreversible climate change we are all coming to the position of rethinking our vital space to offer us (human, trees, forests, other plants, animals and insects) suitable conditions for life.

With Puig de la Bellacasa (2017) we can think of the forest as a "matter of care", going beyond the concerns raised by the "matters of concern discussed in the previous section. *Thinking with trees* as "matters of care", in the temporality and asymmetrically shared reciprocity of caring for and with trees, is making connections across space, time, bodies and species. The discussion on the rights of nature and on recognising trees as beings introduced in chapter *4. Shifting consciousness on forested landscapes* calls for a new ethics of relating to trees and to the forest, one that goes beyond the socio-technical relation we have constructed with the forest in the last 250 years. It also calls for *care* in the way trees are represented in scientific discourse as well as in media and environmentalist campaigns, going beyond the objectification of trees and forests and recognising them as beings of this Earth we jointly inhabit while being fully aware that they cannot represent themselves, and need human mediation in order to be represented in our scientific and public forums. Thinking with care for trees is a shared trans-generational connection: we are caring for a forested landscape that we inherited from our ancestors, with all its transformations, in a way that it transforms it for future generations. In its temporality, caring for and with trees now will only be reciprocated for future generations. This trans-generational transmission is the transmission of a landscape and the knowledge to care for it that are interrelated in the forests' becoming.

Thinking with care for and with the forest "troubles" the productionist paradigm and the temporality it has imposed on the forest, to paraphrase Puig de la Bellacasa. It also "troubles" the ways in which ethically sourced timber is framed through the "infrastructure space" (Easterling 2014) of national and international regulations. Puig de la Bellacasa (2017:133-134) critiques the ways in which applying ethical standards to every thing gives the impression that caring for things is a personal choice. Thinking of the "multiple temporalities" (Puig de la Bellacasa 2017:201) involved in caring for things such as forests and forested landscapes, where the temporality of tree's growth and reproduction rhythm, the time it takes to make and maintain a nurturing forest soil, the temporalities of logging

and letting the forest rest and regenerate, and the temporality of the forest as a centuries old being with a distinct genetic heritage overlap and intersect, repositions ethical and caring practices as collective responsibilities. Accounting for the different temporalities engaged in the care of forested landscapes in the Carpathian Mountains, that have followed a different path than the forested landscapes elsewhere in Europe, and elsewhere in the planetary forest landscape is an entry point into reconsidering the practices of care embedded in these landscapes. Going beyond the legal requirements of logging, focussing on growing forest resilience through forest management practices that include logging is a necessary shift from discussing illegal logging as a "*matter of concern*" to approaching the forest as a landscape to care with and to care for. While there are more than human carers and practices involved in "webs of care" (Puig de la Bellacasa 2017:155), we are best at taking care of and managing our human practices than attempting to manage whole ecosystems (Brocki and Lister 2014).

In Romania and elsewhere in the western world, forest care is institutionalised, as has already been mentioned. The process of institutionalisation of forest care has taken several centuries, and has developed in parallel to the institutionalisation of urban development, resulting in the separation of forest and city and the increasing institutionalisation of forest and city governance and management in the aftermath of the Second World War. Beyond the concerns that the previous sections *6.1. Timber flows* and *6.2. Matters of concern* have raised, regarding the vulnerability of unmanaged and managed forests and forested landscapes towards the supply chains of transnational capitalism, there are several caring practices that are part of forest management throughout Romania and on the Vișeu Valley in particular, that are worth naming as such. As part of scientific forestry practice, safeguarding and protecting the forest's genetic heritage and the knowledge that it holds within the soil and the trees, a heritage and a knowledge that has accumulated over millennia in ancient forests (categorised as virgin and quasi-virgin), and that speaks about our co-evolution, and accounting for a 100 years logging age, so that trees reach reproductive age and the forest can regenerate itself are caring practices, involved in the temporality of the forest and of the tree's growth and reproduction rhythm. As presented in the previous section, both of these practices are at risk due to increased market demands. Taking care of the soil is done through the choice of logging and transportation methods. Specific to the Vișeu Valley, dragging logged timber with a horse instead of a mechanised vehicle, of which I will speak in more detail in chapter *7.3. A changing land management* is a way to care for the processes of soil formation, respecting the time it takes to make nurturing soil by its more than human inhabitants.

Specifically in relation to illegal logging practices, concerns towards how to better safeguard the forest, and particularly how to surveil the forested landscape have been growing in the

recent decade with the introduction of timber regulations. As a way to care for the forest, forest safeguarding and surveillance have been part of institutional forest care. Throughout the XXth century in the Carpathian Mountains, and particularly on the Vișeu Valley, forest surveillance has been conducted on the ground, within the forest, by sparsely populating the forested landscape with forestry posts where forestry engineers and foresters would live accompanied by their families, changes in forest governance and the use of technologies have transformed forest surveillance and safeguarding, at the beginning of the XXIst century, and increasingly in the last decade. In the Romanian Carpathian Mountains, presence in the forest is still part of forest surveillance, though not living in the forest. The increase in technology use have, however, opened the forested landscape to surveillance from the distance and to a variety of publics. The devaluing of ground knowledge in the service of the forest has been growing with the restructuring of forestry offices, the diminishing of jobs in the sector (Drăghici et al. 2016), and the making available to the public of technologies of engagement with illegal logging and forest change, like the Forest Inspector (https://www.inspectorulpadurii.ro/#/). To Gabrys (2020), the increasing use of technology in monitoring forest change, driven by a global turn towards data-oriented governance, is transforming the planetary forest landscape into a technological device for mitigating climate change, foreclosing other ways of being of the forest as a place of cultural practices and indigenous cosmologies.

6.4. Conclusion

In this chapter I have followed the shift in timber production landscapes within Europe, from Central European territories to the new frontiers of logging in the Carpathian Mountains and the vulnerability of forested landscapes to transnational supply chain capitalism. Shifting the issues raised by illegal logging within the new frontier territories from “matters of concern” (Latour 2005) to “matters of care” (Puig de la Bellacasa 2017) I shed light on the ethical and legal obligations to safeguard, protect, and improve the resilience of the forested landscapes we have inherited in the Carpathian Mountains in particular, and broadly at planetary scale. Viewing us as inheritors of a landscape that we are *taking care of* for future generations is consistent with an indigenous view on the relations between us and the forested landscapes, as presented in *4. Shifting consciousness on forested landscapes*. As elsewhere in the planetary forested landscape, the landscape we have inherited is a “socio-natural hybrid” (Zimmer 2010) profoundly altered by the extraction and transportation infrastructures that have been built since the end of the XIXth century, as well as the artificialisation of the forested landscape through plantations, a landscape, nevertheless that has preserved important wildlife communities of plants and animals. Approaching land(scapes) as beings to care for as suggested by María Puig de la Bellacasa invites us to look into the temporality and the reciprocity of care the forested landscapes have and are

being given. All the while this brings the awareness that the care we practice today will benefit future generations of plants, humans, animals and all the other beings inhabiting the landscape.

7. The forest as infrastructure

The following chapter looks at the urbanisation process through the creation resource landscapes. The premise for such an investigation is that the immaterial infrastructure of regulations that is governing the planetary reach of timber necessarily relies on the extractive and transportation infrastructure constructed in the last 250 years. This infrastructure relies itself on the landscape, the geography of the terrain and the water courses that have allowed for roads, canals, dams and railways to be constructed. I therefore look at the transformation of the Vișeu Valley since the XVIIIth century and the introduction of commercial, large scale logging. While logging has always been a part of the way of life on the valley, and is part of the way of life within mountainous landscapes, the intentional development of extractive infrastructures that would augment the flow of timber has profoundly transformed the valley during the last 250 years. As I argue, this has been the prevalent way through which the urbanisation process has unfolded over the centuries in such remote resource landscapes.

Chapter 7.1. An urbanising territory takes a wider look at the process of urbanisation within Romania and its state driven character. While the narrative of urbanisation implies the transformation of the rural into the urban, I argue for a radically different way of understanding it through the creation of resource landscapes.

Chapter 7.2. A multitude of agencies makes use of the lens of the palimpsest in order to read the territorial transformation of the Vișeu Valley during the last 250 years of its recorded territorial history. Reading the territory as a palimpsest exposes the erasures and the strategical additions of the infrastructural networks that have been built in the valley to extract its timber and mineral resources over its long extractive history. In working with a concept of agency that accounts for more than human agencies, I enlist the agency of water and the life projects of the human and non-human inhabitants of the valley as part of the palimpsest. The maps that represent the palimpsest reveal an ongoing phenomena that could be amplified by changes in the microclimate of the region with global climate change, that of the upward shift of the forest towards occupying alpine grasslands territories.

Chapter 7.3. A changing land management further looks into the evolution of forest management practices on the Vaser Valley, a tributary of the Vișeu river while highlighting the co-existence of ancient management practices with modern scientific practices. It proposes to view land and forest management as a form of knowledge transmission and of landscape regeneration through care practices. Throughout the chapter I follow the transformation of logging practices and of the forested landscape from a multi-age and multi-species

landscape to a state of artificialisation characteristic of the intertwinement of ancient forests and plantation landscapes.

7.1. An urbanising landscape

Both in academic debates and in practice, urbanisation in Romania is anchored in mid century categorisations of urban and rural areas according to population number and density. These categories have been fixed in the Romanian landscape in the aftermath of the Second World War, with the territorial reorganisation during the late 1960s and early 1970s. We still inherit the visions of territorial development that were laid down in the 1968 Territorial Reorganisation Law in the ways in which the landscape is seen, statistics are made and funding is allocated to specific projects differentiating between the urban and the rural. These visions are indebted to an engineered view of the landscape through infrastructural development attempting to control and to dominate the landscape. Development projects grounded in a false need to catch up with the developed world are more often guided by the quantitative achievements of production than by the shifts in paradigms that have and are inspiring different approaches worldwide.

Attached to the false dichotomy between the urban and the rural, the narrative of backwardness was the prevalent lens through which to view the rural and its inhabitants throughout the XXth century. Backwardness was instrumental in separating humans from nature and in making resource landscapes. As a narrative, backwardness was employed in remote landscapes inhabited by indigenous communities, that in the early XXth century were entering the capitalist economic system (see Demuth 2021:240-266).

In the official and academic discourse, the story of the urbanisation of the Romanian territory is the story of how the rural is transformed into the urban. As a state driven project, urbanisation was initiated in the aftermath of the Second World War, during the 1960s. Contemporary to European debates on the form of territory, Romanian sociologist Henri H. Stahl's 1969 "Commentaries to the new Law of territorial organisation" envisaged the development of conurbations, a term he adopted from Patrick Geddes, where the predominantly agricultural rural landscape was called to sustain urban growth in Romania's rapidly urbanising cities. From understanding the complex relations between people and the landscapes they inhabited as cultural ones, and the landscape as a cultural artefact, Stahl conceived of the urbanisation process as having an impact not only an urbanising cities and the people that came to inhabit them through rural to urban migration, but also on the landscapes that were still inhabited and that supplied the growing cities with material resources, food and new inhabitant-workers. As a sociologist, Stahl undertook extensive research into the autonomous forms of organisation of mountainous landscapes in the

Vrancea region in Romania, a territory over which the state was extending its reach in the early XXth century. For Stahl, the village as an autonomous form of social organisation no longer existed in the urbanising Romanian landscape of the early XXth century as the extension of state power over the remote villages of the Vrancea region changed the structures of government of the village. The rural and the urban are therefore two interrelated concepts engaged in the process of urbanisation that ultimately aimed at changing the living conditions of all inhabitants. Throughout the XXth century, with the extension of infrastructure of transportation, education and medical care, the patterns of dispersed inhabitation, characteristic of village spatial organisation, were transformed towards more compact urban forms.

The potential of the Romanian landscape resides in the incomplete projects of development that have been driving its transformation. On the one hand, the abandoned spaces of the envisioned industrial development of the 1970s and 1980s are being re-colonised by plants and animals, becoming spaces of potential for both their return to the natural environment and their transformation and integration into contemporary development projects. On the other hand, the urbanisation process is continuing the transformation of the rural, an urbanisation at is most dramatic in the vicinity of growing cities. The contemporary development of the peripheries of Romania's biggest and growing cities like Cluj, prompted architectural theorist Dana Vais (2013:89-90) to characterise contemporary Romanian urbanisation as a "degree zero" of urbanism, an artificial process guided by laws rather than the features of the landscape and the needs of its inhabitants. Particularly the laws of privatisation and reconstitution of property right that were passed in the early 1990s and continued to be amended and complemented throughout the 2000s, started a process of territorial division and extraction that has only recently stoped, affecting the whole fabric of the city and its agrarian territory, including forested and forest landscapes. The same laws allowed for individual private owners of agricultural fields near growing cities to transform their land in urbanised land for housing, and for individual and collective owners to claim rights to agricultural and forested lands for production and timber extraction. Many of these claims were situated, as Vais portrays it, at the "loose margins of legality".

At the academic level, an explicit agenda with a dedicated program on the urbanisation process at the scale of territory and the landscape does not exist. While early XXth century scholars, like Stahl maintained a live connection with ideas developed in the western part of the continent, the isolation of the Iron Curtain in the second half of the XXth century has interrupted the flow of people, but also ideas that could no longer flow freely across borders. Romanian urbanism became "*sistematizare*" (in Romanian), a form of manipulation of ground terrain to fit modern and modernist constructions and infrastructures. The legacies of half a century of "sistematizare" are ingrained in the landscape but also in the mind. Areas such as

the one studied here are not in the sight of urbanists and architects, if only for the eulogy of a traditional way of life and the image of a traditional wooden house whose idealised images seldom correspond with the ways in which many rural households are adapting under new socio-economic conditions. The landscape, with its interdependent links between other than human forms of life (plant, animal, soil) is systematically left out of the debates on expanding urban areas. When it is included in such debates, it is reduced to a mere technical description. It is most often through protest, civil disobedience, and the pursuit of legal action that the ecology of the landscape where human beings cohabit and interrelate with other beings makes an appearance. Such was the case of the Roșia Montana mining landscape, where centuries of gold and mineral extraction since the Roman times have constructed a multiple layer extractive landscape within a mountainous landscape. The site came to public attention as it was designated to have an exclusively mining future, therefore foreclosing other possible futures and alternatives for development. After more that a decade of protest and legal action, engaging part of the community that opposed the mining project and citizens of major Romanian cities, the continuity of the landscape was ensured through its inclusion on the UNESCO World Heritage list in July 2021. Forests in the vicinity of cities and in the Carpathian Mountains have also benefited from active protests and civil engagement for their preservation.

Approaches similar to landscape urbanism approaches and ecological design approaches as presented in chapter *5. Shifting paradigms on urbanisation landscapes* are rare, and they are most often with the involvement of international experts. Trans-disciplinary approaches involving architects, urbanists, mapping specialists, environmental engineers and hydrologists, along with public authorities and local communities are emerging. In the city of Reghin, Mureș County, such a project, with the aim of developing nature-based solutions for the redesign of the Mill Canal (Canalul Morii) is being implemented as part of a wider project for a more democratic access to water funded through the EEA Norwegian Grants. The project is a one of a kind project in Romania specifically regarding the focus on community involvement within one of Romania's small cities, including also international expertise in river landscapes.

To tell the story of the urbanisation of the Romanian landscape while accounting for the resource landscapes that were created since the late XVIIIth century through the XXth century is a radical project, as Paola Vigano would say. The concept of resource landscapes refers to the specific ways in which landscapes are viewed as resources for extraction by the capitalist-colonial system. It relates to the creation of resource frontiers explored in chapter 3.2. Frontier landscapes. The landscape is a resource for its local inhabitants, human and non-human. Demateis (2016) views resource as a relational concept, emerging through the attribution of a social value to "things". Resources emerge locally through the interaction

between human actors, soil, trees, plants, animals, and involve diffuse knowledge (Demateis 2016). State and imperial narratives about the non-efficient utilisation of resources are part of frontier expansion projects of the capitalist-colonial system (Chann 2020). As will be argued, the Vișeu river valley came into the attention of the Astro-Hungarian administration in the late XVIIIth century as a site of frontier expansion, extending the reach of the state over the forested territory that was considered to be poorly managed by the local population (Ardelean 2014). Infrastructural development, urban areas expansion through an urban form with a grid typology and the changing of living conditions in the Valley ensued throughout the XIXth and XXth centuries as the vast forested landscapes were being exploited and altered in their depths. Frontier expansion of capitalist projects and urbanisation throughout the wider Romanian territory in the XVIIIth and early XXth centuries came also with the change of forms of government over landscapes used as resources by local populations to accommodate the resource landscapes of the capitalist system. In the early XXth century this process was enfolding the Vrancea region of the Carpathian Mountains, a region in the Romanian Principalities before 1918, and now part of greater Romania. Henri H. Stahl's account of the transformation of the forested landscapes of the Vrancea region in the early XXth century concomitant to the development of the Romanian Forestry Code, that aimed at imposing unitary forest regulations over the diversity of forms of forest governance existing at the beginning of the century in the larger Romanian territory, documents the ways in which locally governed forests entered the capitalist market through the creation of the communal forest as a distinct legal category, the regulating of extraction rights and the introduction of forest management under scientific principles (see Mateescu 2011 (a)). In the creation of communal forests, the territory of the forest was extracted out of the body-territory of the village so that extraction rights could be inherited and sold. While in the previously autonomous governed territory of the village, extraction rights were directly related to presence in the village (one had to live in the village to have access to the forest), state regulations no longer required one's presence within the village, as they relied on lists of names and the rights attached to them (Mateescu 2011 (b)). The limitations of the human body to take as much wood as one could carry were replaced by the transmissibility of rights along inheritance or purchase. With purchase, external actors could gain access to village forest resources in the early XXth century Vrancea region. In the 1930^{s}, Stahl and Serafim (undated) remarked the paradox of local communities in the Vrancea region introducing management rules after having logged their forest to the point of having very little left to log. As Stahl and Serafim (undated) recount, communities with plenty of forest to log disregarded the introduction of management rules.

7.2. A multitude of agencies

Reading the *territory as a palimpsest* invites for reading the multitude of traces, paths and intentions that have been inscribed in the landscape. As mentioned in *2.3.Mapping as a design project*, the metaphor and method of the palimpsest has an anthropocentric focus as it was designed for the city as its exploration territory (see Corboz 1985). Current uses of the concept see it being deployed to reconstruct and retrace landscape design interventions (Nijhuis 2020) and to trace politico-economic trade routes for the transportation of resources (Morata, Cavalieri, Rizzo and Luciani 2020). This anthropocentric focus exposes a concept of agency itself anthropocentric. Manzini (cited in Escobar 2018) presents a concept of agency that de-centres the anthropos in order to include a multitude of agencies, both human and non-human, which he calls "distributed agency":

> "*The concept of distributed agency - which suggests that agency is not the result of discrete actions by single subjects acting intentionally but largely the effect of complex heterogenous networks of humans and nonhumans - has profound implications for design […] (Manzini 2015).*" (Escobar 2018:125)

For a research project dealing with the forest, an entity larger and older than the human, and also different as a non-human, Manzini's concept of "distributed agency" suits best, for it allows to think of the human and non-human networks as having design agency. *Thinking with* Manzini, I look at multiple agencies that inscribe their writing in the landscape and that together make the forest accessible, loggable, and inhabitable all at once. By looking at the forest as a landscape that is accessible and that offers itself not only for the purpose of resource extraction, but also for the purpose of inhabitation, where human, plant and animal communities together inhabit the landscape, I look beyond the separation of landscape into landscapes destined for production and landscapes designated for human habitation, and beyond the separation of nature and city that creates two distinct concepts of habitat, one for humans and the plants and animals they have domesticated, and one for plants and animals in the wild. Humanist and modernist paradigms envision (human) habitation as restricted to a delimited part of the landscape, that in modern planning is instituted through zoning, as Doxiadis' planetary visions showed (see chapter *5.1. Urbanisation at planetary scale*). This separation, together with the anthropocentric gaze and the way land is governed and managed fuels social and ecological injustice and reduces plant and animal kin to be voiceless. By contrast, a non-modernist and more than human concept of *habitation*, such as the one proposed by Ingold (2011:12) envisages the wider landscape as inhabited through movement and the perception it engenders. Following psychologist James Gibson (1979) theories on perception and philosopher Merleau-Ponty's phenomenology "in their rejection of the Cartesian paradigm", Ingold (2011:12) articulates a concept of habitation that is primarily indebted to the lived experience of human and non-human beings inhabiting

the landscape. Since experience is gained in movement, to Ingold (2011:12) “way finding is the fundamental mode by which living beings inhabit the earth”.

There are two questions to which this reading of the territory of the Vișeu Valley through the lens of the palimpsest answers: *Who writes?* and *What is being written?* They address the palimpsest as a more than human texture, where it is not only humans that write, but also non-humans. Thinking in terms of distributed agencies, there are three kinds of agencies that add to the palimpsest. Water was the first to carve paths and ways of access from the depths of the mountain through geological processes of erosion and depositions. Then there are the traces of the life projects of human and non-human inhabitants of the mountain whose forms of writing are more or less permanent. Last but not least there are the traces of the capitalist extractive project, the most visible of all, that chart territories, draw maps and then draw on the land, leaving a permanent mark in territory. Being in the landscape, as I have done throughout my fieldwork, it is impossible to separate these agencies, for they together co-create the landscape we experience today. The lines of water and those of extractive infrastructures overlap and intersect. The lines of the inhabitants cross the landscape, cross the waters, cross the mountain, cross the forests, and the extractive infrastructures. Furthermore, the process is on-going.

The process of territorial transformation evidenced through reading the landscape as a palimpsest presents us with two interrelated phenomena. The different human and non-human agencies have constructed different forested landscapes, where different logging techniques, ancient and modern co-exist. The separation of human settlements from forests and pastural landscapes has led to the intensification of production and the concentration of human inhabitation on the valleys of the Vișeu valley and its tributary rivers.

After reading the palimpsest the last 250 years have inscribed in maps and on the land, I have also looked into the future forecast of territorial evolution over the next 100 years, as studied by biologists. A concerning phenomena emerged at this encounter, as both forest and settlement landscape have changed in relation to each other. The evolution of the forested landscape in relation to human inhabitation and intensifying production of the landscape (both forest and pastural landscape) presents us with the phenomena of the forest’s migration towards higher altitudes. Mapping has revealed the upward shift of the forest on the mountain, with the opening of more space for human inhabitation in the valley and intensifying forest production. Continuing this shift, biologists (Engler et al. 2011) forecast that the phenomena will continue with climate change, the warming of ground temperatures and the changes in precipitation levels. They predict that the change in micro-climate will make more space available for the forest to continue its migration towards higher

altitudes, where suitable life conditions may be encountered, while potentially displacing alpine grasslands and their inhabiting plant species (Engler et al. 2011).

There are several maps which I use to illustrate the reading of the palimpsest. They have been drawn while overlaying the different historical maps I used, spanning the last 250 years of recorded history on the Vișeu Valley, since the end of the XVIIIth century to the 1970^{s} and a 2018 Corine Land Cover map. Fig. 31. Vișeu Valley roads and railway evolution, beginning of the XXth century to 1970, extracts the layers of infrastructural development. The legend that accompanies the map differentiates between the different times of construction of the extractive infrastructure. It is accompanied by photographs taken during fieldwork to illustrate the traces left in the landscape, some of which have been erased from the official account of the history of the Maramureș Mountains. Fig. 32. Vișeu Valley human settlement evolution, XVIIIth century to 2018, extracts the layer of human inhabitation, comprising more compact forms of inhabitation in villages and cities, and dispersed inhabitation in the forested landscape, which includes the more temporary and permanent forms of inhabitation with a focus on overseeing the production landscapes and the border, that used to prevail until the late XXth century. The map records the expanded way of inhabiting a mountainous, forested landscape as a territory for both living and production.

