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THE FOREST AS A TERRITORY FOR THE OPERATIONS OF PLANETARY URBANISATION: SORTING FOREST AREAS ON THE VASSER VALLEY IN ROMANIA

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ABSTRACT. Lefebvre's 1970 prophecy of the total urbanisation of society has come true with the expansion of the urban into natural and rural territories. For Lefebvre, the question of nature is closed by its 'steady, violent death' (Lefebvre, 2003) and its replacement by a 'second nature' (Schmid, 2014; Smith, 2008). This closure accounts at an epistemic level, for the dominance of the urban (Krause, 2013; Brenner and Schmid, 2014). Far from being closed, *the question of nature* is renewed within the present conditions of planetary urbanisation, as the interiorised non-urban is *'operationalised'* to sustain urban growth, thus making the non-city 'an essential terrain of capitalist urbanisation' (Brenner, 2016). In what follows, I present how the Romanian forest is operationalised as a territory of planetary urbanisation through forest management practices. Looking into the negotiations and manipulations on the ground provides a way to 'pay attention' (Stengers, 2010) to those practices that sort and select natural areas. In the face of the recorded disappearance of the forest, the effort of making visible the rationality of planning, and the challenges that are posed upon it inscribes itself within an 'ethics of visibility' (Roberts, 2012; Topalovic, 2016).

Keywords: planetary urbanism, scientific forestry, territory, sorting

Planetary urbanisation and the question of nature[2]

In 1970, Lefebvre voiced a prophecy - of the total urbanisation of society. What Lefebvre first voiced as a hypothesis of total urbanisation through the implosion of industrial production within the cities, and the explosion of the

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urban without of the cities, is a phenomenon of spatial distribution. To him, the phenomenon of urbanisation transcends the rural/urban dichotomy, as well as the capitalist/socialist modes of social organisation. As Neil Smith argues in the introduction to Lefebvre's *Urban Revolution*, though Lefebvre does touch upon the question of nature, in a time when nature was just emerging as a subject of debate, he does not see in it a ground for political change (Smith, 2003: xv). For Lefebvre, the question of nature is closed by its 'steady, violent death' (Lefebvre, 2003: xx) and its replacement by a 'second nature' (Schmid, 2014; Smith, 2008). What is at stake for Lefebvre is the extension of a form of life that gained priority over rural life. In his 1968 commentary on the Law of Territorial Organisation in Romania, Henri H. Stahl presents a theoretical model of *urbanisation as the extension of a form of life*, as a key question of infrastructure extension and spatial distribution of resources. Almost in accordance with Lefebvre, Stahl announces the death of the rural in an undated article for the Royal Foundations Magazine. With the dissolution of village organisational forms, the village as a phenomenon no longer existed. According to Stahl, it died its many deaths in the beginning of the 20th century when capitalist interests entered village life. As it appears in his commentaries, the territorial organisation initiated by the 1968 Law in Romania aimed at instituting an urban society, where the village resources were called to sustain urban growth.

The death of nature announced by Lefebvre, and the death of the village announced by Stahl in the 1970s contributed to 'the dominance of the urban' (Krause, 2013; Brenner and Schmid, 2014). The urban dominates as it becomes the only space of relevance for questions of infrastructure, natural disaster and social justice (Krause, 2013), and as the prevalent space where questions of growth are posed merely in population number (Brenner and Schmid, 2014). As Brenner and Schmid (2015) argue, the urban attains its dominance by non-representing the other spaces that sustain urban life, particularly the rural and the spaces of production that have been relocated at the 'geopolitical margins' (Roberts, 2012; Princen and Topalovic, 2014).

Countering the dominance of the urban, Brenner and Schmid (2012) propose the thesis of planetary urbanisation. According to them, urbanisation is a dual issue of resource flows and landscape transformation. Far from being closed, the question of nature is renewed within the present conditions of planetary urbanisation, as the interiorised non-urban is 'operationalised' to sustain urban growth, thus making the non-city 'an essential terrain of capitalist urbanisation' (Brenner and Schmid, 2015). As an epistemic shift, the thesis of planetary urbanisation invites to bring forth those spaces that are concealed by its operations. There is a dual question of visibility inscribed in it, addressing both scientific visibility of a non-represented space and public visibility of the lacking images of labour and labour spaces (Roberts, 2012; Steyerl 2012; Princen and Topalovic, 2014), those images that are not represented in 'the official image of the community' (Bourriaud, 2007: 52). As Roberts (2012) argues 'visibility and visual access are doubly at issue where the subject is as vast, unmappable and volatile as global capital'.