For both of these maps, the represented borders (of the Austro-Hungarian Empire until 1918 and the Romanian State there after) are devices that direct the flow of resources. The account that I make recalls what has been erased, what has persisted, what has changed. While reading the palimpsest, I look for the traces of water, of the extractive project, and of the human and non-human inhabitants of the mountain through historical accounts, stories I was told and remembering the material marks in the land. The palimpsest brings to light questions of accountability for the acts of erasure, persistence and change. It also calls into being a larger notion of memory, encompassing the memory of the land and its non-human inhabitants. Trees, after all, hold the knowledge of past events in their trunks.

Legend:

Imperial border 18th century until 1918

1900 - 1940s

Interwar railroad

Interwar light rail extraction railroad (in use)

Interwar light rail extraction railroad (not in use)

Main valley road beginning of the 20th century

State border 1918-1939 1944-present

1948-1970s

1948 railroad (Salva-Vişeu)

1956 extension of the extraction railroad

Forestry posts

New connections by road

Secondary roads

Mining roads

Cableway *(Funicular (RO))*

Mining sites (non-ferous metals)

Mining residues deposits

Power network

Sheepfolds/ Cattlefolds

Apiary

Tisa

Vişeu

Repedea

Cisla / Tăsla

Fig. 33 - 35. Vaser Valley.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22

0 2 4 6 8 10km

Fig. 31. Vişeu Valley roads and railways evolution, beginning of the XXth century to 1970

1 Confluence of the Vaser and the Vișeu river, Vișeu de Sus, promenade on the Vișeu river

2 Extraction road for sand from the Vișeu river, Vișeu de Sus

3 Ancient landscape practices, planted trees as fences, pruned to use their branches. Vișeu, Valea Vinului.

3 Ancient landscape practices, land fencing and stabilising using tree branches. Vișeu, Valea Vinului.

4 Trees as protection from strong winds. Vișeu, Valea Vinului.

5 Trees as drying hay supports. Vișeu, Valea Vinului.

6 Mosaic pastoral landscape, integrating living, hay meadows, orchards. Vișeu, Valea Vinului.

7 Drezina, transportation on the light railroad

8 Vaser river, wooden dam structure

9 Forest light railway no longer in use, Vaser valley

10 Forestry post, Vaser valley

11 Forest light railway in use, Vaser valley

12 Vaser plain, hay meadow

13 Vaser plain, grazing meadow

14 Old chestnut at the centre of the community, Poienile de sub munte / Ruzpoyana.

15 Roads opening to the forest, Poineile de sub munte, uncontrolled logging in unprotected forest landscapes

16 Roads over water dams, Poienile de sub munte, uncontrolled logging in unprotected forest landscape.

17 Roads along water ways, Socolău river.

18 Living in the forest, formerly occupied by forestry engineers and their families.

19 "The king's road", constructed under the Romanian king in the interwar period, on the Socolău river.

20 Ecological restoring of a former landfillt

21 Abandoned mining site

22 Water dams

Tisa
Theiss Fluß
Valea Vișeului
Vișeu Fluß
Vișeu
Bistra
Csorban Thal
Petrova
Crasna
Vișeului
Barzana
Monaßter
Sudok
Strentura
Bârsana
Iza Fluß
Iza
Rozavlea
Roßallia
Saje
Șieu
Sajopoyanna
Poienile Izei
Kuchina
Bogdan Vodă
Jood
Jood
Monaster
Dragomerßalva
Dragomirești
Leordina
Ruskova
Leordina
Petrova
Ruskova
Repedea
Kriwey
Ruskova Polyana
Poienile
de sub munte
Ruskova Bach
Kis Bocska
Bocicoel
Also
Viso
Vișeu
de jos
Közep
Viso
Vișeu
de mijloc
Felso Viso
Vișeu de sus
Szelistije
Săliștea
de sus
Szaesali
Săcel
Waßer Fluß
Vaser
Fig. 33 - 35. Vaser Valley.
Moyszin
Moisei
Moyszin
Monaster
Mănăstirea
Moisei
Borßa Fluß
Borșa
Borșa
Contumanz
Weckthaus
Weckthaus
Zesla Bach
Cîsla / Tâsla

Legend:

water bodies

Imperial border 18th century until 1918

XVIIIth century

dispersed settlements

water mills

churches and monasteries

water canals and water courses

State border 1918-1939 1944-present

1948-1970s

dispersed settlements

water mills

irrigation network

2018

continuously inhabited areas

industrial sites

mining residues

former dumping site (under ecological restoration)

Text

XVIIIth century to 1918

XVIIIth century to 1944 (47)

since 1944 (47) onwards

0 2 4 6 8 10km

Fig. 32. Vișeu Valley human settlement evolution, XVIIIth century to 2018.

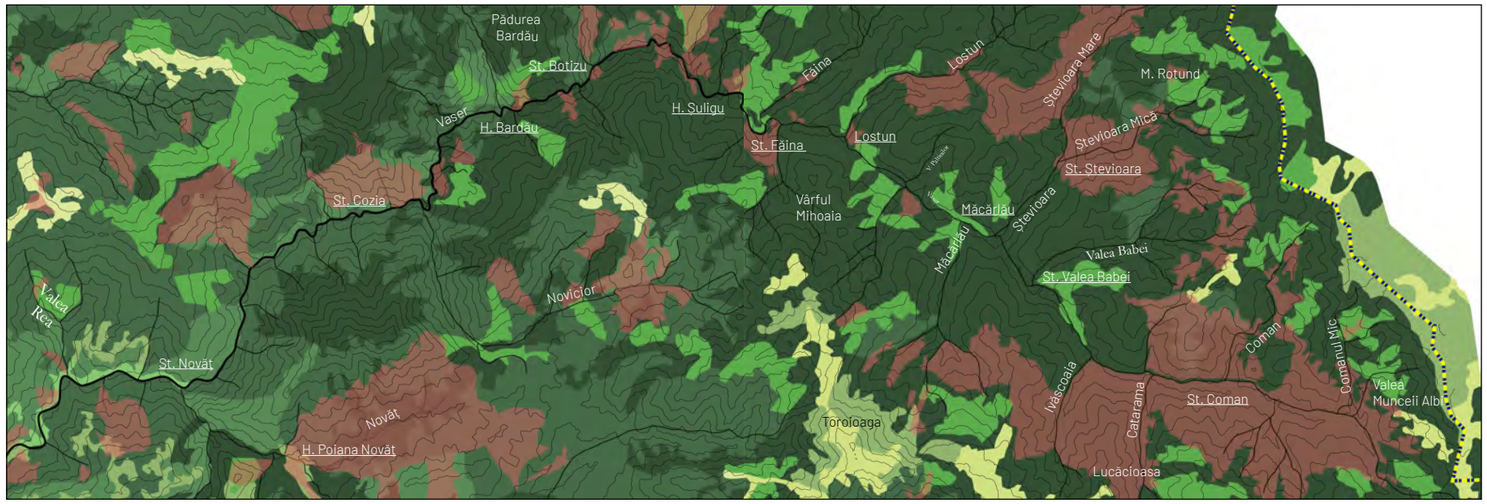


Fig. 33. Vaser Valley. Forest change and logging. 1948 to 2018.

Legend:

- border 18th century to present
- Vaser river (Râul Vaser)
- springs

2018

- valley pastures
- beech forests
- mixed forests
- coniferous forests
- reforestation areas and other non-extractive forests (Juniperus forests)
- pastures on alpine grasslands
- alpine grasslands

1948 - 1970

- reforestation areas

Lostun extraction posts

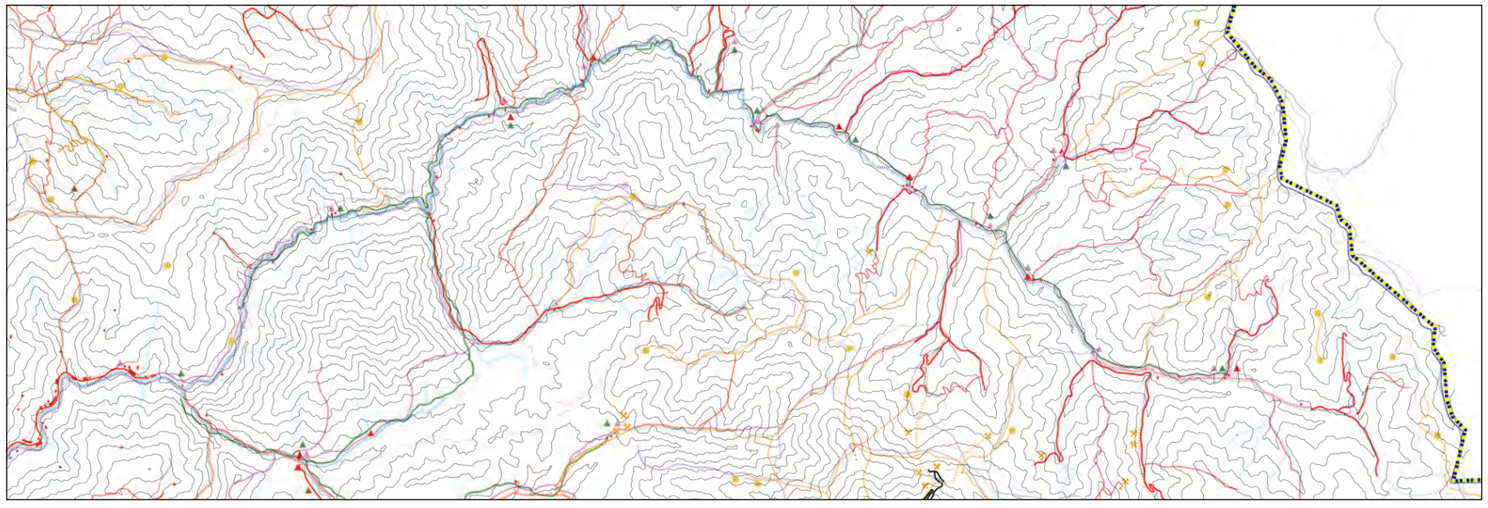


Fig. 34. Vaser Valley. Paths, Roads and Railways. XVIIIth century to 1970.

Legend:

- border 18th century to present
- Vaser river (Râul Vaser)
- springs

1948 - 1970

- extension of the extraction railroad (in use)
- extraction roads
- extraction paths
- roads to pastures
- pastoral paths
- border road
- mining cable (not in use)
- mining roads
- mining sites (not in use)
- forestry posts
- sheepfolds
- horse stals
- logging infrastructure

1870 - 1944

- Light rail (still in use)
- Light rail (not in use)
- extraction roads
- pastoral paths
- extraction posts

1785 - 1870

- extraction roads
- water dams
- pastoral paths
- extraction post

XVIIIth century

- extraction road
- pastoral paths
- extraction post
- sheepfold

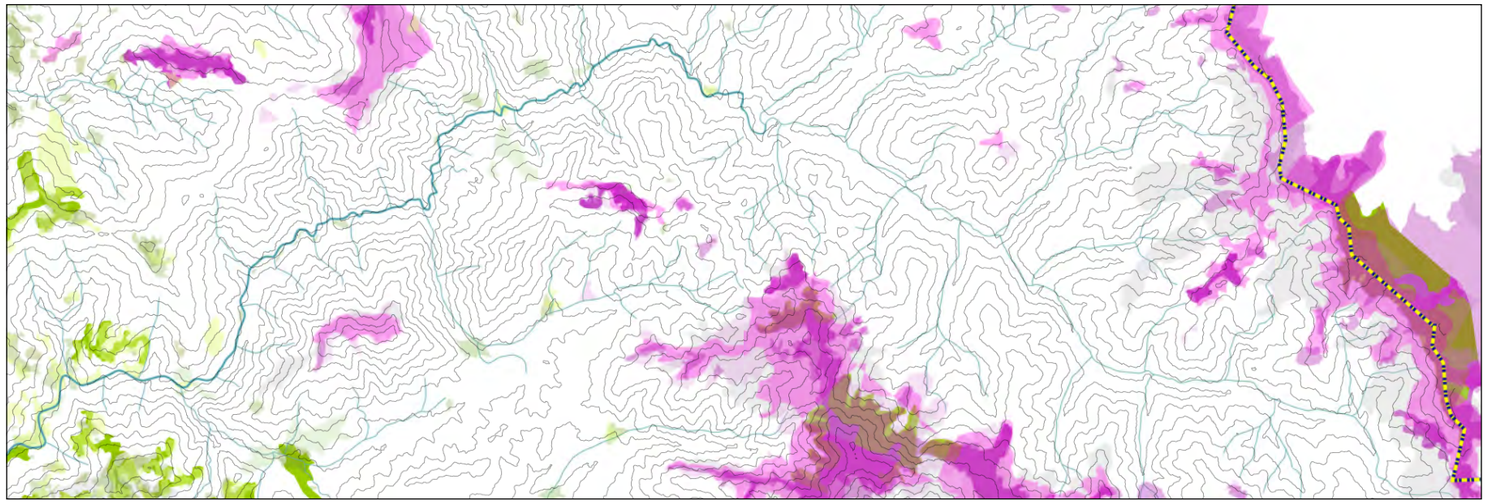


Fig. 35. Vaser Valley. Forest change and pasture change. XVIIIth century to 2018.

Legend:

- border 18th century to present
- Vaser river (Râul Vaser)
- springs

pastures and clearings

- 2018
- 1970
- 1944
- 1870
- 1785

alpine grasslands

- 2018
- 1970
- 1944
- 1870
- 1785

0 1 2 3 4 5km

Fig. 33. Vaser Valley. Forest change and logging. 1948 to 2018, Fig. 34. Vaser Valley. Paths, Roads and Railways in the forested landscape. XVIIIth century to 1970, and Fig. 35. Vaser Valley. Forest change and pasture change. XVIIIth century to 2018, present the co-evolution of extraction infrastructure and production landscapes on the Vaser Valley while illuminating the co-existence of production and protection landscapes. Among the 3 detailed maps of the Vaser valley, Fig. 35. raises the already mentioned concerns with regard to the diminishing of alpine grasslands in the last 250 years.

Water, forest, mountain and its inhabitants are interdependent. They exist in the form we experience today as the result of their *working with* one another throughout time. Their distributed agency is what makes the landscape like it is today. Recognising the palimpsest of water is a way to pay respect to it, to enter into another kind of relationship with it, it is also a pathway to start acknowledging the rights of water in relation to the land that supports life on the valley, the life of all its inhabitants, human, animal and plant communities. Recovering water as a ground layer of the palimpsest represents also a shift from the anthropocentrism of the concept of agency towards a distributed concept of agency. Water nourishes the forest and the forest nourishes its waters through collecting, filtering, storing and allowing for water to flow underground and above the ground in springs and rivers. During my forest walks I was shown, I drank and I learned that my guides prefer spring water form the mountain for drinking and cooking. They refer to it as “living water” in its materiality, resulting out of the filtering process of the forest. They do not trust tap water in the valley, as their concerns are directed towards the materiality of the infrastructure network that delivers it. The 2014 Management Plan of the Maramureș Mountains Natural Park estimates that The Maramureș Mountains are one the most rich mineral water landscapes in Romania, with 185 sources identified within its boundaries out of the total 256 mineral water sources in the Maramureș region (Management Plan of the Maramureș Mountains Natural Park 2014:14). One can think of the mountains, and specifically the Maramureș Mountains as water territories. Throughout my walks and my mapping I have learned to read the mountains as water territories, following the flows of rivers and springs. From the flow of water, the valleys and the peaks of the mountains can equally be read.

As the first one to carve ways of access to the depths of the forest, water provided for a navigational path. Until the end of the XIXth century and the beginning of the XXth century when world-wide the railway overtook the flow of goods and people (see Cronon 1992), they flowed on water, on continental rivers, seas and oceans. At the end of the XVIIIth century, with the first military campaign initiated by Empress Maria Tereza to assure possession of territories and succession of the crown, the first map of the Vișeu Valley was drawn. Less accurate in topographical precision, this map holds very precise information on where roads passed in relation to river flows and flood plains, where wooden bridges were

constructed to oversee the timber transport, how the forest was crossed by pastoral paths leading to alpine pastures, and how settlements were scattered in territory. In the XVIIIth century, the territory of the Maramureș Mountains was known in depth. The XVIIIth century territory shows a logic of organisation at the ground. It is a logic of living with the mountain, imbued with ground knowledge, where orientation is done through the visual experience of the landscape. Paths, in this landscape, connect distant places. This kind of ground knowledge precedes imperial military knowledge and scientific knowledge. First the land was (is) known through presence and experienced through the senses. The archival records of this charting recorded also the path of timber from the valley to Szigeth, where it would be traded and continued its journey on the waters of the Tisa river reaching Solnoc, at the confluence of the Tisa and the Danube rivers. Timber trade had been a way to exchange an abundant local resource for another for the communities inhabiting the Vișeu Valley at the confluences of the Vișeu river with the Vaser and the Cisla rivers, respectively at Vișeu de Sus (*Ober / Felso Vißso*[35]) and Borșa (*Borßa*[36]).

Looking at the evolution of extraction infrastructure (Fig. 31. Vișeu Valley roads and railways evolution, beginning of the XXth century to 1970), the palimpsest reveals how water, railroad and roads were intimately interwoven. The civil engineering of infrastructures for the transportation of goods and people began at the turn of the XIXth century. The first bridges over the Vișeu river were engineered by the Austro-Hungarian administration to be constructed at Leordina in 1910, Vișeu de Jos (*Also Viso*) in 1911, and Petrova at 1913[37]. Between the two World Wars, in the first half of the XXth century, as Maramureș became part of Greater Romania in 1918, the railway from Siget to Borșa was built, running parallel to the course of the Vișeu river. Water and railway co-habited from then on the overflowing plain of the river. Light railways were constructed on the Vaser and on the Repedea valleys. The Vaser valley light railway became operational in 1933 (Țelman 2008). Light railways for logging were constructed throughout the Carpathian Mountains in the beginning of the XXth century. During this first half of the XXth century, the railway network connected the flow of timber form the Vișeu Valley to the Hungarian and Austrian territories, following the imperial pathways of the XIXth century. Deep into the mountains, on the Socolău valley, a paved road known as the king's road, constructed during this period, stands testimony to the area being one of the hunting grounds preferred by the Romanian king, a member of the European Hohenzollern royal family. Local stories document the passings of the king through the valley. With the extension of extraction infrastructure, the forest became a living space for

[35] XVIIIth century settlement name.

[36] XVIIIth century settlement name.

[37] "Viso-Brücke Bei Leordina," 1910, http://www.archivinformationssystem.at/detail.aspx?id=2237877. "Viso-Brücke Bei Petrova-Bisztra," 1913, http://www.archivinformationssystem.at/detail.aspx?id=2237879. "Brückenskizze Der Viso-Brücke Bei Also-Viso. Protokoll Der Lokalbegehung Der Im Abschnitt Zwischen Km 8 Und 9 Der Straße Sziget Kirlibaba Befindlichen Visobrücke Nr. 62," 1911, http://www.archivinformationssystem.at/detail.aspx?id=2237878.

foresters that inhabited, together with their families, the forestry posts constructed along the extraction paths. The militarisation of the border between Romania and Ukraine also brought military personnel living deep into the mountains.

Only in the aftermath of the Second World War, and the change of political regime under the Romanian Communist Party, was the flow of timber, goods and people connected to the interior of the Romanian territory with the construction of the Salva - Vișeu railway connection in 1956 (Ștefan ed. 2020), that crossed the mountains between the Iza and the Vișeu valleys. After the second World War, the intensification of logging operations and the targeted investments and divestments in logging infrastructure have brought about a radical change in the landscape. Not only logging intensified in the aftermath of the Second World War, but also the pastural economy and the mining sector, with the opening of the non-ferous metals mine at Borșa. While the whole of the forested territory of the Maramureș Mountains was managed for logging, the development of light railway infrastructure focussed on extending already existing infrastructure on the Vaser valley, through the expansion of the railway deeper towards the springs of the Vaser and the development of new lines on the Novăț and the Ștevioara rivers. The light railway that had been built in the interwar period on the Repedea valley was abandoned to the point of it being erased from the 1970 map of the territory. Traces of the railway on the Repedea valley are still visible today. In the aftermath of the Second World War, as the Romanian Communist State was expanding its reach, the Ukrainean villages on the Repedea valley were re-named with Romanian names. Fig. 32. Vișeu Valley human settlement evolution, XVIIIth century to 2018 records the name change: from previously being named Ruskova, the whole valley became Repedea, while the villages of Ruszpolyana (*The Russian's Clearing*) and Kriwey together became Poienile de Sub Munte (*The Clearings under the Mountain).* With this change, Ruskova became Leordina, Leordina became Petrova, and Petrova became Crasna Vișeului*.* Renaming as a state project attests to the making of the Romanian nationalist state by the Communist authorities. All the while, the massive dispossession of individual properties that allowed for the formation of national state properties in the form of land (forests, pastures, agricultural land) and buildings during the late 1940s, restructured the relation between local inhabitants and the lands they inhabited. With the opening of the Borșa mine (Pic. 20, 20, 22 accompanying Fig. 31), many inhabitants across the Vișeu Valley were employed, interrupting centuries old ways of living on the mountain through pastoral and logging practices. The closing of the Borșa mine in the 2000^{s} left many unemployed. Some returned to pastoral and logging practices for sustenance and survival. The rise in illegal logging on the Repedea Valley is interconnected with the closing of the Borșa mine. In the absence of caring for the light railway as a logging infrastructure, informal and illegal networks profit from logging, while improvised roads and earth bridges make up

for the loss and degradation of the interwar infrastructure developed for extraction (Pic. 15, 16 accompanying Fig. 31).

The Vaser valley is the most well known valley of the Maramureș Mountains, as a place where logging practices have been passed on from beyond the XVIIIth century onwards. It is the place where knowledge of this logging history has been documented by local historians (see Țelman 2008, Nicoară 2001). The local history of logging and the beauty of the forested landscape are valued today through the co-existence of logging and tourism development on the light train line. Today, one can take a tourist trip on the valley on board a tourist train (*Mocănița* in Romanian) into the depths of the forested landscape. The stories of the densification and diversification of extraction infrastructure on the Repedea and the Cisla valleys, and the consequences of their abandonment are less known. Furthermore, the anthropocentric gaze by which we look at these valleys and other valleys with similar stories focuses on macro-economics and employment, or the lack of it. They are often stories of massive unemployment arising from the abandonment of extractive infrastructure and the categorisation of post-extractive economies as disadvantaged areas. The multiethnic histories of these remote areas, at the far away borders of historical empires and the extractive visions of development that have fostered social, economic and environmental injustice remain recorded in maps, even though contemporary narratives disregard them.

Looking at the evolution of extraction infrastructure on the Vaser valley, represented in Fig. 34., one can read through the densification of the infrastructure network with the opening of new paths for extraction deeper on the Vaser valley and along its tributary rivers. In the XVIIIth century, timber extraction was intentional. Along the course of the Vaser river an extraction road reached deep into the forest, between nowadays Bardău and Șuligu forest surveillance posts. While it runs parallel to the Vaser river, the path crosses it in many points. In the XVIIIth century, the logged timber used to be assembled in rafts that were guided on the waters from the many bridges crossing the Vaser (Țelman 2008:58). During the XIXth century, timber shipments from the Vaser valley reached further deep into the forest, and on the affluents of the Vaser, modifying also the course of the river through the construction of dams for the intentional control of the flow of water. With the construction of the light railway in 1933 (Țelman 2008:61), water and railway complemented each other as paths for the transportation of timber, as both practices of shipping logs in rafts and with the train co-existed until the mid 1950s in the depths of the Maramureș Mountains and other similar areas in the Carpathian Mountains (Țelman 2008:61). After the second World War, extraction roads, for access with motorised vehicles, carved permanent paths in the land, while the light railway infrastructure was extended and logging operations intensified. The 2008 Forest Management Plan for the Vaser valley (p:181) estimates that the amount of logging done between 1957 and 1977, which amounted to 24% of the forest surface, was higher than the

amount of logging done between the end of the XIXth century to the 1940s, when 21% of the forest was logged. In time, this translates to what took 50 years to be logged in the first half of the XXth century, was logged in only 20 years in the aftermath of the Second World War. *Fig.45.* highlights the areas that were logged between 1948 and 1970 as reforestation areas.

Looking at the evolution of settlements on the Vișeu Valley (Fig. 32) from the XVIIIth century to present time (2018), one can read the settlement of both land and waters to accommodate the infrastructures of extraction and the expansion of urbanised land. The co-evolution of infrastructural development and settlement expansion has fragmented the mountainous landscape. Biologists talk in terms of the fragmentation of the habitats of plants and animals, where the roads, railroads, and extraction areas have interrupted pathways of migration. Fragmentation, however, has also impacted the living territory of humans. The multiplication of roads, railroads, and delimiting borders have, in the last 250 years, acted to clearly separate human inhabited areas from those parts of the landscape that were seen as valuable for production.

In the XVIIIth century the territory of the mountains was much less fragmented than it is today. Settlements were composed of small enclosures of land, depicting a house and a garden, that appear grouped closer to the Vișeu valley, but also scattered across the mountains, at the edges of the forest. At a closer look, they differ in how orderly the houses are depicted, indicating that ethnic communities lived closer together. The Austro-Hungarian archive scribe disapproved of the way the landscape was settled in such scattered patterns[38]. This was, however, a way of living on the mountain that has persisted through present day. Furthermore, the continuity of the mountain landscape across the Imperial border made it so that both human and non-human inhabitants could move more freely in their migratory paths. Ardelean (2014) points towards human migration across the imperial border being a generalised phenomena, as people were escaping famine and prosecution. Their tactics included ways to avoid the border control and compulsory quarantine instituted at Borșa (Borßa). The movement of people across the larger territory of the Austro-Hungarian Empire and its borders made the Vișeu valley a multi-ethnic territory. Germans, Jews, Hungarians, Ukrainians, Romanians lived in communities in the cities and villages of the Vișeu valley during the XVIIIth and XIXth centuries, well into the first half of the XXth century. The imperial extractive and colonialist projects contributed to the multi-ethnic region, through the settlement, at the end of the XVIIIth century, of german speaking colonists from the Zyps region, nowadays Slovakian territory, at Vișeu de Sus (Ober / Felso Vißso) to oversee logging operations in the newly acquired imperial forest on the Vaser valley

[38] "Topographische Beschreibung Des Maramaroser-Comitates, 1767-1769 (Einzelstück (Aktenstück, Bild, Karte, Urkunde))". AT-OeStA/KA KPS LB K VII k, 18 Epsilon. Accessed July 4, 2016, http://www.archivinformationssystem.at/detail.aspx?ID=2237071.

(Țelman 2008:40). The fiscal administration thought to take control over logging, as local noblemen were not trusted to assure the sustainability of timber resources (Ardelean 2014:184). The settlement of the Zyps colonists brought a new order in how the forest was managed and a new order in how the settlement was organised. The settlement the Zyps built is organised in a grid structure at the confluence of the Vaser and the Vișeu river. This form of settlement was uncommon for the way local inhabitants settled the territory, and still is to this day, the only grid structure on the valley. The Zyps settlement appears on the XIXth century map of the Vișeu Valley, that also shows the growth of cities and villages on the valley. By looking at the explosion of settlements during the XIXth and early XXth centuries, one can imagine the multi-ethnic communities on the Vișeu valley thriving with the expansion of extraction infrastructure in the forest. Throughout the XVIIIth and XIXth centuries, the European wide phenomena of the enclosure of the commons touched also the Vișeu valley. As the territory was mapped by the fiscal administration of the Austro-Hungarian Empire and the cadaster register was instituted, the XIXth century map of the Vișeu valley shows the beginnings of the process of enclosure, as lines depicting property boundaries appeared, surrounding clearly delimited rectangular properties in the villages and cities and clearly delimited alpine pastures, clearances and patches of forest in the surrounding landscape.

Dispersed settlements meant also dispersed production along the valley. The XVIIIth and XIXth centuries maps depict many mills and sawmills scattered across the valleys. During the Second World War many sawmills, including the one in Vișeu de Sus were burned down (Țelman 2008:114-118). A considerable number of sawmills still existed on the Vișeu valley, its tributaries, and on the Iza valley well into the 1970^{s} as shown on the 1970s map. With the disruption and hatred brought about by the war, and the making of the Romanian socialist state in its aftermath, the prosperous multi-ethnic territory was re-invented as a Romanian territory in development. The selective state investment in the development of logging infrastructure on the Vaser Valley and the opening of the Borșa mine were part of the industrialisation project of socialist Romania and the redirection of resources towards the interior of the Romanian state. As the territory was being industrialised, it was also being urbanised. The 1970^{s} map of the valley represents an urbanised territory, fully equipped with railroads, roads, electrical grids, cable carts, schools, hospitals and medical units in every city and every village. It manifested in space and in territory the vision of territorial development that the 1969 Law of Territorial Development (see Stahl 1969) held. During this second half of the XXth century, the closure and militarisation of the border manifested in space and in the life projects of the valley's human inhabitants. Migration took the path of interior migration within the boundaries of the Romanian state territory, and particularly in the logging sector.

With the fall of the Iron Curtain in the early 1990s, people from Maramureș were among the first to start new migratory paths towards Western Europe (Petrescu 2010). The 1990s also meant the re-invention of the valley and of the Maramureș region as a stronghold of " traditional" Romanian culture, a project entwined with the rise of the Orthodox church. The territory has retained its ethnic diversity, as Romanians, Hungarians, Germans and Ukrainian descendants still inhabit the mountain. Logging continued well into the 1990s, as stories from fieldwork accounted for the existence of many private sawmills along the Vișeu valley, a phenomena that generated sawdust pollution on the river (Government of Romania, United Nations Development Programme 2003:28). Since the 2000s, timber processing has reduced to a few major operators on each river tributary to the Vișeu river and pollution with sawdust has reduced, which has enabled fish populations to restore (Management Plan of the Maramureș Mountains 2014:33). In the last 10 years (2010 - 2020), seasonal work migration specifically in the agricultural sector in Western Europe has become a generalised phenomena in the valley, as field stories and individual interviews have disclosed. Migration paths contribute to the economic prosperity of the valley, through the building of new houses (see Călinescu, Hodoiu 2013). They drive forward the urbanisation of the land from previously pastural and agrarian land into urban land.

What we are experiencing now on the valley, is a post-industrial landscape, where, in the ruins of the previous industrial extractive mining and logging projects, trees, shrubs, flowers, animals and fish are returning and reestablishing their living territories. The life projects of the human inhabitants of the valley, continuing logging and pastoral practices, are entangled with the landscape's becoming. The return of a certain species of fish to the waters of the Vișeu river (*lostrița* (RO), huck (EN)) (Management Plan of the Maramureș Mountains 2014:33), and the recognition the value of the landscape as a space of co-habitation that has given rise to what biologists call a "mosaic landscape" (Management Plan of the Maramureș Mountains 2014:39) has called into being a new form of territorial governance through the institution of the Maramureș Mountains Natural Park in 2014. The Maramureș Mountains Natural Park was instituted on the right side of the Vișeu river between the river and the Ukrainian border, delimiting the largest part of where the Vișeu river receives its water, at the initiative of local, regional and with the support of the World Wildlife Fund. Not based on property, the Natural Park is grounded in the ecological coherence of the landscape and the continuation of land management practices that have co-constructed it. The Natural Park introduces a form of land management that extends its jurisdiction over both natural and urbanised land. In so doing it recognised the ways in which they are inter-connected through ancient practices and landscape forms that transcend the urban/rural/natural divide. As it overrides property boundaries, it opens up a space of debate and of guidance where individual interests on properties can converge on a common goal.

7.3. A changing land management

As argued in *Chapter 3. Shifting production landscapes*, throughout the XIXth and XXth centuries, with the separation of human settlements from the surrounding natural land, production land was managed separately from human inhabitation. Intensifying urbanisation in settlement land and intensifying production on surrounding lands went hand in hand. Increasingly post World War II, the institutionalisation of land management under scientific principles and the extension of disciplinary jurisdictions over specific landscapes, intensified the productivity of forested and pastural landscapes and accelerated the life projects of plant and animal kin inhabiting these landscapes. For some, the imposed rhythms of reproduction were too fast, and they disappeared from the landscape.

Plantation landscapes have more often defied and replaced existing landscapes together with the practices of land management that assured their continuous co-existence. This is particularly evident in occupied indigenous lands in the so called American and Australian continents, as well as in other places where colonisation has left an imprint on the land and its inhabitants. As presented in *Chapter 4. Shifting consciousness on forested landscapes*, land management as practiced by indigenous inhabitants is a practice of caring for the land, of tending to it and to the rhythms of life and death that make it thrive. Contrary to plantation management, indigenous management of landscapes account for a multitude of plant and animal species. Through Steffensen's (2020) account, indigenous land management practices strive at safeguarding the health of the whole community comprising the soil, the waters, the human, plant and animal inhabitants of the land. As Aldo Leopold (1990:272) points out, health is an organism's ability to regenerate itself. Indigenous land management practices directly work with the regenerative capacities of the land and its inhabitants, while they place an important role to the transmission of inter-generational knowledge through direct engagement and experiencing. For humans, knowledge is transmitted through stories, practices, artefacts, and more traditional educational systems. For all of us, human, plant and animal kin, knowledge is equally passed on through genetic information from one generation to the next, as our bodies hold knowledge that our ancestors held. Thinking *with* Steffensen, from an indigenous perspective, land management can be thought as a form of landscape regeneration and transmission of knowledge.

Throughout the last 250 years, as driven forward by state powers and fiscal administration, land management in the Western European imaginary, has evolved as a practice of monitoring, regulating and restricting activity, while holding a vision of plant and animal life projects disconnected and separated from human life projects (see Steffensen 2020). It has less to do with the practice of caring for and tending to the land, working with its regenerative capacities and assuring the transmission of knowledge, than with surveilling

and policing existing practices. Nevertheless, practices of caring for and tending to the regeneration of the forested landscape, as well as the transmission of knowledge on ways of working with the landscape that are adapted to the land, co-exist and have been incorporated into contemporary land management practices.

Forest management practices in particular, as they have developed in Western European forestry, have aimed to transform the forest landscape into a cartesian landscape (Topalovic and Princen 2014). The Finnish forest landscape, as Jokinene (2006) presents it has been transformed through the tools of scientific forestry to become a standardised landscape. In contemporary Finnish forestry, as he describes, resembles the agricultural model of the plantation closely, as colonisation through standardised tree stands aims at increasing yields through rotation-based planning. In Finland, the tools and principles of scientific forestry, "*minimum diversity, the balance sheet, and sustained yield*" (Jokinene 2006:208) directly generate forest regulations. In Finnish forests and forestry practice, where the terrain allows for a fully mechanised technology of extraction, the stand is both a concept and a material entity to be logged (Jokinen 2006:198). As he presents it, the Finnish forested landscape destined for logging is similar to a plantation landscape, a transformation that has taken centuries to unfold.

The Romanian forested landscape, on the other hand, has not been fully transformed into a plantation landscape. The transmission of indigenous, landscape specific, logging practices and forest knowledge has influenced the development of scientific forestry in Romania. Local inhabitants turned forestry engineers and the mountainous landscape did not allow for the plantation to take hold of the forest. The preservation and protection of the ancient forest (*codru* in Romanian) has always been part of landscape management both before and after the introduction of scientific forestry through the regulation of production and the specific protection of parts of the forest. On the Vișeu Valley in particular, wit the first scientific forestry plan, the 1947 Forest Management Plan for the Vaser Valley, forests belts around alpine pastures were enlisted as protected from logging. Furthermore, in scientific forestry, the co-existence of production and protection within a managed forest is conceptualised as two distinct functions of the forest, that can be territorially distinct or coalesce in the same forest.

As we are approaching the planetary boundaries of not only the forested landscapes, but all inhabitable and production landscapes, making explicit all implicit forms of protection is a way to safeguard the preservation of the landscape for the generations to come. Beyond the anthropocentric gaze, and the ways in which we may have indeed touched every part of the Earth's terrestrial, aquatic and atmospheric mediums, protecting parts of land is becoming more important as there are few places left where plants and animals can take refuge in the

eventuality of climate collapse. With the concerns raised by the evolution of forested, pastoral and grassland landscapes (Fig. 35), scientific reports stress the importance of land management practices that aim to extensively manage production landscapes rather than intensifying production on individual plots of land (Engler et al. 2011). The maintenance of traditional pastoral practices that make use of the whole mountain and guide the animals to graze on the alpine grasslands is an effective measure to preserve valuable vital space for the plants inhabiting these landscapes, as the grazing keeps the large tree and shrub vegetation belt around these grasslands from advancing further and occupying the space (Engler et al. 2011).

Throughout their recorded territorial history, starting in the late XVIIIth century, the forested landscapes of the Vișeu river valley have been mixed species landscapes, of native Beech forests, spruce and fir[39], as well as other native trees that populate the landscape in more sparse formations, like oak trees and fruit trees (walnut, chestnut, different varieties of apple, pear, plum). They have always been hybrid landscapes, in part made by our plant and animal kin with support from soil, water and wind, in part man-made through clear-cutting and planting, altering of soil conditions, displacing and/or enriching plant and animal communities. They are cared for, tended landscapes, 'touched' by some form of human management practice since before their recorded colonial history. Imperial historical records accompanying the first map drawn of the territory fail to mention the land management practices that have, since historical time, co-created these landscapes. Land management practices are implied in these records, as they mention local inhabitants trading timber and entertaining a pastoral economy on the mountain. In making these records, the intention of the fiscal administration was to substitute existing forestry practices with other forms of forest management that would maximise the resources the imperial administration could extract (Ardelean 2014).

The introduction of scientific forestry and the intensive logging it engendered transformed the way the landscape was seen and the ways in which different logging, pastoral, hunting, and gathering practices were coordinated in the landscape. The XVIIIth century forest landscape, that had never before been seen through the lens offered by cartographic techniques, had a logic of organisation of the ground, where selective felling and pastural practices co-existed in the landscape on separate paths. Pastural paths connected the valley landscape with the alpine grasslands, while forest paths along the valleys and springs reached deep into the forest. Felling was typically practiced in the spring, after the snow had melted, guided by the May moon. Timber needs time to dry before it can be used for

[39] Already the first recorded record of the First Military Survey of the Hungarian Kingdom (1782-1785) enlists the species of beech, spruce and fir as timber sourcing species on the Valley "Topographische Beschreibung Des Maramaroser-Comitates, 1767-1769 (Einzelstück (Aktenstück, Bild, Karte, Urkunde)". AT-OeStA/KA KPS LB K VII k, 18 Epsilon. Accessed July 4, 2016, http://www.archivinformationssystem.at/detail.aspx?ID=2237071.

construction and for fire, so the summer months provided for this time. In this landscape, pastures can be used a limited time, form June to August due to the weather conditions and precipitations (Maramureș Mountains Management Plan 2014:14). This kind of coordination between the different practices can be seen as the overall design of a shared landscape. The spatial and temporal spacing of these practices assured a form of protection of both the forest and the grasslands. With the large scale view that mapping technologies brought about for the imperial administration, and the introduction of large scale logging and scientific forestry principles, forest surfaces and pastural surfaces became interchangeable within the boundaries of the administered territory. Fig. 35. Vaser Valley. Forest change and pasture change. XVIIIth century to 2018 presents a synthesis of the process of forest and pasture management throughout the centuries, a process that was marked by the diminishing of alpine grasslands. The Management Plan of the Maramureș Mountains Natural Park (2014) records a change in the species composition of the pastures in relation to the change in management practices. With intensive grazing, the species composition of certain pastures has changed to being similar to that of a country road, while only 15% of meadows are managed using traditional management practices. With the change in management practices, some species rich meadows and grasslands have become species poor.

Closer to the valley of the Vișeu river, the urbanisation process in the last 250 years has, nevertheless preserved ancient landscape practices. Pictures 3 to 6 accompanying Fig. 31 illustrate the ways in which trees are integral to ancient landscape management practices. They delimit properties and provide shelter from strong winds, drawing patches of land in the vast landscape. They are used as hay stackers, while their branches are used for making baskets and for stabilising the land. The lines of trees that draw the landscape pattern also provide for migrating routes for small animals and birds, while providing valuable habitat for them. They are the fruit trees, walnuts, chestnuts, apple, pear and plum trees, and the osier trees (răchite in Romanian) grown and pruned for their branches, that inhabit the forested landscape along side beech, fir and spruce.

The 250 years of capitalist extraction on the Vișeu valley, that have introduced the principles of scientific forestry to a landscape that has ancestrally been logged through selective felling have transformed the forested landscape, differentiating between different forests. Scientific forestry has co-evolved through the practice of engaging with the landscape. Through this evolution, ancient logging techniques adapted to the conditions of the terrain have been preserved, adapted and adopted by the practice. Both scientific forestry and ancient practices had to adapt to the landscape, to work with it, in order to obtain timber while preserving the energy of humans, animals and machines and assure (re)generative conditions for the forest. As the study of forest management plans revealed, the managed

forest landscape is, for the forestry engineers that manage it, a non-ideal forest, a forest of the ground, a hybrid forest, that has been transformed by humans and non-humans alike. The particular way of seeing such a forest, which is related to the modern, colonial way of seeing humans separated from nature is of seeing it as a "disturbed" forest, while idealising an original state of the forest. The state of the forest, its history (whether it is a plantation or a naturally regenerated forest), its accessibility, the state of its life-bearing soil, the herbaceous layer, all matter in the assessment of the forest's disturbances (Hurducaș 2019). On the Vaser valley, the disturbed forest represents 88.5% of the whole administered forest (*2008 Forest Management Plan of OS Vișeu*:270), which accounts for a variety of conditions that make the forest vulnerable to being felled down by strong winds, succumb to pest attacks, heavy snow falls, land slides, soil erosion, or damages produced during logging. A particular form of "disturbance" is the disturbance produced through the wide spread of plantation landscapes, in particular spruce monocultures, that Forest Management Plans assess as having altered the hardwood-softwood balance of the forest. Plantations have spread through the Carpathian mountains through clear-cutting and re-planting. While clear-cutting has been prohibited since the 1986s (WWF 2005:7), we are still living with the consequences of plantation landscapes, that have grown into forests vulnerable to strong winds and to the multiplication of insects to the point of them becoming a pest. Through forest management practices, and the tools of the Forestry Plan (the balance sheet, the calculated yield, the stand of trees), forestry engineers act to manipulate both the Plan and the forest on the ground, in order for the two of them to meet.

With the 1948 Forest Management Plan the territory was organised in one Great Production Unit comprised of 10 "series", 10 bodies of forest, each one of them ascribed to a spring running down the mountain. The rationality behind this organisation principle was to index the forest territory by water courses, following "the natural flow of timber" (1948 Forest Management Plan of OS Vișeu:19). This indexing added to the indexing of the forest by age classes (see Scott 1999:14), and together they allowed for the intensive extraction that followed in the next two decades, when clear-cutting and rotation-based logging prevailed as logging methods. Until the 1970s, forested landscapes in Romania only benefited of implicit protection forms derived from the inaccessibility of the terrain, the need to protect alpine pastures with a vegetation belt comprised of trees and shrubs (1948 Forest Management Plan of OS Vișeu) and potentially also the preferential protection of local forests as refuge places for animals and plants, that have been passed down from generation to generation. Explicit protection forms have been integrated in scientific forestry and in forest management plans only since the 1970s. For the Vaser valley, the 1978 Forest Management Plan of OS Vișeu instituted protection over a large part of the forest as a means to ensure a high water flow to be harnessed and transformed into power through the national electricity grid. Two storage lakes, on the Vaser and its affluent, the Novăț rivers were planned, but

never constructed (1979 Forest Management Plan of OS Vișeu). While the 1998 Forest Management Plan lifted the protection granted to the forest as an embedded protection of the water flow, with the institution of the Natural Park in 2014, 97% of the forest administered by OS Vișeu was granted differential protection status, including 69% of the forest as a buffer zone for the natural reserves instituted by law. This protection accounts for the quality and extension of logging interventions, though not entirely prohibiting them. In this landscape, protection and production co-exist and coalesce, as they are not mutually excluded.

The protection areas instituted through the Natural Park protect parts of the alpine grasslands and of the forest where animal and plant kin are finding places of refuge, as their numbers and habitat areas have diminished over the centuries. The most sensitive of all birds on the Vișeu valley, the black grouse (*cocoșul de mesteacăn* in Romanian) and the western capercaillie (*cocoșul de munte* in Romanian) still find places of refuge in the Maramureș Mountains. Some of the areas they prefer have been designated protection areas in the Maramureș Mountains Natural Park Management Plan (2014). The places where the birds find refuge are passed down from generation to generation by hunters, forestry engineers, biologists, foresters and local inhabitants who search for them in their mating season to view the dance the male birds perform. During my spring internship at the Maramureș Mountains Natural Park in 2017 I accompanied the park rangers in their search for traces of the birds during their monitoring campaign.

As logging practices have co-evolved in relation to the landscape, responding to the declivity of the terrain, the accessibility of the forest landscape, the availability of timber and the implicit and explicit protection granted to parts of the landscape, they have been integrated into contemporary scientific forestry practices. The accessibility of the forest as a logging landscape emerges at the encounter between landscape and technologies of extraction. The whole of the landscape is not 100% accessible for logging, granting it an implicit form of protection. For example, the forest adjacent to the Vaser valley has an accessibility of 75% (*2008 Forest Management Plan of OS Vișeu:26*), the remaining 25% of inaccessible forest benefiting from the protection granted by the lack of extractive infrastructure. Securing accessibility of the forest was and still is a way of securing the access points. From the point of view of access to the forest, the forests on the Vaser valley that is now in state property, is easily to secure, as the Vaser valley and the light train that runs parallel to the river are the only ways to access it.

Due to the declivity of the terrain, timber extraction on the Vaser Valley is not fully mechanised, and makes use of machine technology along side human-horse collaboration and the possibilities of sending timber down the slopes of the mountains. Logging and

timber transportation techniques are adapted to the forests' accessibility on the terrain. Timber is collected from the mountain to the valleys where roads and railway (on the Vaser) can transport it further. Collection is done through motorised vehicles, where the forest is accessible through roads, but more often through sending timber down the slope of the mountain, in a collection line, either on a lower road or on a vertical line on the slope, or through dragging it with a horse. As my interviewee attested, forestry practice at OS Vișeu preferentially uses dragging timber with a horse as a way to better protect the herbaceous layer. Sending timber with a raft on the Vaser river used to be the preferred transportation method until the construction of the light railway. Rafting has survived in the Maramureș region until the mid XXth century as a complementary practice to transportation on railway (Țelman 2008:61).