But what are the operations of planetary urbanisation? What does it mean to operationalise a landscape? And what is concealed as nature is denied its epistemic existence? Thinking at a territorial scale, to operationalise a landscape is to inscribe it with a bio-political rationality akin to the city, to make it a solid territorial form through legal inscription, to plan it, and to introduce a new order within it. Solidity is achieved through legal instruments and inscription of borders (Boerie, 2002), that make even a liquid territory, such as the sea, capable of organising urban life around it (Topalovic in Yabuka, 2014). But to make a territory, even as liquid as the sea into a zone around which urban life is organised, to make it navigable, or to securitise it by dividing it into zones with different degrees of access, means to plan it like you would plan an urbanised land. It is a practice that as Scott (1999) points out, aims to bring *legibility* into an unknown territory, whose inherent fluidity or solidity as a property of its shifting 'natural' borders, becomes less important, as a new rationality is inscribed upon it into the realm of planning. Its borders, and the quality of the transformations within them are at stake when resource territories are made 'liquid' to the point of disappearance by the operations of planetary urbanisation. From a solid territorial form, inscribed in territorial borders, sand is made 'liquid', as its import for the construction of new land forms in sea territories displaces existing land forms, as for example occurs in Malaysia (Comaroff, 2014; Topalovic in Yabuka, 2014). As Comaroff (2014) suggests, the flow of 'liquid' sand not only overcomes territorially imposed boundaries, but it also alters them. 'Worker-palms', palm trees destined for industrial production, replace 'natural' palm forests in Indonesia (Topalovic in Yabuka, 2014), while operations of deforestation are ongoing in the Amazonian forest (Sun, 2013).

In between its solid territorial form and the liquid disappearance of timber, the problematic of the forest stretches across the scientific and public domains. In the Romanian territory, the disappearance of the forest is felt as the anxiety of not being able to control the flow of timber. As environmental activists have estimated, 50% of all timber logged in Romania is illegally sourced.[3] The Forest Certification Association in Romania has mapped the areas of high-risk for illegal logging across the territory. Along the Vișeu valley,

[3] Environmental Investigation Agency 2015 Report. Stealing the Last Forest: Austria's Largest Timber Company, Land Rights and Corruption in Romania.

in northern Romania, there are two areas marked as high-risk[4], however, the present inquiry rests upon a managed forest that is not included within this category, situated on the Vasser Valley, an affluent of the Vișeu river. Access to those high-risk areas was not possible within the confines of the research project, and was also not the focus of the study. As studies on deforestation (Sun, 2013; Andronache et all, 2016; Pintilii et all, 2016; Draghici et all, 2016) converge on the need to strengthen forest management practices, the effort of making visible the rationality of planning that makes the forest a solid territorial form, and the challenges that are posed upon it inscribes itself within an 'ethics of visibility' (Roberts, 2012; Princen and Topalovic, 2014).

Methodology and methods

The paper builds on a one and a half months fieldwork in the spring of 2017 and a two weeks period in the autumn of 2017, during which I was registered as an intern at the Maramureș Mountains Natural Park. During this time I accompanied the rangers at the Natural Park in their daily routine patrolling and monitoring the territory of the Natural Park. Participant observation and walking interviews intertwined as practices of the field. The organisational structure of the Natural Park has forestry engineers among its employees, and quite often during their daily routine they were accompanied by the forestry engineers responsible for the particular area that was patrolled. The initial brief of the research project aimed at covering the whole forested territory adjacent to the Vișeu valley that constitutes the territory of the Natural Park. As a methodological choice, the valley is a reference for the forest in as much as water indexes the territory of the forest. While in the first month and a half I followed the routine at the Natural Park, during the two autumn weeks I entered with confidence in the office of the head of the Vișeu Forestry Yard, and was granted access to the planning documents that bind the practice of forestry engineering. As will be argued below, planning transforms the forest into a fractal object, making each part resemble the whole. The mathematical fractal is defined by a 'law' of replication of the parts. To a certain extent, forest management represents the 'law' of the forest, a man-made law applied throughout the whole forested territory, not only of the Vișeu Valley, but of the whole Romanian territory. From this point of view, the part can speak for the whole.

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 researcher and 'interviewee', male and woman, urbanism and forestry. As a

[4] http://certificareforestiera.ro/pag/harta_risc_cont.php.

woman, an urbanist, and a researcher, the field of forest management proved to be opaque, hierarchical, and male-dominated. Access to it came through the men that trusted me walking into their territory, and were open and proud to show me their forest. That is to say that I could only speak to whom my curiosity made them curious towards me. As a woman, I was walked-through, and shown the forest territory, as I asked questions on management practices, and on what had happened to the particular areas we were walking through. During the walks, I was constantly reminded of the laws that bind forestry practices. Most of my questions directed at a particular situation observed within the forest were answered with an inscribed legal reference. What became apparent is that on the one hand, the law is an instrument of manipulation, of which everybody is aware of, and on the other hand, the ground offers a space of manipulation where things are fitted into the law.