7.4. Conclusion

While in the previous chapter the focus was on the immaterial "infrastructure space" constructed during the last 30 years to accommodate the flow of timber, here I focused on the material infrastructure constructed since the end of the XVIIIth century to extract resources from the landscape of the Vișeu Valley and the ways in which it inhabits an already inhabited territory.

Reading the palimpsest, and looking into the material infrastructure constructed in the Viseu Valley for the purpose of timber extraction and transportation disclosed the ways in which the timber flow from the Valley was first directed towards the imperial territories of the Austro-Hungarian Empire in the late XVIIIth century and then re-oriented towards the interior state territory of post World War II Romania, from where it is now engaged in the planetary timber flow. As shown in the previous chapter, increasingly since the 1970^{s} the flow of timber from Romania, including the Vișeu Valley has been directed towards Arab and Asian markets. The reorganisation of the railway system that was redesigned to redirect the flow of resources from the Vișeu Valley to the interior of the Romanian state and the reorganisation of resource landscapes by the Romanian Communist State during the second half of the XXth century has disconnected the Ukrainian communities on the Repedea Valley from the flow of timber towards which they were previously contributing to. The co-existence of illegal practices and extended poverty in the area cannot be dissociated from deliberate state intervention that aimed at profiting from the resources of the landscape while excluding the human inhabitants. Reading the landscape as a palimpsest exposes illegal logging on the Repedea Valley as a consequence of state policies during the second half of the XXth century.

In the diagrammatic representation of planetary tiber flows from the previous chapter, the lines of trade traversing continents and transporting timber through roads, railways and maritime routes appear as the decisive lines of the capitalist-colonial project. By looking at the landscape at large and the other lines inscribed in and that inscribe themselves in the landscape this chapter brings forth other agencies that offer the very material support of such projects, like the agency of water in the territorial construction of the Vișeu Valley landscape as a landscape of extraction. With an expanded and distributed concept of agency, the territory of the Vișeu Valley is shown as being inhabited by a multitude of human and non-human beings, along their life paths intersecting with the capitalist-colonial extractive project.

Studies on forest loss, including through illegal activity, underline the need to strengthen forest management practices (Sun et al. 2013, Andronache et al. 2016, Pintilii et al. 2016, Draghici et al. 2016). Through delving into forest management practices on the Vaser Valley, and the ways in which they have integrated ancestral knowledge while continuously transmitting forest knowledge over generations, this chapter suggests a rethinking of forest management as a practice of knowledge transmission with the aim of landscape regeneration is better suited to strengthen trust in forest management and forest management structures.

8. The forest as a more than human landscape

In this chapter, I delve into the life projects of the non-human inhabitants of the valley and the relationships human inhabitants develop with them. Through immersive ethnography, conducted during fieldwork, I rely on the reading of the forested territory by other specialists, biologists and forestry engineers, in the company of whom I walked the forested landscape of the Vișeu Valley. The body is an important mapping tool in architectural and urban practice. The immersive experience I had during my forest walks opened a pathway towards connecting with the consciousness of the forest. Through a methodology of being present, I attuned my senses to the more than human landscape.

While I have walked the territory of the forest in the company of biologists, forestry engineers, and local guides, I reiterate the walks I had through using the writings of Aldo Leopold, Jakob von Uexküll, Emanuele Coccia, and Peter Wohlleben as my reading companions. The walks were not audio recorded, but my reiteration of them makes use of the notes I took after having completed them. The selection of writings used reflects the conversations and the observations I had in the forest. Through the writings I have chosen, trees, birds, animals and plants come through as our equals, “as if” they possess the ability to see, speak, listen, respond, think and move with intelligence. As scientific studies and indigenous cosmologies presented in *4.1. Forest intelligence: from trees to forest bodies* show, our non-human kin have these abilities, but they do not exhibit them in the form that sight, speech, movement and intelligence are experienced by a human body.

Chapter 8.1. Forest encounters presents the relationships established between human and non-human inhabitants in the more than human landscape through my forest walks. Every walk is a journey through which stories were told and different narratives were called into being. These narratives bring nuances and contrast to the official institutional narratives that are told through planning documents, official accounts and media reports. The account starts with a description of the bodies of trees and forests, with the aim of understanding the different ways in which the same processes manifest in plant bodies and human bodies. It discusses the bodies of trees and forests and the ways in which the neural connections and pathways of nutrients and communication signals makes them similar to human bodies. Our perceived separation from plant beings is a form of othering, and this description is meant to bring them closer to us, as a part of the world we jointly inhabit. While the conversations I had during my forest walks evoked a scientific understanding of the landscape and the forest, the way I present them here is in a double format. First I present the experience of the walk and the way knowledge was embodied by my field companions in their quick decisions on the field. Second, I discuss scientific approaches on the forested landscape through the writings of German forestry engineer Peter Wohlleben (2016). Wohlleben’s view of the forest,

through his work in forest conservation, is closer to the view of biologists, as his efforts of understanding and of practicing forestry are directed towards the regeneration of the forest.

Chapter 8.2. A mosaic landscape delves into the forested landscapes' dynamic and the ways in which plants come together in mosaic patches within the forested landscape. The chapter has evolved as a dialogue with some of the concepts biologists and landscape ecologists use to define and conceptualise the ways in which plant and animal kin live in communities, and the ways in which we live in community with them. It offers itself as a way to bridge interdisciplinary collaboration and trans-disciplinary action. In detailing the mosaics of the landscape, I approach the landscape at the micro scale of plants and their preferred living conditions, known as "habitats". At stake in this discussion is to introduce the diversity of species and to name the most vulnerable members of the plant communities inhabiting these landscapes. This naming brings further specification into the landscapes that have been identified as vulnerable to climate change in the previous chapter, *7. The forest as infrastructure*.

Chapter 8.3. In harmony thinks through the much used phrase of the harmony of nature, with specific reference to what harmony means on the Vișeu Valley. In *2.2. Boundary conditions* I discussed John Laws' notion of knowledge hinterland in scientific approaches that can show itself as a form of manifested absence or as a hidden otherness. In this part I introduce the concept of "harmony", widely used by biologists, as part of the knowledge hinterland of biological sciences, more specifically as a form of manifested absences. In thinking of the concept of "harmony" as exhibiting a manifested absence I retrieve the historical meaning that was attributed to it in the first half of the XXth century, particularly in the writings of Jakob von Uexküll and Aldo Leopold.

8.1. Forest encounters

The categorisation systems we have do not reflect the particular lives of earthly beings. We are used at categorising trees and forests by appearance. Trees are categorised by size, as being taller than an adult human being, having trunks, branches and leaves, in a particular stage of their life (Wohlleben 2016:143-145). Plants and trees that stay rooted and transform light into food through photosynthesis are categorised as different than animals that move and eat other animals and plants for food (see Coccia 2019:4-6). In the Prologue to "The Life of Plants. A Metaphysics of Mixture", Emanuele Coccia (2019:4) exposes the ways this difference has constructed different ethical approaches to plants and animals. While, from a human perspective it was much easier to identify with animals than plants, the ethics of animal rights has not extended over the plant realm in modern societies (Coccia 2019:4). Plant life is not seen as valuable in modern capitalist-colonial societies. Yet the life of plants is becoming more valuable as landscape transformations induced by climate change and modern practices of cultivation, such as those of the plantation landscapes threaten the stability of human societies. Simard's (2015, 2017, 2018) research, presented *in 4.1. Forest intelligence: From trees to forest bodies* is evidencing the importance of trees' long life for the resilience of whole forested landscapes. While the plantation and the scientific forestry paradigms account for 40 to 100 years of age in the life of a tree, when it is deemed productive for human use, Simard shows centuries old trees are the most valuable for landscape resilience. Beyond categorisation on appearance, contemporary scientific findings investigating tree roots (Simard 2017, 2018, see also Wohlleben 2016:145-146) advance the root as more important than the above ground tree trunk (Wohlleben 2016:147). Scientists investigating the activities of tree roots are advancing the hypothesis that it acts in a similar way to a human brain through transmitting neuronal signals and transporting nutrients from beneath the ground to above the ground tree trunks, branches and leaves (Simard 2017, 2018, Wohlleben 2016:147-148).

> *"The root is certainly a more decisive factor than what is growing above ground. After all, it is the root that looks after the survival of an organism. It is the root that has withstood severe changes in climatic conditions. And it is the root that has regrown trunks time and time again. It is in the roots that centuries of experience are stored, and it is this experience that has allowed the tree's survival to the present day."*
> *Wohlleben (201206:146)*

Scientists are concerned these findings are threatening "to blur the boundary between plants and animals" as the brain-like activity exhibited by plant roots is similar to animal and human brain activity (Wohlleben 2016:150).

Within the forest community, every tree has specific requirements and plays a specific role. Even dead wood plays a role, and a very important one, of nourishing the forest and its

inhabitants. Dead wood enriches the forest through providing habitat for as much as a fifth of all known animal and plant species (Wohlleben 2016:228). Insects, bacteria and fungi living in the forest have very specific preferences and are specialised to feed off either decomposing tree trunks or the leafy canopies of trees (Wohlleben 2016:227-8). Through their feeding of decomposing tree trunks and leafs, they enrich the soil and thus nurture the forest (Wohlleben 2016:229). Life and death are interdependent in the forest landscape. As Wohlleben (2016:229-230) points out, some trees, like spruce trees, sprout well on the decomposing bodies of their parents feeding on the nutrients released by fungi and bacteria feeding on the parent's body.

As shown in *Chapter 3. Shifting consciousness on forested landscapes*, scientific advances are converging with ancestral knowledge on the hypothesis of plants being intelligent beings and communicating through their root systems and underground mycelia networks. Trees also have been shown to exhibit sensory reactions and nurturing behaviour towards their kin. They can sense light, as they orient their leaves towards the light and as flowers open and close their petals with the cycles of day and night. Do they also have a sense of vision, of what they see? In animal and human beings, vision is associated with the eyes. Already at the beginning of the XXth century, botanists were entertaining the thought that plants had the capacity to see. As Mancuso (2018:49) presents, Austrian botanist Gottlieb Haberlandt advanced the theory that plants could see through the epidermic cells that worked like "ocelli", a form of primitive eye common among invertebrates. Haberlandt's theory was later discussed in English botanical circles, as Harold Wager produced a series of photographs using the leaves of plants as photographic lenses, thereby demonstrating that optical principles were applicable to plant's leaves (idem). Since the early XXth century Haberlandt's theory and Wager's experiments remained unexplored. A recent biological discovery involving a common plant inhabiting the forests of Chile and Argentina (Boquila trifoliata) that was observed to imitate with great skill the shape, colour and size of other plants' leaves has stirred up debates on how it could do that (Mancuso 2018:47). For the community of botanists, the fact that the plant could imitate all three defining elements characteristic of other plants leaves was remarkable. Gianoli and Carrasco-Urra, the botanists who first noticed the plant's out of the ordinary abilities thought that it was using the communication channels known of plants, those of scents and underground mycelia networks (Mancuso 2018:48). As Mancuso proposes, however, it could be possible that the Boquila saw the other plant it wanted to imitate and did its best to do that. Drawing on the observations of early XXth century botanists, Mancuso and Baluska advanced the hypothesis of of the visual capacities of plants (Mancuso 2018:49). Entertaining the thought that plants see, brings them closer to us. It is a bridge across differences, for it enables us to think of the ways they sense and perceive the world around them with their own bodies. The possibility that plants

have visual capacity reverses the unidirectional observation of plants by humans. We may well be seen and observed by plants as we walk among them.

At the turn of the century another botanical experiment challenged the normative way of thinking of plants as immobile, passive, lacking the capacity to react and move (Mancuso 2018:21-23). Wilhelm Friedrich Philipp Pfeffer's use of the time-lapse photographic technique presented sequences of the movements of plants (idem) which further spurred great interest in the community of botanists. Unlike Haberlandt's and Wager's proposition that plants had visual capacities, Pfeffer's demonstration of the way plants moved as they flowered, as they adapted to the light of day and to darkness at night, and as their roots explored the soil through their movements has made the community of botanists interested in the movements of plants (Mancuso 2018:23). Following in the footsteps of his father, Charles Darwin, who already in 1880 advanced the thought that plants could intentionally move their bodies, Francis Darwin introduced, in 1908, to the audience of "the annual conference of the British Association for the Advancement of Science" the hypothesis that plants were endowed with intelligence and able to intentionally direct action (Mancuso 2018:23-25). Studies on plants movements are a continuous preoccupation of botanists today, as numerous applications of their extraordinary abilities are translated to the domain of space explorations where scientists are purposefully designing exploratory objects that use plant intelligence principles, as Mancuso (2018:191-203) details. Unlike human and animal bodies that make use of muscular contraction and relaxation to move, plants movements are hydraulic, as they direct the flow of water within their bodies or respond to the presence of water and water particles in their surroundings to expand and contract their bodies (Mancuso 2018:25). The ways in which plants move to explore their surroundings reaching nutrients and water, to protect themselves from herbivore animals or to feed themselves, to live with the cycles of day and night and with the seasonal cycles of frost and warmth, to propel their seeds in order to assure their reproducibility, and to act as a collective body are further advancing scientific interest in plant intelligence.

The century long scientific discoveries that have transformed the ways in which plants are perceived, from being perceived as mere objects to being perceived as living beings has yet to change the ways in which plants are represented, treated and exploited as resources. This change of perception however, was only possible through careful study and through being in the presence of plants for long enough to witness their movements. Though the thought of plants as beings does not yet cross the scientific domain to spill into the public, being in their presence on a daily basis and tending to them, as do biologists and forestry engineers, is transformative and allows for a perception of plants as living beings through witnessing the cycles of annual growth, of death and life. Being immersed in the surroundings with plant beings allows for the perception of their movements in relation to the

movements of the air, the soil and the water surrounding them. From immersion, one is no longer detached and separated from the surrounding, one does not think in terms of the separation between humans and nature.

Every walk within the forest that I performed in the company of forestry engineers, environmental engineers and biologists was a journey in itself. As I was *walking with* biologists, forestry engineers, environmental engineers, local guides and hunters I was presented with differing ways of seeing the forested the landscape, and differing ways of conjuring non-humans to tell, from a human perspective, a story about the place we were at. My field companions conjured wind, soil, water, plant movements, animal traces, sedimented rocks, fallen trees, tree stouts to tell stories of animal and plant migration, creation stories, logging stories, hunting stories, and stories about the life of the forest. As we were exploring the ground, these stories crossed the jurisdictions instituted through the governing bodies of the forested landscape: the Natural Park, the Forestry Offices, the Hunting Funds and the private, public and communal property owners. They did so not only through the ways in which animals and plants migrated, and the ways in which the different forests succeeded themselves in space and time, but also through the ways in which collaboration was established across institutional divides. Performing forest walks, which were patrolling routine for the Natural Park's rangers, required collaboration and cooperation with other persons outside the organisation of the Natural Park that had other kinds of knowledge as the Park's rangers.

Fig. 36 Forest walks, shows the tracks that me and my field companions have taken in the forested territory of the Vișeu Valley. The map differentiates between driving and walking as ways of access to the forested territory, as well as between the walk that I had by myself and the walks I where I was accompanied by park rangers, forestry engineers and their local guides.

The accounts of my walks each speak of a very particular forest in a very particular moment in time. They are situated accounts of the state of the forests on the Vișeu Valley in 2017. In them I chose to represent through photographs, text and diagrams 6 particular forests each with a distinct story that resonates for the forested landscape at large. They are titled: Conjuring the wind, Walking in constantly changing terrain, Community strengthening, Correct and incorrect logging, Landscapes in transformation, In the presence of animals. Each of these stories contains an account of the journey and/or journeys that inspired it, a discussion on the theme that relies mostly on Peter Wohlleben's account of "The hidden life of trees" (2016), photographs and diagrams. Both Wohlleben's account and my field companions' knowledge and practice was inspired by their everyday presence within the forest. I chose to introduce the themes discussed through Wohlleben's account as a way to

show how knowledge of the forest resonates across spaces and disciplines and as a way to value ground knowledge. The way spruce plantations are more vulnerable to extreme weather events presented in story 1. Conjuring the wind, the likely probability that a forest fire was set by human hands presented in story 3. Community strengthening, the different forests, the cycle of water and the way that the forest holds and releases water presented in story 2. Walking in constantly changing terrain were all part of the discussions I took part in during my forest walks. The theme that was not discussed during fieldwork, but that emerged through this research is a discussion on the need to hold a vision of landscape transformation for Romanian forested landscapes such as the ones introduced by Peter Wohlleben (2016:395-406) for forested landscapes in the United States, in Germany and the UK. From an indigenous perspective, the land is our greatest teacher, and the way in which knowledge of the forest transcends political and cultural boundaries is indicative of such.

A note on the diagrammatic representation of forest bodies accompanying my forest encounters presented in the stories that follow:

In the opening paragraph of this chapter I have advanced the scientific hypotheses of tree roots as being important for the bodies of tree in an analogous way to the importance of the brain for human bodies. Chapter *4.1. Forest intelligence: From trees to forest bodies* also introduced the mycelial networks co-partnering with tree roots to enhance trees communication and nutrient transmission. The forest diagrams accompanying 3 of the 6 auto-ethnographic forest encounters will take these hypothesis into the representation of forest bodies. Conventional scientific representations of forest regeneration do not represent the underground tree roots and their mycelial networks (see Fig. 1. Forest succession curve (modified from Eckert et al. [23]). in Morales-Barquero et al. 2014 and Fig. 1. Schematic stages of early to mature forest stand development following major disturbances (adopted from Oliver and Larson (1996)) in Bartels et al. 2016). Such representations are still rooted in the way the capitalist-colonial system values only the above the ground tree trunk, disregarding the underground networks connecting trees into larger forest bodies. If tree roots and their fungal partners exhibit brain like activity, making them intelligent beings, as suggested by Mancuso 2018, conventional representations of trees fail to represent the body part where tree intelligence resides. Updating our representation of the forest to represent it as a whole body with its above the ground and underground parts is important for valuing trees as intelligent beings beyond their commercial value.

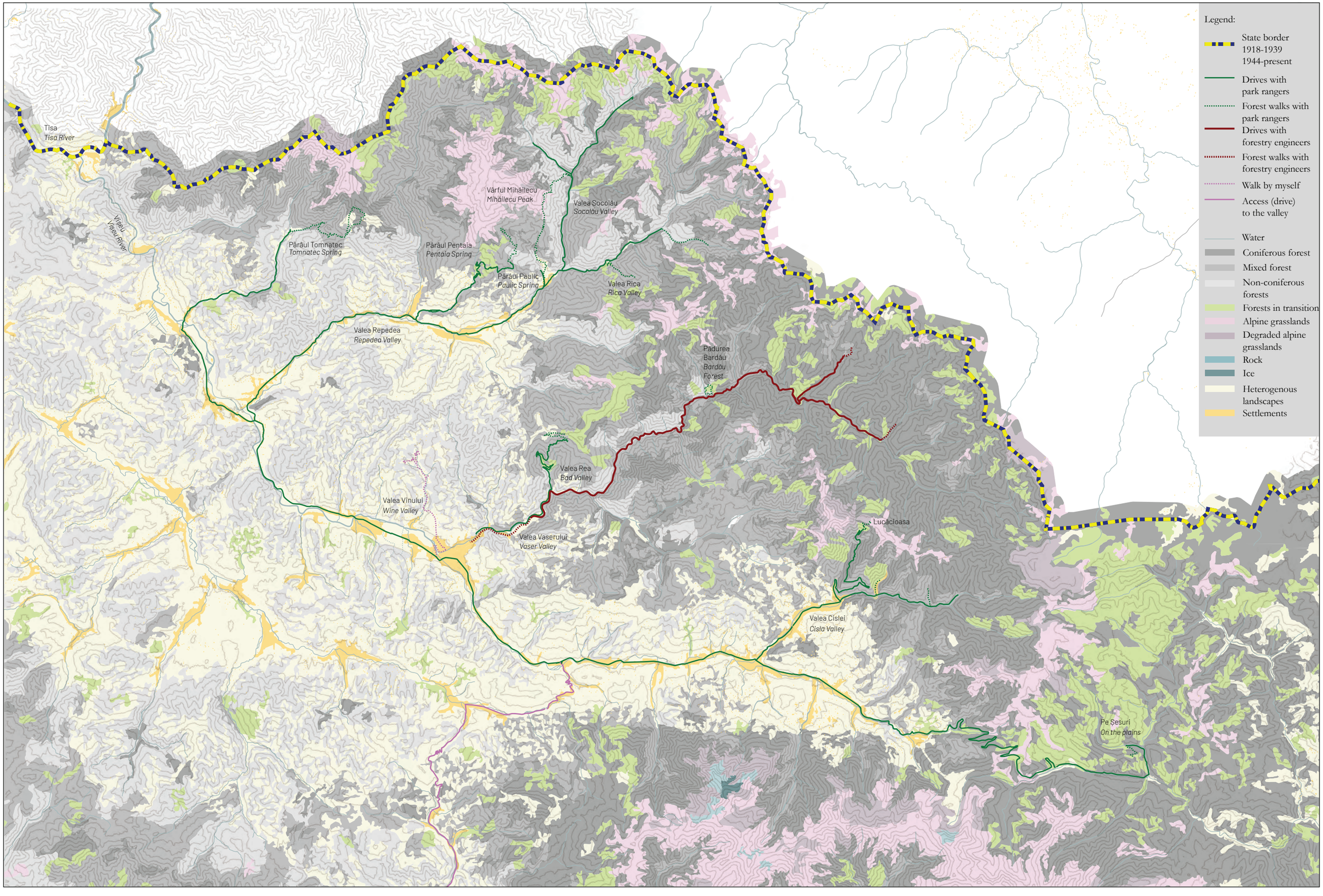


Fig. 36. Forest walks

1. Conjuring the wind

The last journey I took in the Maramureș Mountains was along the Vaser valley, in the company of the head of the Vișeu Forestry Office and a videographer from the valley. The purpose of their trip was to survey the damages produced by a strong storm, the kind of storm that comes with cyclical periodicity once every 5 to 10 years in Europe (Wohlleben 2016:238). Late October 2017 the storm that passed through the north-western part of Romania produced damage throughout the region. Many trees fell during it, along with electricity posts, while roofs were damaged. Throughout the Vaser valley, individual trees had occasionally fallen in the water or in the forest. Spruce plantations had been most damaged by the storm, having felled in groups, partially exposing the slopes of the mountains. The photographs accompanying this story were taken during the visit we took to surveil the damages produced by the wind storm in spruce plantations.

Spruce plantation where trees had fallen in group due to a strong storm.

Spruce plantations.

Many events happening in the forest are known in their specific details only in retrospect. In advance, they are recorded as occurrences, warning the carers of the forest of the eventuality of an event. That spruce plantations are vulnerable to strong wind blows and storms is something forestry engineers account for in their management plans. Yet the meeting of wind, trees and the topography of the terrain that effectively makes trees fall in specific areas is unknown until its occurrence. When, during our walk, we reached a part of the forest where trees had fallen in groups and I asked how that happened, Mr. Vlad conjured the direction of the wind, the force it applied on the slope of the mountain to break the tree trunks of the even aged spruce forest, and the particular topographical conditions created by the valley of the river to visualise the storm in action.