As bound to the abstract rationality of law and planning, forest management can be deciphered using Isabelle Stengers' concept of the 'psychosocial constraints' between which scientists negotiate their artificial creations. To Stengers, the 'psychosocial constraints' that bind a scientific practice are the obligations addressed towards the scientific community and the requirements directed towards phenomena (Stengers, 2010: 51) In the case of forestry practices, the obligations of the forestry engineers are those inscribed in laws, both at local level, as the Forestry Management Plan is, and at national level. The Forest Management Plan is done with a regularity of 10 years and comprises three parts: a text book, a list of tables, and the forestry maps. The text book describes the existing and the forecasted state of the forest. The Forestry Plan is made in the form of a table where the forecasted and achieved works on the forest are introduced according to forest plots and cubic meters of logged timber or works conducted on existing trees. The Forestry Maps detail in the geographical representation of territory the state described in the text book and the Forestry Plans. The main legal framework governing forestry practice is the Forestry Code, the latest of which was adopted in 2016. Though forest management practices existed prior to 1948, the present inquiry rests upon the 1948, 1978, and 2008 Forestry management Plans done for the Vasser Valley. As the current Forestry Plan was in the phase of planning, away from the ground, in the forestry planners' offices, while I was on the field, it rests outside of this inquiry. As they concern state-owned forests, all of the planning documents are public documents. However, while they exist in multiple sites, in the planners' records, in the regional forest management departments, in the ministerial records, and at the local forest management structures, access to them was only made possible at ground level, from the local forest management structure. Throughout the research process, the planner that I talked to, as well as the representative of the regional forest management department directed me to the local forest management structures. The distribution of power into the hierarchy inscribed in the field of forest management, from the level of the state, through the regional, and local, attest to the fact that power over the forest is at ground level. The fragmentation of the forest territory at ground level, however, made it difficult to obtain the plans for the whole valley, so I restricted the enquiry of forest management to the Vasser Valley. The reading of the Forestry Management Plan and of the Forestry Code that I perform is that of looking for the *obligations* that they institute on behalf of management structures and the *requirements* that they set on the forest. Within such a reading, the information collected from the field serves to show the territory of negotiation inherent into a practice of the ground. Looking into the negotiations and manipulations on the ground provides a way to 'pay attention' (Stengers, 2010) to those practices that sort and select between what is really possible on the ground, and what is hypothetically possible in abstraction, but does not need to happen. In other words, on the ground, the limits of the practice become apparent.

The following sections discuss the rationalisation of the forest territory as an essential operation of planetary urbanisation aiming to transform it into a solid territorial form through its legal and scientific inscription. The analysis of the Forestry Plans brings forth the requirements and obligations that are inscribed within them.

The solid forest. Legal inscription

The Romanian forest planning system developed as a mix between the Prussian and the French systems, from where it draws part of its vocabulary. The long history of forestry has incorporated in the current practice ecological, geological, hydrological and biological concepts, as well as advanced mathematical calculation methods. It is very far from what Scott (1999: 14) describes as the crude bureaucratic rationality that the cameral sciences introduced in the Prussian and Saxon forested territories between 1765 and 1800. What Scott makes appear as 'the logic of commercial exploitation' (1999: 15) is an operation of abstraction, through which the forest was first extracted onto papers, in tables classifying trees by age. This abstraction was then to be inscribe into the actual forest with the aim of producing a structure of evenly aged forest patches that could be logged one by one each year. As it appears from Scott's description, scientific forestry's aim is to transform the forested territory into a 'cartesian landscape' (Princen and Topalovic, 2014).

The forest emerges as solid through its legal inscription. As such, it is a legal fiction and a scientific artefact, existing on paper, defined as a surface of at least 25 ha covered with forest vegetation (Art. 2, Law 46/2008). This is its legal definition inscribed in the Forestry Code - Law 46/2008 - that also prescribes all actions that are allowed/not-allowed on its physical body. Though forestry and forest management practices have developed throughout time, the solidity of the Romanian forest as a territorial form dates back to 1947, when Law 204 first defined the forest as a surface of land to be subjected to planning. The solid forest of today is the result of all territorial organisation, territorial construction, and boundary retracing to which the forest was subjected prior to and since 1947.