Trees have to withstand strong winds and storms every autumn and winter in Europe, and, as Wohlleben (2016:236-238) notes, they have adapted to survive them. Furthermore, particularly strong winds and storm ”occur every 5-10 years” (Kirby and Watkins 2015:6). Deciduous trees such as beech trees living in a forest community are well prepared for such storms. The loss of their leaves in the winter leaves them with a flexible and aerodynamic shape that bends with the wind rather than breaking (Wohlleben 2016:237-38). During a strong wind storm, as Wohlleben (2016:238) recounts, the diversity of individual trees and the differences between them work together to safeguard the survival of all trees. As each individual trunk responds in a differentiated way to the power of the wind, their movements encounter the movements of neighbouring trees, which slows them down and prepares them for the next gust of wind (idem). Spruce plantations, on the other hand do not have the advantages that multi-age beech forests have, as each tree is likely to respond in a similar way to the force of the storm thereby multiplying its force. They are lucky to be saved by the dissipation of the energy of the wind escaping over the top of the hill or mountain, like the ones we encountered were.

Fig. 37. A diagram of the wind contrasts the ways in which same age spruce plantations and mixed age multi species forests respond to strong winds. While spruce plantations can amplify the power of the wind eventually succumbing to its power, multi-age forests can dissipate it through their movements.

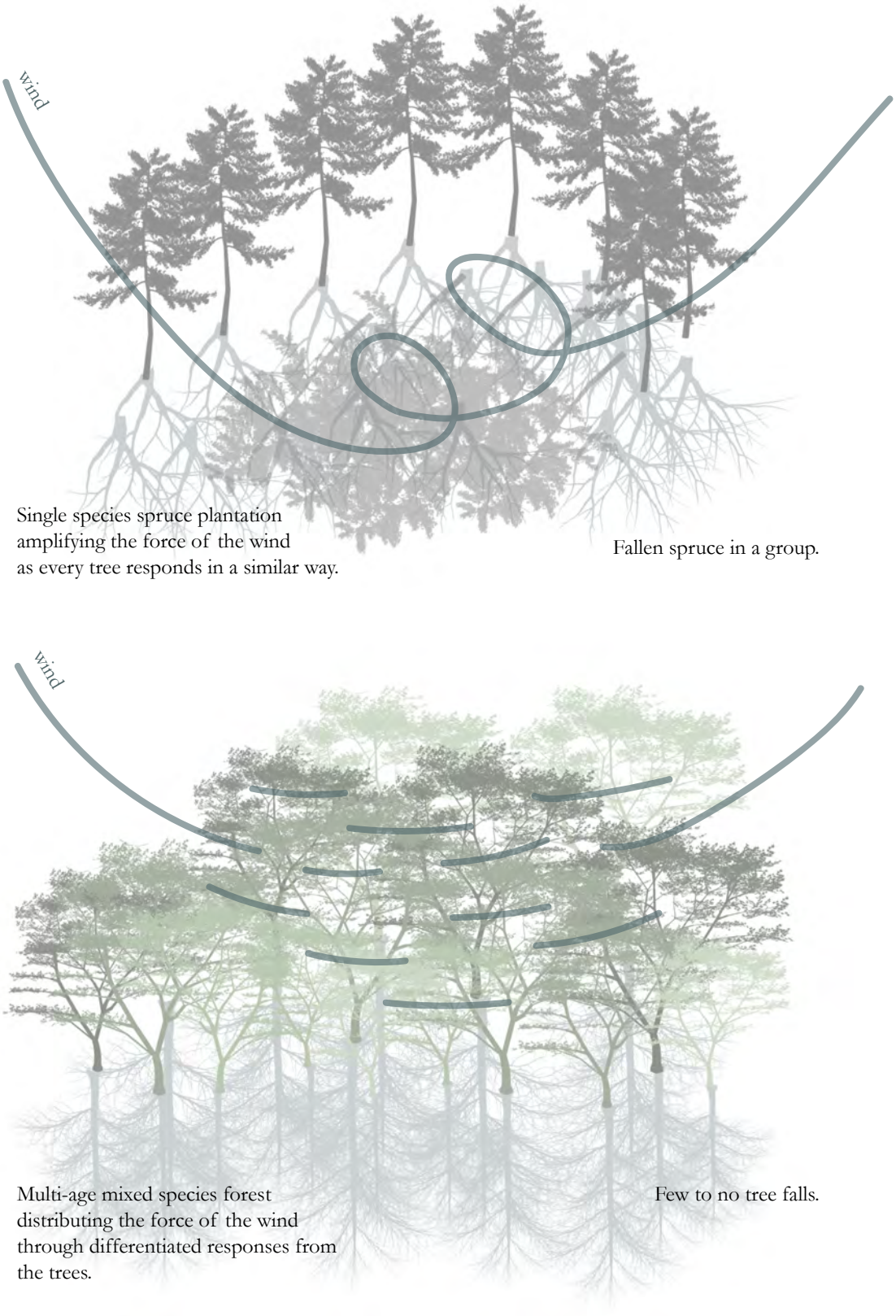
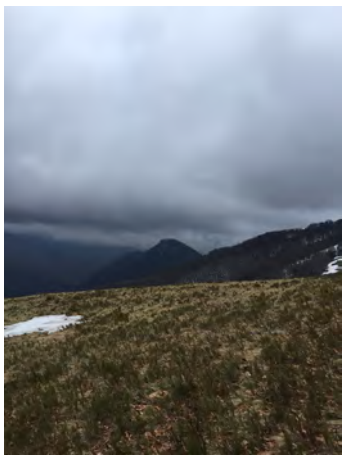


Fig. 37. A diagram of the wind in the forest.

2. Walking in constantly changing terrain

It may have been the spring that allowed us gradually in the forest, or the careful planning of our walks that allowed me to progress from shorter to longer walks in the forested landscape. Walking in the mountains in the company of forestry engineers and biologists was never exhausting to the point of no return. Through walking along with my companions, I adjusted my rhythm and I gained skills in walking efficiently. I watched my companions make precise decisions in the otherwise seemingly undistinguishable landscape, and I watched them walk slowly, adjusting their bodies to the declivity of the terrain, protecting their knees and saving their energy resources, as they had to be ready to walk in the forest the next day as well. I watched them as they were thinking with the deers, finding a small path in the landscape, away from the road, that must had been used by deers and other animals. We mostly walked on roads and known tracks, but when we occasionally strayed, finding a small path to guide us back to the road proved to be a skilful act on behalf of my companions. As an embodied practice, walking in the forest required us to activate our senses and let them guide us through the landscape. The paths we walked on were known to my field companions. “Known” in this instance means that they had a recollection of what we would encounter. Their recollection was no guarantee, but it was what guided us through the continuously changing forested landscape. Through every walk we encountered the landscape in a new configuration, yet it was still the same. During the walks we encountered several of the many groundwater springs the Maramureș Mountains are known for.

There were two particularly long walks that we took. One of them was in the company of a forestry engineer and hunter, and a local guide form the Ukrainian community in Poienile de Sub Munte. There was a double purpose for our joint walk, monitoring the wild animals in the forested landscape and marking some trees for felling. We started our walk from the village, leading to some meadows and beech forests that showed signs of having been coppiced some while ago. Wild boar had been roaming through the forest. The weather changed several times during our walks, from rain to fog that travelled between the trees. At the marking place, with the glance of an eye, the forestry engineer pointed towards the spruce tree that should be spared, as they produced offsprings close by, while pointing towards the other spruce trees that stood crooked but were thick in their trunks. Identifying trees in the forest, according to age, to their reproductive capacity and strength is a skill the forestry engineers embody while in the forest. The local guide, whose land belonged, mentioned he would log the trees by ancient practice, as his grandfathers had done, on a full moon in May. It was late March when they were marked. Felling trees in the forest requires preparation. The first four photos accompanying this story were taken during this walk while the next 2 were taken on the Bardău and the Bad (*Valea Rea* in Romanian) valleys. They illustrate the changing weather, sometimes within 5 minutes.



Travelling clouds above the mountains.

Changing atmospheric conditions within 5 minutes.

Forests perspiring atmospheric clouds.

Forest spring.

The photographs direct attention towards the water cycle in the forest, by which atmospheric water is condensed into clouds, fog and mist that travel with the wind.

Forests are part of continental streams of water. Within 400 miles of the coast water that evaporates from the oceans and seas travels inland with the wind, but beyond that, the continuation of coastal and inland forests transports it from place to place (Wohlleben 183:184). Forests create their own microclimates and their preferred soil, as they take part in the cycle of water, storing and releasing it into the atmosphere (Wohlleben 2016:174-177). Being in the forest, water is all around. Deciduous forests like beech forests, have a cooling effect on the weather, as they create more water rich soils (Wohlleben 2016:174-175). The soil is enriched each year with the decomposing leaves and the bodies of the fallen trees, making it more moist and able to store more water (Wohlleben 2016:176). Deciduous and conifer trees differ in their approach to water retention. As Wohlleben (2016:178-179) recounts, deciduous trees use their bodies to redirect pouring rain towards their roots, where it gets stored into the soil, while conifers catch the water in between their needles from where it evaporates into the atmosphere. With the evaporating water, conifers release terpenes into the atmosphere, that condense the atmospheric water to create thicker clouds above them than above non-forested areas (Wohlleben 2016:186). Deciduous forests with moist floors capture water which, after the trees are satiated, gets released deeper into the ground and into the underground streams of water that surface as springs (Wohlleben 2016:186). Spring water has the same temperature around 4 degrees celsius throughout the year. As trees shelter springs, they provide a living habitat for some forest inhabitants like snails (Wohlleben 2016:188). Streams of water running though deciduous forests are protected by trees, that maintain a stable habitat for its inhabitants, allowing sun to warm it up in the winter and shading it from the sun in the summer, while fallen trees stoping the flow of water create habitats for those inhabitants that require more quiet and slow waters (Wohlleben 2016:189-190).

Fig. 38. A diagram of the cycle of water in the forest constantly changing atmospheric conditions represents, in diagrammatic form evaporating, moving and ground infiltrating water in the forest. Without representing soil and ground level, the diagram represents whole tree bodies, comprising above the ground trunks and crowns and below the ground roots and partner mycelia networks. In co-creating their environment, the soil they inhabit and the atmospheric conditions that surrounds them, trees are active participants in the water cycle.

With the evaporating water, conifers release terpens int othe atmosphere, that condense the atmospheric water to create thicker clouds above them than above non-forested areas (Wohlleben 2016:186).

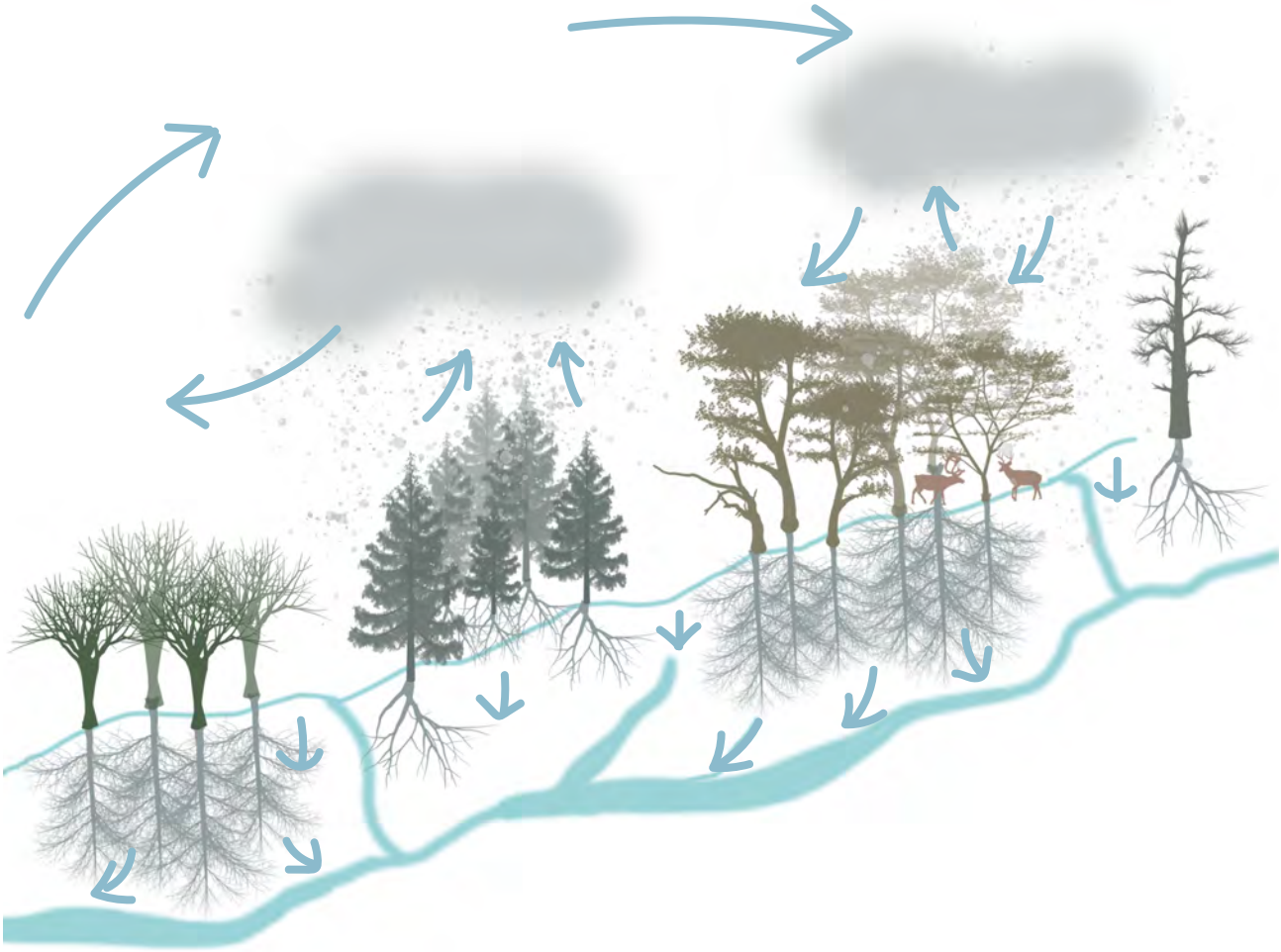


Fig. 38. A diagram of the cycle of water in the forest constantly changing atmospheric conditions.

3. Community strengthening

There is a valley that runs in the Vaser valley which is called The Bad valley (Valea Rea in Romanian). The origins and symbolism of the name are unknown to me. It was here, however, that we stumbled upon an incipient forest fire on our way back from patrolling the forested landscape. Coincidentally, on our way up the hill we met with local firefighters that were distributing information sheets on how to respond to a forest fire. Anyone is obliged to alert the firefighters about a fire. As I was in the company of park rangers, and was new to the forestry engineers accustomed with them, I was approached by several of them, inquiring upon my presence there. They were curious, and I too, was curious to see them all together. Luckily, the fire we encountered was extinguished in an afternoon, but the event brought together the community of forestry engineers, park rangers, and local people who were interested in extinguishing it, next to the professional fire fighters. Some went to help the fire fighters with extinguishing the fire, turning the earth around with shovels to cover the grass that had caught on fire, some went deep into the smoke to clear the trees of fire around their trunks. There were no high flames, but the smoke impaired vision if you found yourself immersed in it. The ones that stayed away from the fire to supervise the operation were remembering other times they had to fight fire. The pictures accompanying this story were taken at the early sight of fire as we were descending on the Bad valley.

In 2008, the forest on the Cisla valley burned for a month. Many of them fought the fire in rotation for the whole time, only to go home to rest. According to their stories, they dug up tranches to halt the fire, while helicopters dropped water from the sky. Firefighters, forestry engineers, park rangers, local inhabitants, all took part in extinguishing the fire. The feeling of being in community fighting fire, protecting the forest brought them closer together, despite their professional divides that placed them on opposing fronts. In the history of the forest, events such as fires, flooding and strong storms occur with certain frequency, and my field companions were conscious of these cycles of events with respect to the time of the forest. They were conscious that the forest has a much longer life when compared to the lives we, as humans, are given on Earth. And they knew, of course, that these events are recorded in the trunks of the trees, in their growing rings, that dilate and contract, or get smokey as the trees live through water rich years, drought years and forest fires.

Fig. 39. A diagram of community strengthening during forest fires represents the intense activities of extinguishing a fire in the form of a networked, more than human community. Women, men, firefighters, forestry engineers and park rangers take part in extinguishing a fire along with shovels, helicopters, firefighting vehicles, rain, wind and the small fires that cook nourishing meals.

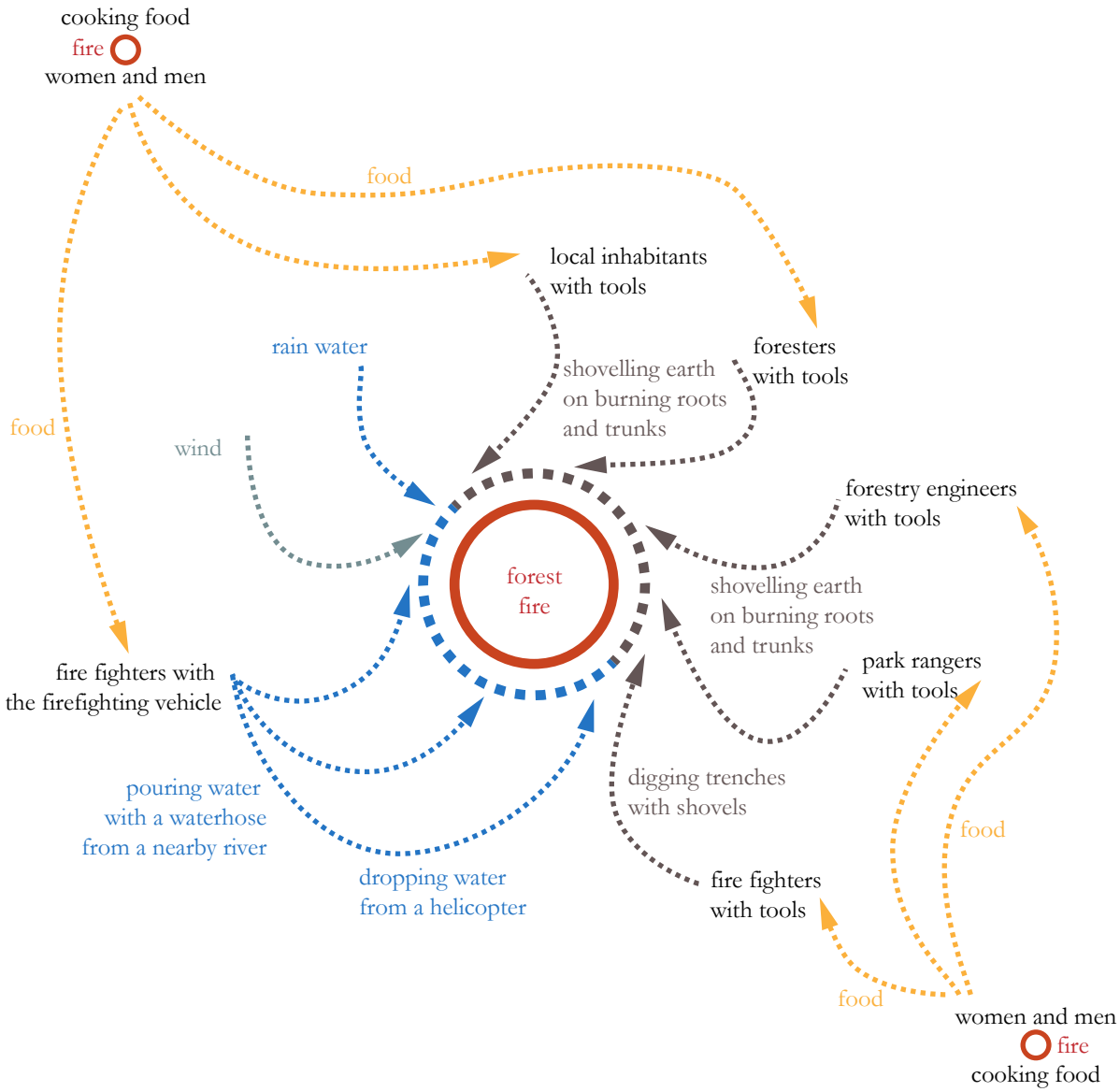


Fig. 39. A diagram of community strengthening during forest fires.

Forest fire on the Bad Valley

There are forested ecosystems that are dependent upon low intensity fires for germination and growth, so that the forest can regenerate itself. These are the North American landscapes, touched upon in *3. Shifting consciousness on forested landscapes* and the Australian bush landscapes. Coastal forests in Portugal have also adapted to fire in the course of millennia, as their thick bark offers fire protection, while the buds underneath the bark start growing after a fire (Wohlleben 2016:345-346). But, as Wohlleben states, Central European forested landscapes are not adapted to living with fire. As fire caused by lighting is more rare than fire caused by people, the forests did not adapt to live with fire (Wohlleben 2016:346), even though in some parts of Central Europe, like Poland, the landscapes were managed with fire in the XVIIIth century (Latałowa's et al. in Kirby and Watkins ed. 2015:249-253). While fire from lightning in the North American landscape, in Ponderosa Pine and giant Redwood forests, where the soil is covered with needles and can get very dry, spreads easily, in Central European forests a stroke by lightning dissipates into the moist soil (Wohlleben 2016:348). In Central European forests it is more likely that fire starts by human hand than by natural lightning Wohlleben (2016:358). While humans strengthen their communities through actively engaging in the major events of the forested landscape, such as fires, floods and avalanches, forest trees strengthen their communities as they grow old and increase their "social connections" (Wohlleben 2016:364).

4. Correct and incorrect logging

In Peter Wohlleben's (2016:359-363) account, individual trees are always at risk of falling prey to bugs, spores and microorganisms that cause disease arriving on the soles of the boots we, humans, cary, or as an unnoticed traveller in the feathers of migrating bird species. Yet, the genetic diversity of old-growth forests ensures they survive, as the whole forest acts in unison to help individual trees overcome their particular vulnerabilities (idem). Among insects and microorganisms that can endanger the life of trees, bark beetles are feared by forestry engineers as they can render entire forests useless for logging. The contemporary proliferation of bark beetle infestations is linked to both climate change and to the simplification of forested landscapes, plantation landscapes and same age forests being more vulnerable to such infestations (Tsing et al. ed. 2020. (b)). With less colder winters, beetle populations don't dye off of frost during the winter, as they spend the winter in the tree trunks that keep them warm enough to survive (idem).

To limit the risk of beetle infestation occurrences, Romanian forestry practice dictates that logged tree stouts be shaved off their bark so the beetles cannot find a home in the freshly exposed inner bodies of trees. This is what my field companions, forestry engineers and park rangers categorised as correct logging practice. Throughout our walks we encountered many logging sites, with varying practices, varying surfaces, adapted to the declivity of the terrain, legal or illegal, correct or incorrect. We also encountered a site that had been ravaged by fire on the Cisla Valley and that was now being replanted. Clear-cut logging on large surfaces is illegal, so the correct practice is to log smaller areas in patchy textures to allow for the forest to regenerate itself, and the trees to re-colonise the barren land.

The pictures on the next page present logging and marking practices encountered during my forest walks.

Corhana (sending timber down the slope) sign and action.

Trees marked for felling.

Bug repellant plate on tree.

Tree stouts shaved off their bark after felling.

5. Landscapes in transformation

Throughout my walks I have encountered different forests, of different species and at different stages of growth. I have seen spruce and fir plantations that have been more or less successfully logged, some having the stouts cleared of bark as forestry practice required, some being in the early stages of regeneration, spruce plantations 50 to 60 years old that were thriving, 40 year old spruce plantations that had succumbed to strong winds or to logging, old spruce forests that had many fallen trees and more open spaces within them, beech forests closer to the valley that showed the signs of centuries old coppice practice, beech forests circling the alpine pastures that stood bending on very steep slopes, beech forests that were well cared for by forestry practice and stood tall at 30 to 40 years of age, neglected beech forests that were regrowing in a crooked way after having been clear cut 10 to 15 years ago, spruce and beech that were cohabiting in a forest. My field companions recognised the beauty in them, were proud to show me the well, healthy and standing tall forests, and felt deeply for the forests that had not been tended to properly, that were growing crooked, were not regenerating as they should have been, had not been cleared of the bark on the remaining stouts after having been logged, that had been poached or clear-cut all-together, exposing large areas of mountains' slopes. The photographs on the next pages illustrate some of the forests I have encountered.

Mixed forest older than 60 years.

Naturally regenerating spruce forest (5 years)

Mature spruce forest.

Old growth mixed forest in protected area

Coppiced beech forest in the vicinity of Poienile de Sub Munte.

Spruce forest of varying ages at Bardău, younger than 60 years.

Clear-cut forest.

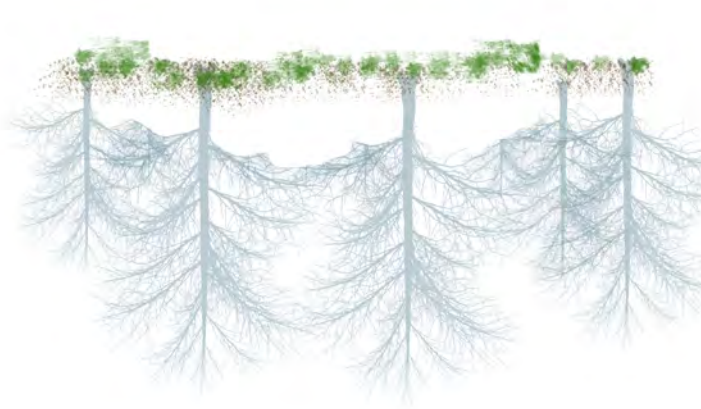
Clear-cut forest. regrowing (15 years old).

The image of the forest we have collectively normalised, as an evergreen spruce or fir forest, or as a full grown beech forest often impedes us to see the different stages of growth of a forest and the transformations of the forested landscape as normal. For the untrained eye, transformations within the forested landscape are difficult to spot, to see and to interpret. Messy forest boundaries, where the forest is advancing in clearings, that at start is just an overgrowth of bushes, where bushes and young trees are almost indistinguishable are not typical to the representation of the forest we have. Neither are the remains of a logged forest or of a forest that had succumbed to bark beetle infestation. In Central Europe, the transformations of plantation landscapes, for their most part spruce and pine plantations, are the most dramatic, particularly in newly established national parks (Wohlleben 2016:395). As the forests are no longer cared for by forestry practice, that would have them cleared of any diseased or fallen tree, they easily succumb to bark beetle infestation, leaving the land covered with rotting wood (idem). Yet, as Wohlleben assesses, the fallen trees offer ideal conditions for deciduous species, like oaks, beech and bird cherries to grow, creating a moist and fertile ground and offering a shield against deers that would otherwise browse through them. The way we think about forest protection is also impairing our way of viewing the transformations of the forested landscape in a long time frame. At a planetary scale, forest protection and preservation adds to carbon calculations, while at the scale of the national territory, forest protection and preservation directly relates and invokes the resiliency of forests in the future. The way we think about protection is mostly a restriction of human activity, and not a series of enabling human actions that can conduce the forest towards resiliency. As a narrative, forest protection does not foster the consciousness of the future evolution of the forest. There are several ways by which forests are protected across the planetary forest landscape, as indicated by Wohlleben (2016:395-406). In parts of the planetary landscape where old growth forests, comprising old growth trees continue to exist since hundreds and millions of years, in Canada, and in the United States, the old growth status is designed to protect them from logging, although logging interests and pressures still exist and First Nations fight them on a daily basis (Wohlleben 2016:296). In England, the term “ancient woodland” protects the continuous existence of the forest as a landscape since the XVIIth century, even though individual trees may be younger than the landscape they are a part of (Wohlleben 2016:395). In Germany, as forests have been replaced with plantation forests over the centuries, and forested land has been transformed into agricultural land, there is a political debate and preoccupation towards protecting a small percentage of forests from any kind of human intervention and allowing them to grow into the old-growth forests of the future (Wohlleben 2016:397-398).

Unlike the Central European territories described by Wohlleben (2016), in Eastern European territories, the Carpathian Mountains still hold primeval forests, that had never been commercially logged. The whole of the forests in the Carpathians are hybrid forests, in part

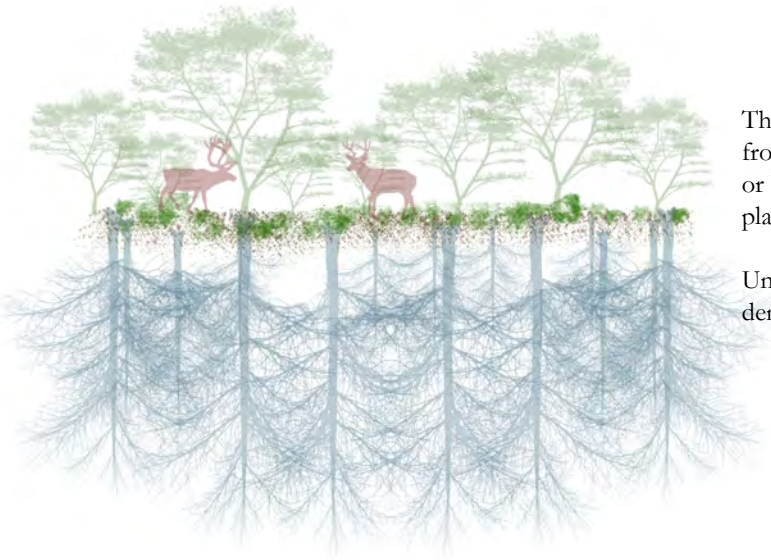
planted, in part regenerated after logging, in part continuing the cycles of life and death of old growth forests. In chapter *7. The forest as infrastructure* I also discussed how protection and extraction co-exist within Romanian forestry practice, that is consciously protecting parts of the forest for the preservation of genetic material, and protecting the continuity of the forest for various purposes, not necessarily particular forests. As shown in *7.3. A changing land management*, implicit protection has existed prior to the 1970s when protection regimes were designed through the institution of National Parks in Romania. The current protection regime of the Maramureș Natural Park includes differentiated protection areas, subjected to sustainable logging or exempt from logging. The instrument of the management plan, inherent in any administrative structure of both National and Natural Parks however, does not foster a transformative vision, it rather continues and specifies management practices, including protection regimes, as does the Management Plan of the Maramureș Mountains Natural Park. The implied vision is for things to remain the same, which is never the case in the evolution of the forested landscape.

Fig. 40. A diagram of the forest regenerating illustrates, in diagrammatic form the regrowth cycle of a forest after logging or forest fire. This diagram holds a vision of continuous forest regeneration and regrowth, young trees growing in the vicinity of and / or in the shade of older trees and their mother tree. To a certain extent, this diagram illustrates the potentiality of the forests I identified as “forests in transition” in Fig. 2. The Vișeu Valley. While in a geographical categorisation they would be marked as clear-cut forests, seeing only the lack of a forest body above the ground at a certain moment in time, looking at the continuum of life through the different stages of forest re-growth and at how a forest grows a body both above and underground is useful in envisaging forest transformation beyond the immediate moment and beyond human time.



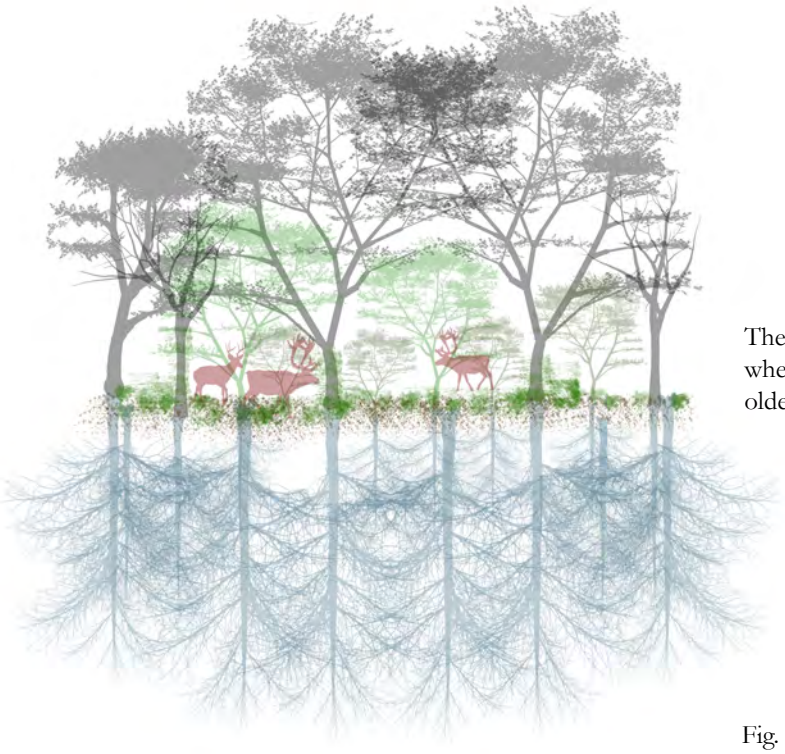
After logging or forest fire, tree roots and mycelial networks still live underground. Ideally, in Romanian forestry practice tree stouts above the ground are cleared of their bark, to prevent disease, but that does not always happen.

Mycelial networks living underground will become the future fungal partners of newlly grown trees. Old stouts with their roots still left on the ground will continue to nurture and support the growth of young trees via mycelial networks.



The young forest regrowing among old tree roots, from from seeds stored in the soil or brought by wind or animals, or from seedlings planted by human hands.

Underground, mycelial networks and tree roots densify their connections and interconnections.



The mature forest continuing to regrow itself, where young trees develop in the shade of older trees.

Fig. 40. A diagram of the forest regenerating.

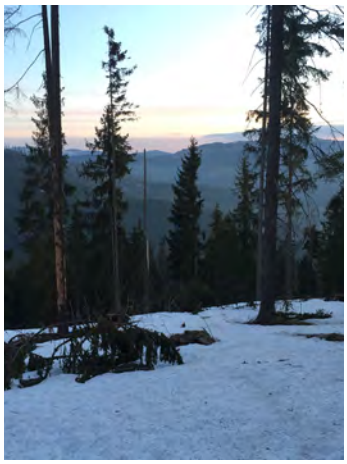
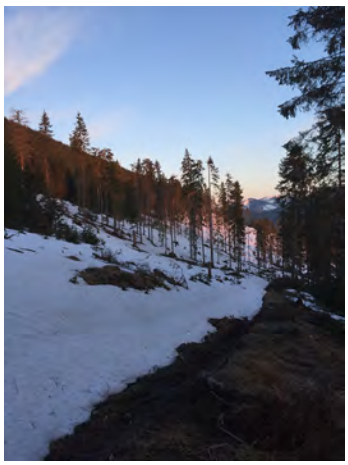
6. In the presence of animals

During the time I was an intern at the Maramureș Mountains Natural Park, the rangers were conducting their annual animal monitoring campaign. In early spring, as the snow begins to melt, the forest is more accessible while the snow and the wet and muddy earth still offer a canvas for recording human and animal traces. In early spring, animals are also more active in their search for food after the winter as the whole forest is coming to life. As we walked our routes, we crossed paths with wild boars, deers and stags, rabbits, bears and lynx. We were surveilled by eagles and welcomed by birds singing at dawn. The presence of animals was most felt in the areas where there was no on-going extraction, and as we were approaching the strictly protected natural reserve areas. As the historical records of the Vișeu Forestry Yard and local accounts indicate, their presence has been more increased and their numbers larger than what is recorded at present time. Extraction with a horse, presented in *7.3. A changing land management*, made and still makes human activities in the forest less noise intensive and less destructive with respect to extraction with motorised vehicles and industrial technologies, thereby reducing the impact of human activities in the forest.

Among the animals present in the Maramureș Mountains, the Western Capercaillie, also known as Wood Grouse or Heather Cock[40] and the Black Grouse[41], are the ones that most keep their distance from human activities. Their populations have been greatly diminished in the last 150 years with the introduction and intensification of large scale logging. The mating season of the Wood Grouse in the Maramureș Mountains is at the end of winter, late March and early April. It was the time I was walking through the mountains in the company of the rangers and biologists of the Natural Park. The Black Grouse mates later in the spring, in May. Seeing the birds mating ritual that involves the fight dance of the male Grouses exhibiting their feathers and abilities is an experience forestry engineers and biologists alike look forward to, though not all are lucky enough to experience it. Two of our forest walks had the purpose of looking for traces of the Wood Grouse. There is a place called On the Hills (*Pe Șesuri* in Romanian). To get to there we started off before dawn. When dawn broke, as we were walking up the mountain, a symphony of birds started, with the first rays of the sun. We saw a woodpecker, while there was no sign of any grouse. Logging had been going on in adjacent areas that we walked by. The photographs on the next page were taken at dawn, On the Hills while searching for Wood Grouse traces. Instead of the Grouse, we encountered a sound landscape of birds singing with the first rays of the sun.

[40] *Tetrao Urogalus* by its latin name, *Cocoșul de munte* by its Romanian name.

[41] *Lyrurus tetrix* by its latin name, *Cocoșul de mesteacăn* by its Romanian name.

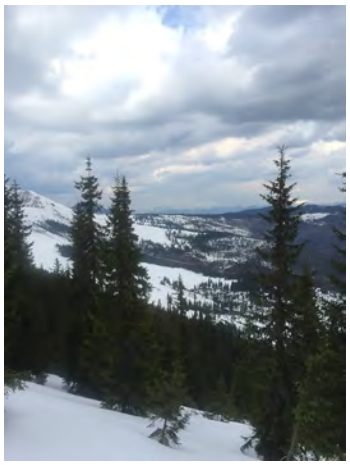
Sunrise On the Hills, searching for Wood Grouse traces.
The visual immage of a sound landscape, with birds singing at dawn.

In the presence of the Wood Grouse:

The second time we went looking for Grouse traces, we hiked up the Tomnatec Spring to reach the natural preserve area of wild daffodils. We passed through different forest and pastural landscapes, to reach the edges of the spruce forest encircling the daffodil meadow. There we saw traces of the Grouse, and mounted a camera to surveil them at a distance. Without a camera, however, to see the birds mating, one has to be hiding in the bushes close to where they dance. This usually involves spending the night in the bushes. As no one knows for sure when and where the birds mate every year, the proud ones pride themselves with having seen the dance and knowing the place. Before the Wood Grouse became a protected species and hunting was prohibited, in local customs, every hunter was permitted to shoot only one Grouse in his lifetime and the shooting of one was highly appreciated by the whole community. As holding a hunting feast out of a Grouse is not possible anymore, the experience of seeing them dance is still highly valued.

I was not so lucky as to encounter a Grouse or experience their mating dance during my short stay in the Vișeu River Valley, but seeing how my companions spoke of them in great respect, curiosity and pride inspired a feeling these birds were special among other birds and animals. They preferred to keep away from intruding human viewers to their lives and rituals, and inhabited the remote parts of the forest. However, if you were skilled enough to find their preferred places and had the patience to sit in silence and make yourself unnoticeable you were granted an extraordinary show. To be in the presence of animals one must move with them as they move through the landscape in search of food, rest, play and favourable conditions to exhibit their dances and raise their offsprings. Interestingly, as camera recordings showed, animals didn't use the same trails from one year to the next.

The photographs on the next page depict the forest bordering the protected daffodil meadow where we found Wood Grouse traces. It is an old growth fir forest, where old and in part dead trees stand spaciously apart as new seedlings grow in their vicinity. It is a regenerating forest, like the one illustrated in Fig. 40. A diagram of the forest regenerating. Fig. 41. A drawing of Wood Grouse traces in the snow represents in an architectural plan the traces we encountered, of Wood Grouse walking around and dancing with their wings spread wide so that the feathers leave marks in the snow. As the drawing shows, we mounted a camera to potentially surveil their mating dance.



The coniferous forest bordering alpine grasslands where we found traces of the Wood Grouse.

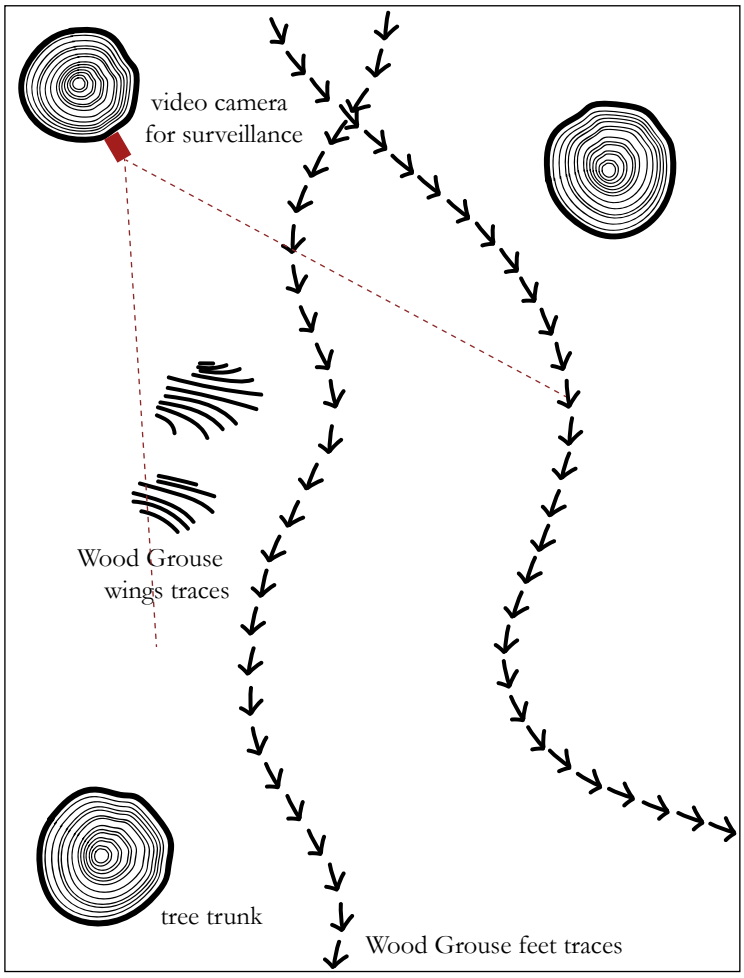


Fig. 41. A drawing of Wood Grouse traces in the snow.

Wood Grouse traces, walking and dancing, making marks in the snow with their feathers.

8.2. A mosaic landscape

From the point of view of an architect and urbanist, to think of the landscape as a mosaic refers to the territorial scale of the different and differentiated uses of patches of the landscape. From the point of view of a biologist or biological ecologist, the mosaic refers to a much smaller scale of the landscape. At the micro scale, landscape patches are mosaics themselves, where a multitude of plants live together in slightly differentiated communities, next to each other, potentially migrating from one community to another. From a biological point of view, landscapes are in a continuous evolution regarding their plant composition and their spatial and temporal locations. Plant communities and individual members of a community are on the move, at times disappearing all together from one location to reemerge in another. Evolution occurs with boundary crossing (Aït-Touati, Arènes and Grégoire 2019:99). In a landscape, the living territories of plants, animals and humans overlap, every movement implying the crossing of a boundary (Aït-Touati, Arènes and Grégoire 2019:99).

The notion of "habitat" biologists use to delimit the living spaces of plants and animals describes a whole ecosystem, with microorganisms, mycelia networks, insects living in and above the soil. Within habitats each being is specialised in one particular process. Habitat borders differ from human drawn state borders, they are much intimately tied to one another. In Wohlleben's (2016:366) words, they "are like a proliferation of small states". From a plant perspective, to be native to a particular habitat is at "a much smaller scale" compared to the human scale that accounts for state borders (Wohlleben's 2016:366). Plants move in the landscape along the trajectories of their seeds or their expanding roots. The trajectories of plant seeds are often mediated by squirrels, birds and other animals that carry seeds further away from a mother tree or a mother shrub. Plants establish themselves where they find favourable conditions. As Wohlleben (2016:358) points out, global movement increases plant movements as seeds travel not only with animals and birds but also with people. Across borders, plants that have been brought by humans as seeds, leaving their ecosystems back home, find partner fungal networks and microorganisms similar to the ones they had within their home (Wohlleben 2016:354). Wohlleben (2016:358-372) refers to them as "immigrants", having to re-assemble their networks of connection that give them access to food, water and social ties.

That the landscape of the Vișeu Valley is a mosaic landscape is acknowledged in the Maramureș Mountains Management Plan (2014). Both from an aerial perspective, at the scale of landscape ecology, and at the micro-scale of biological ecology, the landscape of the Vișeu Valley presents different landscapes with different associations of plants that are interconnected through the networks of the forest: forests, river forests (Alluvial forests), tree

rows that separate individual plots of land in the pastural landscape. In the passage from valley landscape to alpine grasslands, communities of plants that live together in differentiated climatic conditions emerge. There are forests, either of the same tree species, or mixed, alpine grasslands and heaths, communities of plants that live in water rich landscapes, such as the banks of rivers, lakes, and bogs, plant communities that live on stone, plants that only show up in traditionally managed pastures. In time, the landscape has lost the majority of its highly diverse plant communities whose lives are interdependent with traditional pastoral practices. Only 15% of the pastures are estimated to be traditionally managed, therefore maintaining the diversity of the communities of plants inhabiting them (Maramureș Mountains Management Plan 2014:20). It has also lost important water rich landscapes as peat bogs (Maramureș Mountains Management Plan 2014:20-21). Yet it remains one of the most diverse mosaic landscapes and one of the most rich water landscapes throughout the Romanian Carpathian Mountains.

Peat bogs are rare (Clément 201:26). The last centuries of intensified extraction, exploitation and landscape transformation that have released millions of tons of carbon into the atmosphere, have and continue to alter the composition of the soil and its capacity to hold both water and carbon. Carbon is stored not only in the trees, but also in the soil. Peats and active bogs are carbon stores. Bogs are sensitive to any changes in their surroundings. An estimated 0.15 to 0.20 ha of active bogs still exist throughout the Maramureș Mountains Natural Park (Maramureș Mountains Management Plan 2014:20). Active bogs offer conditions for plant species that prefer living in water rich landscapes, like the Drosera Rotundifolia, by its latin name[42]. The Drosera Rotundifolia is a carnivorous plant that feeds itself with the insects that are attracted by marsh landscapes. Forest bogs extend over an estimated 80 ha, and they are sensitive to any kind of alterations in their surroundings that potentially affect the water level, like logging, draining and the planting of new species (Maramureș Mountains Management Plan 2014:27). As the Management Plan assesses, forest bogs used to be more present in the XIXth and early XXth centuries.

In such forested landscapes, as the Vișeu Valley, plant migration is enhanced by human actions. Transplanting small tree seedlings from the forest to the inhabited valley and from the valley to the forest is an on-going practice, as accounted by my field companions. Oaks, fir trees, and other tree kin are carefully being replanted from forest to valley and from valley to forest, as they are offered as gifts, or are taken from the logged mother tree to be transplanted in a more protected setting. There is one notable “immigrant” in the Maramureș Mountains, the Larch tree, Larix, Larice in Romanian. Few individual larches have been planted throughout the forested landscapes, but not as a plantation.

[42] *Sundew*, by its English name, *Roua Cerului* by its Romanian name.

While the passing from valley to forest is almost imperceptible, as forests descend towards the cities and villages on the Valley, and as the culture of living within a forested landscape integrated trees and forests in the overall design of the landscape, on the summit of the mountains, the separation between forests and alpine pastures is more clear.

Brockmann-Jerosch in 1919 and Däniker in 1923, two Swiss biologists defined the line of separation between forests and alpine pastures as the ”treeline” in their study of the Alpine landscape (Körner 2012:18). Since the early XXth century the “treeline” has conventionally been used as an operative concept in the study of alpine environments. As Körner (2012:18) notes, the concept of the “treeline” is based on an anthropocentric definition of trees, as woody plants taller than 3 m, while trees, in their search for suitable living conditions, can venture outside the conceptually defined treeline. As a concept, the treeline differentiates between a biological “natural” treeline, and other treelines (Körner 2012:19) established, for example through land management practices. In *Chapter 7. The forest as infrastructure,* I mapped the upslope movement of the forest on the Vaser Valley during the last 250 years (Fig. 35. Vaser Valley. Forest change and pasture change, XVIIIth century to 2018). From a purely biological perspective, taking into account suitable life conditions relative to climate and precipitation levels, Körner (2012:179) assesses that ”overall, forests are not yet moving upslope but there is a high potential that they will, also in view of paleo-records for periods of rapid climatic warming”. As Italian biologist Giorgio Vacchiano (2019) recounts, it is more likely that the upslope movement of the forest corresponds to the forests’ occupying previous positions to the times when the landscape was intensively used as a pastoral landscape and forests were cleared to enlarge alpine grasslands used as pastures.

While for an architect like myself, it is difficult to distinguish the “natural” treelines from the managed ones, there is one place in particular that the “natural” treeline stands out. At the top of Toroioaga peak, juniper trees inhabit the border between forest and grassland. In the Management Plan of the Maramureș Mountain they are indicated as rare protected species. Throughout the Maramureș Mountains they found suitable life conditions only on the Toroioaga peak. From appearance, they look similar to spruce and fir trees, but their stature is considerably lower. They are smaller than an adult human being at 1.70 m of height. Under biologists definition of the treeline, they would fall outside of it, already being grassland inhabitants. The border here appears as a space of habitation, more than a sharp line.

Beyond the treeline, the multitude of alpine and boreal grasslands and heaths inhabiting the summits of the Maramureș Mountain have already lost part of their plant inhabitants in the last 200 years. Some of the specific plant communities, like the Salix heaths only exist in

isolated groups, and their surface has greatly diminished (Maramureș Mountains Management Plan 2014). Alpine and boreal grasslands hosting a diversity of flower and plant species have lost part of their diversity. Their previous diversity is attested by the rare presence of some protected species (Trifolium lupinaster spp. angustifolium, Ranunculus thora) and orchids (idem).

8.3. In harmony

Often biologists refer to an inherent harmony of nature that exists outside human intervention and control. To biologists, forests could exist and thrive without humans. And indeed they can, as the becoming wild of the Amazon forest after the eco and genocide perpetrated agains its inhabitants throughout history and the re-wilding of the larger territory of the 1985 Chernobyl nuclear explosion in Ukraine show. In the following section I make a small detour through forest soil and the early writings on ecology and conservation of Jakob von Uexkull and Aldo Leopold, in order to present how the concept of harmony refers to the cycles of life and death inherent in nature. The separation of humans from nature that is implied in the way the concept of the harmony of nature is used today is a separation from the cycles of life and death and from the "natural variation" of scarcity and abundance inherent in nature (Demuth 2019:265). Such separation, of humans from nature, has been collectively practiced throughout the XXth century through policies and practices that aimed at controlling the cycles of natural regeneration, speeding up and exhausting both regenerable and unregenerable resources. This is never so evident as in Batcheba Demuth's (2019) account of the transformations of the tundra landscape across the Bering straight in the last 150 years. Her environmental history presents the tundra and its inhabitant beings, reindeer, inuits, birds, vegetation, soil, and the ways in which productivity was enforced on a landscape in continuous change through both the American liberal economy ideology and the soviet communist ideology. The tundra landscape is among the ones that are exhibiting dramatic changes with the rising of annual temperatures, as forests are advancing in grassland territories. It is indicative of what may happen with mountain grasslands also on the Vișeu Valley.

A forest is also its soil. We don't think of soil as part of the forest because in our modern conception, the forest is defined by trees. The community of trees living together in a forest continuously produces not only its atmosphere, but also its substrate, the soil where water and nutrients are stored and used. In the last chapter of her book, "Soil Times. The Pace of Ecological Care", María Puig de la Bellacasa (2017:170-171) explores the ways in which human-soil relations have been articulated within and beyond the field of soil science. She argues that while soil science is deeply rooted within the productivity paradigm of the colonial-capitalist system and its "promissory futures" (Puig de la Bellacasa 2017:179),

contemporary voices within the discipline are calling for a revisiting of the scientific conception of soil towards acknowledging it as a living organism with implications towards its care and the "different temporalities" (Puig de la Bellacasa 2017:202) it calls for. The notion of "living soil" Puig de la Bellacasa (2017:188-189) recounts, became mainstream as the filed of soil ecology grew in importance within the discipline of soil science.

> "*The noticeable changing trend is the increased significance of "biota," from microbial to invertebrate fauna and, of course, plants, roots, and fungi, in the very definition of soil. […] In this conception, soil is not just a habitat or medium for plants and organisms; nor is it just decomposed material, the organic and mineral end product of organism activity. Organisms are soil. A lively soil can only exist with and through a multispecies community of biota that makes it, that contributes to its creation.*"
> Puig de la Bellacasa (2019:189)

Puig de la Bellacasa's (2017:193) proposition is to think humans as part of soil communities, as active participants rather than as exerting such an exceptional influence that science requires they be excluded out of the scientific models of soil.

A conception of soil as a living organism is indebted, as Puig de la Bellacasa (2017:19191) notes on "foodweb" ecological models that "describe the incredibly complex interactions between species that allow the circulation of nutrients and energy". In chapter *4.1. Forest intelligence: from trees to forest bodies* I presented Suzanne Simard's (2018) research on nutrient transmission between mother trees and their younger offsprings that deployed a foodweb model to describe the circulation of nutrients between humans, salmon, bears and trees in direct response to how indigenous people conceptualise the interrelations between humans and the more than human world. In the case of forests, as Peter Wohlleben (2016:159) describes, the living soil with its minuscule creatures that actively co-produce soil, is interdependent with the continuous co-existance of the forest in a particular space throughout centuries. These minuscule creatures have a very limited "circle of influence", they don't move far away from their forest (Wohlleben 2016:158). In European forests where old-growth, deciduous forests have been replaced with plantation forests, these soil producing microorganisms have died together with the old forest (Wohlleben 2016:158). Furthermore, through the cultivation of forests for logging and large scale extraction, as is customary in contemporary forestry practice, forests lose soil every year, that comes down with heavy rains and floods that carry rocks, soil, broken tree trunks and branches (Wohlleben 2016:154-155). A cultivated forest is annually loosing soil faster than it replenishes it, while an undisturbed forest continually enriches its soil (Wohlleben 2016:154-155). Studies in Germany indicate that it takes longer that 100 years for forest soil to be created anew, in the absence of logging (Wohlleben 2016:161). To Wohlleben (2016:157) the microorganisms and organisms within the soil "must be considered essential components of the ecosystem".

German biologist Jakob von Uexküll's scholarship is perhaps among the few western scholars to acknowledge that other organisms, not only humans, are sentient beings that created their own world through selecting what they need out of their surroundings, and are doing so with purpose and intentionality. His perspective on biological life forms is an embodied perspective from careful study and empathy with other beings. From his careful observations and descriptions of the inner worlds of insects, sea creatures and other organisms, Uexküll developed the concept of harmony in nature. The concept of harmony was used not so much to convey the image of aesthetic beauty, but to reflect the ways in which every being had a purpose in the cycles of life and death that are constitutive of nature and life. Uexküll made use of the analogy between the harmony he saw in nature and the ways in which harmony was achieved in music. When an orchestra sings together, the harmony of sounds we perceive is produced through the ways in which individual instruments sing together, attune to each other, oppose each other, and amplify each other's sounds.

American conservationist Aldo Leopold's writings, in the first half of the XXth century, articulates a concept of harmony in nature as something that a meditating mind becomes conscious of after having direct experience with rivers, wolfs, birds, trees, and other forest inhabitants. Two of his writings are particularly instructive in exemplifying the harmony of nature in his view and how he attained such a view, "Song of the Gavilan" and "Thinking like a mountain". The first is an appreciation of the beings that sing the song of the Gavillan river and the ways in which they are interdependent through nurturing cycles that inevitably bring the death of one being so that another one can nurture it / him / her self. Nurture (food) assures the continuity of the cycles of nature and the song of the river (Leopold 1990:159). In his account, non-modern humans have been part of the song of the river, as the remains of their earth works are still visible in the plains and steep slopes by the Gavilan river (Leopold 1990:159). Leopold draws attention on the fact that the song of the river is not perceivable through individual 'notes' played by only one of its 'components', as scientific practice was attempting to do at the time, through separating the domain of nature into subdomains preoccupied with the study of one individual (Leopold 1990:162). The sounds made by running on rocks, tree roots and branches cracking, animals stepping on the ground, munching, running and sleeping, birds singing and flapping their wings are all sounds of beings nurturing themselves, the river and the forested landscape. To perceive the ecology of the river as a cycle of nourishment means to be attuned to how nature speaks, to the sound of the river.

Leopold's famous phrasing "Thinking like a mountain" (Leopold 1990:137), that is also the title of one of his writings, perhaps best exemplifies Arne Naess' concept of "the ecological

self" (Naess 2016:82). Naess uses this concept to illustrate that the self is not an isolated pre-existing entity, but it exists in relation to other living beings, human and non-human. Through an understanding of the ecological relations we have with other beings, we can come to identify ourselves with other beings and feel compassion, empathy and develop solidarity in struggle (idem). In Leopold's writing, an encounter with the mountain through the ecological relations established between its inhabitant beings, led to his identification with the mountain. As he found himself in the presence of the green light in the eyes of a dying female wolf, Leopold initiated a journey through the purpose of the wolf's life on the mountain and on the mountain as a resource for all its inhabitants (Leopold 1990:137-138). The wolfs' purpose within the greater intelligence of the mountain is only visible, in Leopold's account, at the scale of the mountain, as he is either pray or predator for the other beings on the mountain (Leopold 1990:140). In his account, the wolf is part of the cycles of nourishment of the mountain through hunting deer and not allowing them to grow so big in their population as to eat all the resources of the mountain in one season, and thus allowing shrubs and trees to grow and to nourish the forest and its rivers (Leopold 1990:140). The intelligence of the mountain is manifested in assuring the availability of resources in the long term, and with every passing season.

In the long time space, as is evident also in Demuth's account of the changing tundra landscape, there is a dynamic between the inhabitants of the landscapes that implies coordination so that every one of the beings inhabiting the landscape can pursue its life path. Plants need to be allowed to flower and leave seeds behind, so that they emerge next spring as well. Animals need to find sufficient food over the scarce winter months to survive until the abundance of summer. Many of the restrictive actions proposed for managing mountainous landscapes aim towards this coordination of the processes of life and death on the mountain. When grazing is restricted to several months per year and to a ratio between sheep and surface of the pasture, when hunting and fishing are restricted to several months of the year, it is to allow plants and animals the time to birth their offsprings every year. To participate in the harmony of nature we need to be attuned to the rhythms of life and death in the forested landscape. Yet plants, animals and the beings of the forest seldom make an appearance to discuss their needs. They speak through their representatives, which in the Western world are scientists, biologists and ecologists, as detailed in *2.1. Presence*. Their stories of life and death are, however, recorded in biologists' data, in the living memory of the landscapes' human inhabitants and in the landscape itself, whom they nurture.

Fig. 42. View of a forest, represents, in diagrammatic form, a synthesis of the mosaic landscape of the Vișeu Valley. The diagram was constructed based on the habitats listed in the Management Plan of the MMNP (2014) and the immersive ethnographic experience I had during fieldwork. The view of the forest re-presents the forest as perceived through an

ecological consciousness of the kind Aldo Leopold speaks about. In its details, the diagram represents the mosaic based on the altitudes between which different habitats are present in the Maramureș Mountains. It includes a river and its springs, as water and forest are in a reciprocal relation. The continuity of the river and of the forested landscape from the valley to the alpine grasslands act as networks of connectivity. Along them, the non-humans, animals, birds, fish, insects and plants migrate. I have also highlighted the landscapes that biologists classify as mosaics, grouping several distinctly classified habitats that are situated in close vicinity to one another and between which plants can easily migrate. Many of the habitats listed have a very small surface, the majority of them being forest habitats.

Taking into account Engler et al.'s (2011) hypothesis, that within the next 100 years, European Mountain ranges, including the Carpathian Mountains are in danger of loosing between 80% and 100% of their alpine grassland habitats, Fig. 43. Climate change scenario diagram represents the space the major habitat groups occupy in the Maramureș Mountains and a projection in a warming climate scenario. As Engler et al. (2011) assess, with the change in precipitation levels and warming of ground temperatures, alpine grasslands and heaths might only find suitable conditions for living in more remote landscapes, on slopes that are not in direct sunlight and where the temperature is more cool. While this represents a space of potentiality, the preservation of the tree line bordering alpine grasslands at the levels it is today, through specific management practices will become increasingly important over the next century (Engler et al. 2011).

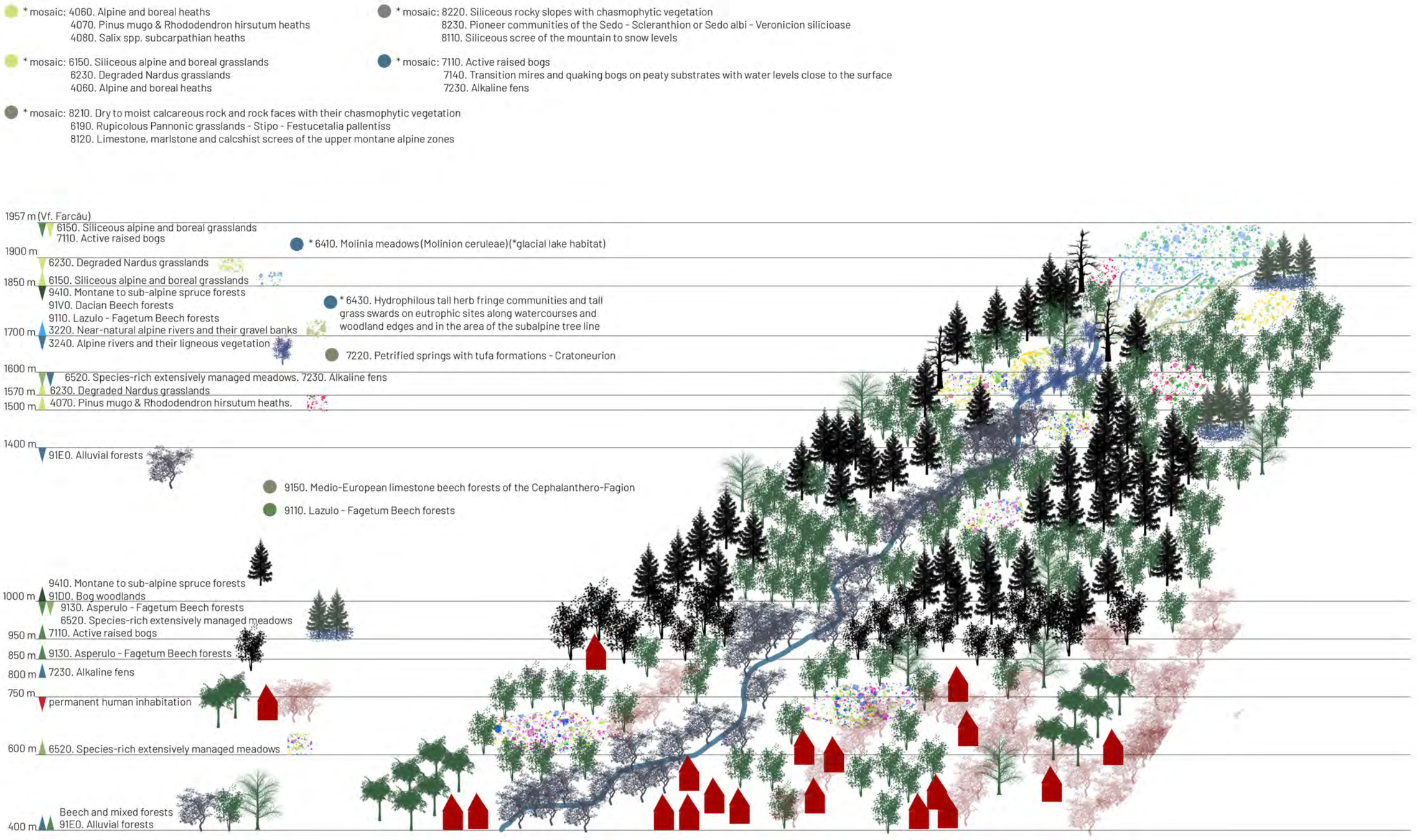
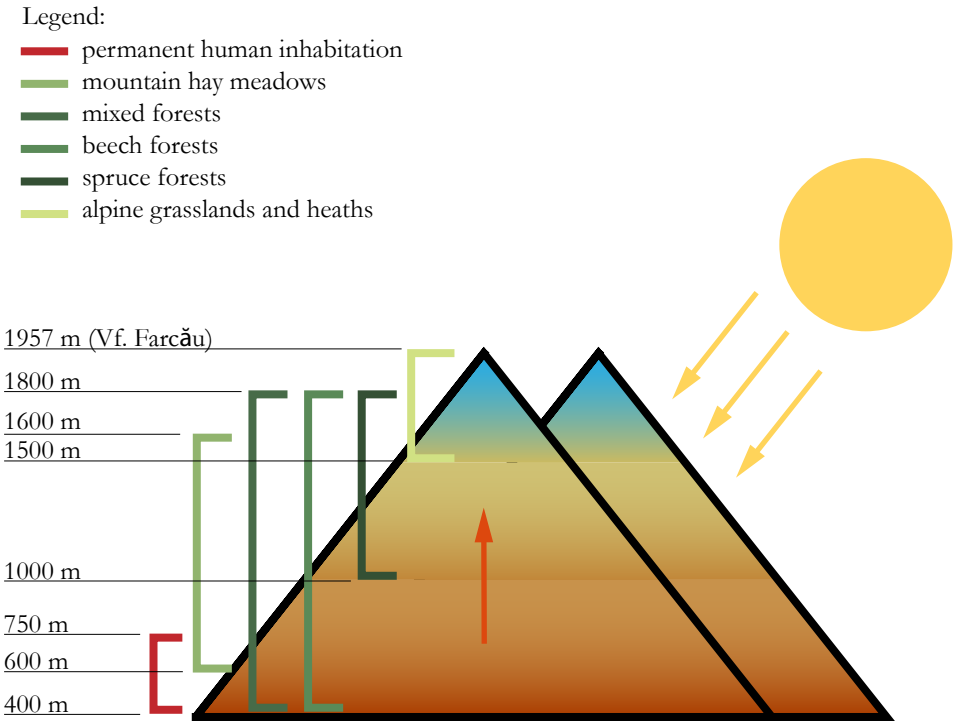
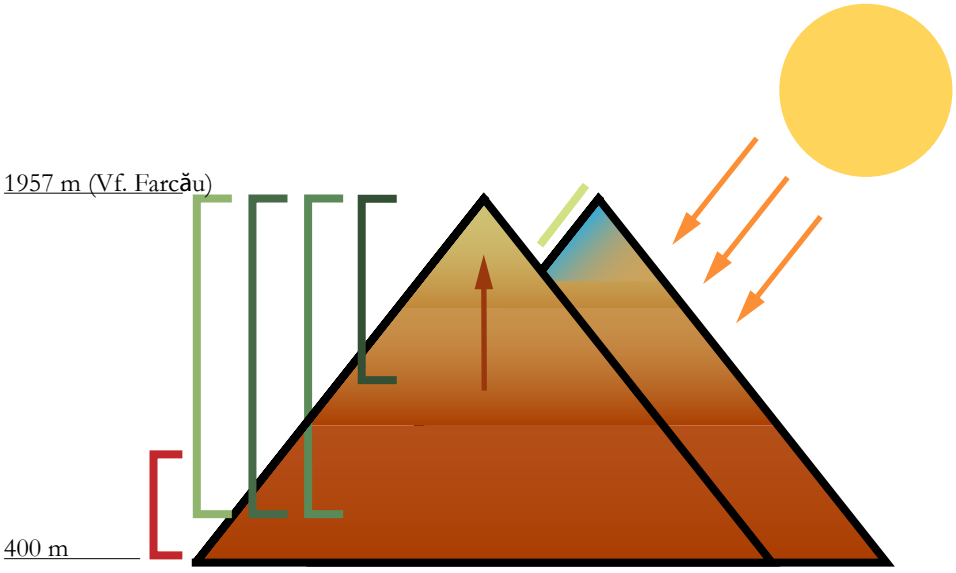


Fig. 42. View of a forest.



2014 plant habitats (PNMM management plan)



2070-2100 climate change plant habitats worst case scenario

Fig. 43. Climate change diagram: Engler et al. (2011) assess that with the warming of the ground temperatures and changes in precipitation levels, plants will have the opportunity to shift upwards on the mountain, if they find suitable conditions. The most vulnerable to the effects of climate change and warming ground temperatures are the plant communities in the alpine grasslands and heaths that may not find a place with suitable conditions. In the South Eastern Carpathian Mountains Engler et al. (2011) estimate that with warming ground temperatures, more than 80% of plants in the alpine grasslands and heaths may lose their habitat by 2100. They might find places of refuge in microclimatic favourbale conditions, but their habitat will be greatly diminished.

8.4. Conclusion

Through appealing to biological concepts and ways of seeing, while relying on the direct experience of the forested landscape of the Vișeu Valley through an immersive ethnography, this chapter discussed the diversity of forests and forested landscapes on the valley and the challenges they face with climate change. Through the encounters I had on the ground major themes emerged: the ability of the forests's carers to read the landscape by conjuring meteorological phenomena and trees' responsiveness to them; the continuous changing in atmospheres, ground conditions and plant communities; the community strengthening effect major events in the life of the forest have, such as a forest fire, on humans, and the ways plants respond in communities to such events; logging practices on the Valley and the ways they respond to forest disease; visions of forested landscapes' transformations in Germany, the US, England and Canada, and the lack of such transformative visions on the Vișeu Valley; ways of connection between humans and wild animals, and changes in their relationship with the restriction of hunting.

The forest encounters argue for the acknowledgement of such forms of knowledge that are gathered from being in the land, or, in this case, the forest, as indigenous knowledge. Beyond scientific approach to forestry, the Vișeu Valley, and every forested landscape, has its own indigenous knowledge, part of which has survived modernisation, to be included in forestry practice on the ground. One of the scopes of such acknowledgement is to go beyond the distinction indigenous / modern / traditional, and the othering of transgenerational practices of landscape care as either indigenous or traditional by modern practice. In acknowledging the indigeneity of some forestry practices on the Vișeu Valley, and their integration in contemporary forestry practice, one can see the common ground between indigenous societies around the globe, like the Sarayaku people of the Amazon river basin, or the multitude of peoples comprising the Aboriginal people of Australia. Such recognition can be a ground for collaborative resistance practices against large scale logging and the pressures they place on forested landscapes at the planetary scale.

As I presented the forested landscape of the Vișeu River Valley as a mosaic landscape, inhabited by multiple and diverse plant communities, the dynamic of the landscape became apparent. In the mosaic landscape every body is in movement and boundaries are in a continuous negotiation process. The advancement of the forest in grasslands, the change in the communities of plants inhabiting alpine grasslands and heaths, changes in the water level in the forest, the diminishing of peat bogs over the centuries and the disappearance of some members of the plant communities transform the landscape in its most intimate composition.

The forest is a living being, the interdependence of its more than human beings being a challenge for any form of planning. It is a landscape in flux, where the ground is changing with the passing of the seasons, the starting or the abandonment of logging and extraction infrastructure, and the 'natural' events occurring in forested landscapes, such as avalanches, land slides, floods, wildfires. In places, the map does not correspond to the ground. There is a dynamic inherent in the landscape which cannot be controlled, which is why ground knowledge is extremely important in forested landscapes. We cannot control the cyclical periodicity of hot and cold years, of years of drought and pouring rain, or the powerful storms that come about every 5 to 10 years in Central Europe. Knowledge on how to respond to these events is transmitted to and is updated by the people living in forested landscapes and caring for them, in the most material sense, of tending to the forested landscape. Changing climates will require they (and us) update the knowledge they have on taking care of the landscapes so they can respond to the new climatic conditions. The dynamic inherent in the landscape necessarily must be mirrored by a form of dynamic knowledge.

In discussing a climate change scenario, I argue for the need to create a transformative vision of the landscape that incorporates its inherent dynamic and a dynamic knowledge process, anticipating climate change induced changes in order to respond to them in advance. As shown in *8.1. Forest encounters*, section *5. Landscapes in transformation*, acknowledging the transformation of the forested landscape as passing through different states, some of which potentially bringing the destruction of the current forest, is important for articulating a vision of the Romanian forests in the context of climate change. As forestry practice's aim is to guide the forest to a more resilient state, closer to a multi-age and potentially multi-species forest, envisioning the transformation of the current forested landscape to reach that state is necessary. As Viganò (2010:149) notes, it is necessary to go beyond the paradigms of the past that saw environmental policies as being concerned with the few protected natural areas and the diffusion of nature as something to be controlled through corridors, and envision a landscape project with diffuse and randomly scattered elements. The study of the landscape on the Vișeu Valley revealed that such a "project" already exists in the mosaics of the mountainous landscape where ancient practices of tending to the land have created a differentiated and patchy landscape. Continuing this "project" with the tools of modern forestry and landscape planning is essential to tackle climate change.

Part III. Ways forward (Conclusion)

In looking beyond the urban, this thesis argues for an understanding of urbanisation as the co-habitation of a more than human community. Starting from Brenner and Schmid's (2012) proposition to go beyond the urban and to understand urbanisation as a planetary scale phenomena, studying the urbanised forested landscape on the Vișeu Valley in Maramureș, northern Romania, being in the *presence* of the forest and encountering a more than human community inhabiting the mountainous landscape through an immersive ethnographic experience, I bring forth the more than human community comprising humans, forests, trees, animals, water and soil that participate in the forested landscape's continuous becoming as an urbanised landscape.

As I introduced in *1.2 Becomings*, this thesis has unfolded at the intersection of three interrelated becomings: the becoming woman of myself as a female researcher while doing fieldwork on the Vișeu Valley, as an intern at the Maramureș Mountains Natural Park, the becoming of the forest from an extractive landscape engaged in the operations of planetary urbanisation to a landscape engaged in extensive "webs of care" (Puig de la Bellacasa 2017:155) entertained by more than human agencies, and the becoming of my field companions from biologists, forestry engineers, and employees at the Maramureș Mountains Natural Park and the Vișeu Forestry Office to holders and transmitters of indigenous knowledge, a knowledge that they are gaining through being in the forested landscape on a daily basis as part of their work duties. While the spectre of illegal logging and its presence in part of the territory I surveyed has been felt and encountered during the research process, and is continuing to hunt media representations of forested landscapes in Romania, the research has shown that increasing global market requirements that go counter the requirements of scientific forestry, and that respectively can use any kind of timber and timber part, including 40 years old trees, as opposed to the 80 - 100 years established logging age under scientific principles for coniferous and beech species in Romania, elicit increasing amounts of timber and entangle ethically and unethically sourced timber in transnational supply chains. Beyond the ethical questions raised by illegal logging, this thesis opened itself towards the forest, its becomings and the becoming of its more than human inhabitants and human custodians.

Departing from the narrative constructed surrounding illegal logging, I have chosen a feminine line of thinking and a feminine view on forested landscapes complementing the view of an urbanist with an architectural background. Though I did not engage with feminist theories, I cannot deny that I am a woman and I share an ethics of care, inspired by Puig de la Bellacasa (2017), along with a relational view to making sense of the world, with feminist thinking. I also share in the intersectionality of feminist struggles with decolonial struggles, and the struggles of indigenous people, some of which are advocating for the rights of nature, and consequently the forest. In *6.3. "Matters of care",* thinking *with* Maria Puig de la

Bellacasa (2017), I have made the conceptual shift from approaching the forest with the neutrality of Latour's "matters of concern" towards approaching it as a "matter of care", bringing in a more affective charge, as Puig de la Bellacasa suggests. Through drawing parallel lines of thinking between Puig de la Bellacasa's "matters of care" and Arturo Escobar's political ontology I have also explored the intersection of feminist struggles and points of view with indigenous and decolonial world views. In situating the discussion on the forested landscape of the Vișeu Valley within a wider planetary forest landscape setting, I have explored debates on the rights of nature, indigenous struggles, and the ways in which scientific findings and indigenous knowledge converge in relation to the forest (see *4. Shifting consciousness on forested landscapes*).

Engaging with the forest beyond the capitalist-colonial paradigm and its extractive project, a feminine line of thinking, infused by a relational way of making sense of the world, has led me to recover European indigeneity, to think urbanisation beyond the boundaries of the city and to go beyond the logic of separation, separating a living space and a resource extraction space, inherent in the capitalist-colonial ways of world making.

Recovering European indigeneity, thinking of ground knowledge as indigenous knowledge, as I have done throughout the thesis, particularly in discussing landscape management practices in *7.3. A changing land management* and in the stories depicting my fieldwork experience presented in *8.1. Forest encounters*, I deem necessary in order to reconcile modern European and indigenous cultures. By looking at the indigeneity of European landscape management practices, like forestry, beyond its scientific predicaments and into the ways in which, as a practice, it arises at the intersection of scientific principles and ground knowledge gained through being present in the forest, we can begin to find common ground with indigenous people beyond the divisions instituted by capitalist-colonial extractive projects and engage in discussions about how to care for and with landscapes.

As much as modern categories separate urban from natural and extractive territories, the cohabitation of resource extraction and landscape protection that has persisted in the Valley throughout its extractive history and is now recognised as a value through the institution of the Maramureș Mountains Natural Park, blurs the boundaries of categorisation systems aiming to keep nature outside of the urban for extractive purposes. In chapter *7.3. A changing land management* I have conceptualised land management practices as practices of trans-generational transmission of knowledge enhancing landscape resilience. As forestry practices in Romania have integrated part of the ancestral knowledge on logging, re-valuing it and its transmission could reshape the relation with the more than human community. The argument I make is that the transmission of logging practices that have co-evolved with the forested landscape, such as the practice of dragging timber with a horse through the forest,

rather than with a mechanised vehicle, is interdependent with the persistence of the forested landscape. In other words, the preservation and transmission of indigenous knowledge across generations is interdependent with the preservation of the landscape and its diverse plant communities.

Reviewing the ways in which the extractive projects of the capitalist-colonial system have transformed the planetary forest landscape through the partial introduction of plantation landscapes and the economies of scale it engendered along with the separation of a joint living space into urban, agricultural-rural and "natural", wildlife inhabited spaces has revealed that these artificial categories imposed on dynamic landscapes do not hold. Chapter *5. Shifting paradigms on urbanisation landscapes* investigates emerging paradigms for the study and design of urbanisation processes in dynamic landscapes. Brenner and Schmid's (2012) paradigm of planetary urbanisation has served as a research guide during the initial stages of the research process, as it encouraged architects and urbanists to study the distant landscapes that are impacted by urbanisation yet without being urbanised areas per se, including natural and extractive landscapes, such as the Vișeu Valley. Taking the Vișeu Valley as a case study for the extractive operations of planetary urbanisation meant following the flow of timber from the valley, discussed in chapter *6. The forest as material* and researching landscape transformations. As much as extractive and transportation infrastructure are ubiquitous in contemporary landscapes and drive much of landscape transformation processes, particularly those of extractive landscapes, I looked into other interpretations of what infrastructure is, or could be, particularly into landscape urbanism approaches of the landscape as infrastructure and the cosmopolitical implications of giving landscape features and non-human inhabitants agency in transformation processes. Chapter *7. The forest as infrastructure* discusses the transformation of the Vișeu Valley during the last 250 years of its extractive life and its contemporary post-industrial condition.

Particularly in the context of Romanian urbanism, engaging with contemporary approaches in urban studies and landscape urbanism allowed me to go beyond the rural-urban dichotomy and the imaginary of underdevelopment that characterises Romanian territorial policy for the last 30 years, and is also a way to index such territories with a long extractive history as the Vișeu River Valley, as introduced in *0. Encountering the unknown*. Viewing such territories as underdeveloped is only serving as a justification for interventions in infrastructural development, a project that has been on going since the beginning of the XXth century. Moving beyond the civil infrastructure dominating paradigm towards viewing the landscape of the Vișeu Valley as a post-industrial landscape, bearing a history of pre-industrial and industrial resource extraction inscribed in its territory and considering the landscape as infrastructure while acknowledging the multitude of agencies that participate in its continuous transformation, human and non-human, is a step towards imagining other

possible futures. Through mapping in particular, this thesis retrieves a territorial approach to urbanism that has been lacking in the last 30 years in Romania.

The knowledge of this thesis can be used in the construction of a territorial vision for the Vișeu Valley to meet the challenges of climate change in the next 100 years. While Engler et al.'s (2011) study suggests ongoing forest migration in alpine regions in Europe will continue over the next 100 years, further research into the specific way this phenomena will unfold in the forested landscape of the Vișeu valley Vișeu valley, would be needed. Such a project would require an interdisciplinary and trans-disciplinary collaboration between biologists, forestry engineers, environmental engineers, landscape urbanists and local inhabitants. Their joint collaboration could produce a map of projected habitat loss, as Misrach and Orff (2014:176-177) have assembled for the Mississippi river delta and its marsh landscape, complementing the Vaser Valley. Forest change and pasture change, XVIIIIth century to 2018 (Fig. 35) I compiled as part of the thesis. On the basis of such a map, scenario planning from a more than human perspective could be approached to make informed decisions about landscape management.

Through looking at the landscape of the Vișeu Valley as an urbanised landscape, as I have done, the question of *what urbanisation is* becomes open. As much as post World War II global policy forecloses the meaning of urbanisation, looking at forested landscapes as urbanised landscapes offers a different approach to urbanising a territory. Throughout this thesis I have presented different ways of viewing urbanised forested landscapes. Through Michael Heckenberger (2012), and Paulo Tavares and Ursula Bieman's (2014) research I have presented indigenous pre-colonial ways of urbanisation, that are now being retrieved through interdisciplinary research, interrogating human and non-human beings and species as well as historical records. If, as suggested by Heckenberger (2012) we can think of pre-colonial indigenous ways of inhabiting the forest as a specific form of urbanisation, and think of the forest not as the outside, but as the extension of the urban (Tavares 2017) the image we associate with the urban, which is that of the city, changes. With De Meulder, Shannon, and Nguyen (2019) and Wambecq (2019) the emerging paradigm of forest urbanism is reconsidering the historical relation between forest and city and its possible futures in central European territories. If the model of the European city as a counterfigure of the forest (De Meulder, Shannon, and Nguyen 2019) rests on the historical evolution of the dense urbanised landscape in Western Europe, that has replaced great parts of the forested landscape, easily accessible to logging and coal burning, the permanence of the forest in the mountaineous landscapes of the Vișeu Valley along its urbanisation process tells a story of cohabitation with the more than human community inhabiting the landscape.

In *1.3. Boundary conditions*, I took upon Isabelle Stengers' and John Law's proposition to *slow down thought* and *proceed with care* towards researching the multiplicity of forests that I was presented with during my fieldwork experience: the forest of the biologists, the forest of forestry engineers, the forest of local inhabitants. While this multiplicity is visible through conflicting and contradictory approaches to the forest and the ways in which we should best care for her, the forest on the ground is still one[43]. *Thinking with care* towards the forest as an inhabitant of our common world has unfolded over several strands: reviewing forest representations, both in drawing and as a mental representation of the forest outside the city, becoming sensitive to the more than human community inhabiting the forested landscape of the Vișeu Valley, and articulating *forest care* as shared between the more than human world.

In Chapter *4. Shifting consciousness on forested landscapes* I reviewed the mental images we associate with the forest. While the image of wilderness, particularly relating to the Amazon rainforest, acquired specificity as left to wilderness during the colonial encounter, the current requirements that on going climate change is posing on forested landscape is that they become, and/or we actively transform them in multispecies and multiage forests, with in-grown forest resilience, what in the Romanian language is called "*codri*". Reviewing forest representations, I was also faced with the task of drawing the forest, and reflecting on the ways forested landscapes, themselves composed of multiple landscape mosaics, each in a different evolutionary stage, are categorised and represented. The Vișeu Valley map (Fig. 2) already diverges from standard geographical representation categories to introduce landscapes in transition as a category of analysis and future projection. The diagrams in *8.1. Forest encounters* take account of scientific approaches to plant communication and the importance of plant roots and mycelium networks in the way in which trees are represented as whole bodied. Through representing whole bodied forests, these diagrams depart from the ways in which the forests are represented in scientific diagrams of their evolution and life cycles. While such form of representation has been explored in landscape urbanism drawings of the metabolic flows of contemporary urban ecologies, specifically those of Kate Orff (Misrach and Orff 2014), the diagrammatic form proposed here offers itself as a model of scientific representation, potentially being taken over by those sciences that, through representation means, continue to reduce the forest to its above the ground body.

Becoming sensitive to the forested landscape as a living space has unfolded as the Vișeu Valley landscape offered itself as a *presence* and a thinking companion. Having had an immersive ethnographic experience prior to mapping the territory of the Vișeu Valley was an important step in the process of this research. Through mapping the urbanisation of this

[43] For an ethnographic account of how the human body is multiplied through medical practice see Annemarie Mol. *The Body Multiple: Ontology in Medical Practice*, Science and Cultural Theory. Durham: Duke University Press. 2002.

forested landscape, that since the late XVIIIth century with the introduction of commercial logging and what the Imperial administration deemed more sustainable ways of managing a forested landscape (Ardelean 2014) has transformed the forest into a landscape of extraction while the infrastructure built to extract timber and later mineral resources carried with it an urban life to the settlements on the valley, the valley emerged as a living space for a more than human community, where the lives of humans are entangled with the fragile lives of alpine grassland plants, trees, animals whose living environment is the forested landscape.

Mapping the evolution of the forest on the Vaser Valley in relation to alpine pastures and grasslands has revealed that in the last 250 years the forest has migrated, occupying previous grasslands. Biologists' predictions of the continuation of this phenomena over the next 100 years with accelerated climate change call for new ways to meet the landscape transformations that are unfolding. In the face of climate change we may be looking for a knowledge of the forest that is inspired by scientific approaches yet deeply rooted in the guidance that the forest on the ground offers. While scientific modelling, prediction and observation can only monitor and attest that change is happening, meeting the challenges of climate change entails the capacity to act from being immersed in the landscape, guided by the intelligence of plants and the other beings inhabiting forested landscapes. In *4.1. Forest intelligence: from trees to forest bodies* I presented recent scientific findings in forest ecology and plant communication that, while broadening our understanding of the paths through which plants communicate underground, also challenge established conceptions about the mind, knowledge and thinking processes. If plants hold knowledge that they process throughout their whole bodies in communicating it, can we share in their knowledge? Eduardo Kohn's (2013) "ethnography beyond the human", into the thinking processes of the Amazonian rainforest is an interlude to sharing in the multiplicity of thoughts that connects living beings in the Amazon forest through articulating multiple and other than human perspectives. The bodily experience of climate change that intensifies extreme weather events putting pressure on human bodies as well as animal and plant bodies, and that impinges on plants to move over generations in order to find favourable conditions to live, requires anticipating a possible future and making steps, in the literal and figurative way, to meet it. It may require us to think with our bodies, not so much with our minds. The *Forest Encounters* presented in *8.1.,* that record changing weather events, forest fire, and seasonal cycles in the life of the forest and its more than human inhabitants also register how knowledge of the forest is gained through the human body, in a distributed way, while walking, observing, and experiencing the forest. While walking in the forest, your feet learn to walk without the knowledge of it being articulated through thinking processes of the mind. Encountering the forest is as much a process of the mind as it is of the body.

The articulation of *forest care*, as an extended and distributed form of agency, shared between the more than human world, in contrast to contemporary human centred landscape management approaches as impositions of abstract metrics, offers itself as a more than human way of meeting the challenges posed by climate change and the landscape transformations we are collectively going through. In the introduction I asked *How is the forest taken care of?* In chapter *7. The forest as infrastructure* I used André Corboz' (1985) concept of the "palimpsest" to discuss the territorial transformations that the Vișeu river valley has gone through in the last 250 years of its recorded history in maps and planning documents. As a multilayer concept, the "palimpsest" allowed to discuss territorial transformation through a multitude of agencies, both human and non-human. Through distributing agency among the more than human community inhabiting the forest, the forest emerges as enmeshed in what Puig de la Bellacasa names "webs of care". These webs of care extend beyond the human, to encompass soil microorganisms taking care of the forest's substrate[44], animal and plant species, but also water and geological agency that have shaped the landscape in geological time. In *7. The forest as infrastructure* I focussed on water and the *acts of care* that forestry engineers perform in the forest. While water provides a way of access to the forest, having historically been used as a transportation way for timber, its course also protects certain areas of the forest, either through the narrow pass that is easy to surveil, or through the lack of a path and access way. Attuned to the landscape, the forestry engineers that I encountered respected the inaccessible areas of the forest in not authorising logging operations in difficult to access areas, thus safeguarding the life of the forest. Thinking about the soil community that is involved in taking care of the forest through the continuous making of soil, an *act of care* is also to privilege ancestral ways of timber transportation through the forest using a horse, instead of modern machinery, as is customary practice in the Valley, and preferred practice of the Vișeu Forestry Yard. Through the lens of care, as proposed by Puig de la Bellacasa, the multiple temporalities involved in the creation of multi species and multi-age forests, that are deemed to have the resiliency needed to meet climate change emerge. Articulating *forest care* as a web of more than human entanglements with specific forms of agency, is intended to make space for more than human agencies in landscape management thinking and practice. Following Nina Marie Lister and Joanna Brocki's (2014) suggestion, that what is required is not that we manage ecosystems per se, but rather our own actions and behaviours towards them, operating with a more than human concept of forest care de-centers the human from the privileged role it has created for itself as an ecosystem manager, while highlighting those areas of forest care that are interdependent with human activity.

[44] For an account of soil science and the importance contemporary ecological approaches to soil ecology give to soils' other than human inhabitants see María Puig de la Bellacasa. *Matters of Care: Speculative Ethics in More than Human Worlds*, Posthumanities 41, Minneapolis: University of Minnesota Press. 2017. "Chapter 5. Soil Times. The pace of ecological care." 169-215.

The thesis' contributions to the fields of urbanism and urban studies are both methodological and epistemic. In expanding the use of the concept of the "palimpsest" (Corboz 1985) to account for more than human agencies in territorial construction and transformation, this thesis contributes to on going debates on the study of territorial transformation processes. While diligently following Brenner and Schmid's (2012) suggestions for the study of planetary urbanisation as a dual phenomena of landscape transformation and resource flows, this thesis proposes to think of landscape transformation as a more than human, distributed agency shaping urbanisation processes, and of the contemporary architecture of resource flows, entangled in the planetary infrastructure of regulating bodies, as bringing together ethically and non-ethically resource landscapes. The convergence of arguments that I have pursued, rethinking urbanisation *with* the forest, and not just any forest, but a forest on the European continent, as a form of more than human living together, similar to the argument Heckenberger (2012) and Tavares (2017) pursued, of thinking of indigenous forms of inhabitation of the Amazonian forested landscape as an alternate model of urbanisation to the European urbanisation model that has been replicated across the planetary terrain through the colonisation process and is currently at the fore front of planetary transformations and global climate change, has a political, as well as a scientific purpose, in retrieving those forms of European indigeneity that have persisted and that continue to shape the European forested landscape, whereby in an alternate mode to the conception of urbanisation as that of city growth. While plant migration and landscape transformations such as the migration of the forest towards higher altitudes, (re)occupying alpine grasslands, is well known to the practitioners of biological sciences, presenting it to architects, urbanists, and urban studies scholars through mapping, is intended to bring into consciousness the agency of the non-humans with whom we share the inhabited world. As designing *with* forests and forested landscapes is becoming an important part of urban design and landscape urbanism, the intimate knowledge of forests that I share is meant to inform design decision and planning strategies.

This research is intended to raise awareness towards thinking about urbanisation as a way of inhabiting the Earth, and about forested landscapes as urbanisation spaces. How we urbanise a forest and a forested landscape are important questions. In making space for more than human agencies in urbanisation processes and landscape transformations I also put forth a proposition for an expanded concept of citizenship. Margarita Jover (2019) proposes a new form of planetary citizenship, expanding the European model of citizenship to the human inhabitants of the planet. In her view, capitalist economic interests and "ecological dynamics" operating beyond state borders call for new global governance forms, beyond the nation state (Jover 2019:34), specifically for the management of what Brenner (2016) calls "global commons". As I introduced in *4.2. Forest governance: the emerging rights of nature*, emerging new forms of personhood resulting from indigenous struggles,

introducing the rights of nature (Lyons 2022), expand and question the human-centred European concept of citizenship, as the inhabitant of a city, and, since the XIXth century, a nation state (Jover 2019:35). As this research suggests, in line with indigenous discourse, our collective wellbeing is interdependent with the wellbeing of our plant and animal kin, and with that of the landscapes we jointly inhabit. Re-evaluating our relationships with the non-human as interdependent, and re-valuing and re-constructing more than human kinship in the wake of planetary urbanisation and global climate change might bring forth a more rich concept of planetary citizenship, and a more rich form of urbanisation as a way of inhabiting the planet.

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