The rationally planned forest. Scientific inscription

Rationalisation, in the form of geometric abstraction and mathematical indexing according to age are inscribed in scientific forestry with the aim of making the forest *legible* (Scott, 1999). Practice, however, distinguishes between the rationally planned forest that is a *scientific artefact*, and the forest on the ground whose transformation is at stake. While the rationalisation of the forest transforms it into a geometric abstraction, the forest on the ground does not achieve cartesian precision. We can say that the model of the forest does not fully match the reality of the forest on the ground. The model however, the rational forest, serves a management purpose, an operation that itself has a dual purpose - to account for both the flow of timber and the permanence of the forest. As a scientifically inscribed principle, the purpose of all actions done on the *body* of the forest are to assure the permanence of the forest on the ground, and to obtain high quality *arboretum* (Art. 28 (2) of the 2016 Forestry Code). They represent the *requirements* set on the forest by forest management practices. An *arboretum* is not yet timber, it is the trees out of which timber may be logged. As such, it precedes the fluid state of a flow of resources, while it is tied to the ground that provides it with life support.

As it appears in forest planning documents, the rationally planned forest becomes a fractal structure, a pure object of thought, upon which mathematical calculations are done. Fractal geometry developed as a method to approximate the shape of natural 'forms' such as clouds, seacoasts, and forests (Sun, 2013). But as Benoit Mandelbrot, whose engagement with it makes him a figure of reference for any of its applications, intended it, fractals have a power of 'organisation, explanation, and prediction' that exceed the field of mathematics (Mandelbrot, 1983: 49). It is in their virtue as an organising principle that they can be used as a reference for the rationalisation of the forest. As such, fractal structures are structures that scale up, as they are given 'statistical self-similarity' (Mandelbrot, 1967). In other words, they are structures made out of parts that resemble the whole (Sun, 2013). Fractal geometry is nowadays used to study deforestation patterns (see Sun et all, 2013; Andronache et all, 2016; Drăghici et all, 2016; Pintilii et all 2016). However, as the 'law' of the forest, forest management transforms the forest into an object upon which calculations and predictions can be made. This object that the forest becomes I consider to be akin to a fractal object, in as much as it is scaled up to serve for calculation and prediction purposes. The individual plots of land are grouped together into *bodies of forest*, as they are called in planning documents (*trupuri de pădure* in Romanian). The bodies of forest are grouped into production units, and they are then grouped into forestry yards (*ocoale silvice* in Romanian). Planning is done at the level of forestry yards, and production units. The principle that guides planning is that of achieving the optimum age structure for the entire territorial unit, so that hypothetically each 10 years, half of an age class, considered at 20 years, can be logged. If the optimum age structure is achieved in each territorial unit, then the whole forest has an optimum age structure. Equilibrium is achieved. The part resembles the whole according to the optimum principle, for it has the same structure at the level of territorial units. The optimum forest is a fractal structure. But this does not mean that the forest on the ground is transformed accordingly. Rather, the individual plots of land preserve their inherent qualities.

The forest on the ground. Disturbance and Optimisation

As Georgescu-Roegen (1970: 20) notes, the concept of the optimum only has 'artificial value'. As a 'statistical artefact' (Brenner and Schmid, 2015), the optimum is never achieved on the ground, and the 60 years of records inscribed in the Forestry Plans of the Vișeu forestry yard attest to this. Nevertheless, as a concept it is used in qualifying disturbed and optimisation areas within the forest.

The 2008 Forestry Plan is indicative of the way the concept of optimum is applied in forestry practice. The Plan registers the areas affected by 'disturbing factors' as following: areas vulnerable to strong winds to the point of all the trees being felled down, to pest attack, to fire, to drying of the trees, to heavy snow falls, damages produced during logging, damages produced by the wind, landslides, sloughing, soil erosion, rocky soil, unhealthy trunks. While the mathematic of calculations accounts for each individual 'disturbing factor' and amounts to a total of 88,5% of the whole forest territory, on the ground, individual forests are affected by a couple or more of these factors, as they overlap (2008 Forestry Plan: 270). The numbers here are irrelevant in their quantitative aspect, but relevant in their qualitative aspect - of showing that the conditions on the ground are not ideal. The qualities of the non-ideal ground are to be taken into account when interventions within the forest body are taken. Interventions in this case account to another kind of 'disturbance' - the replacement of a naturally grown forest with a human planted forest - or the 'artificialisation' of the forest, as is referred to in scientific terms. As is inscribed in the 2008 Plan, the extension of artificial forests in the forested territory of the Vasser valley, prior to, and post 1948, has, through clear-cutting and selective logging, disturbed the hardwood-softwood balance of the forest by replacing accessible and logged forests, with spruce monocultures. Spruce was preferred even though theoretical and practical knowledge existed on other softwood species. The consequences of this policy of 'excessive' and 'forced' spruce introduction particularly in areas where strong winds would manifest with a cyclical periodicity, made the newly introduced evenly aged forests particularly vulnerable to strong wind blows (2008 Forestry Plan: 183-4).

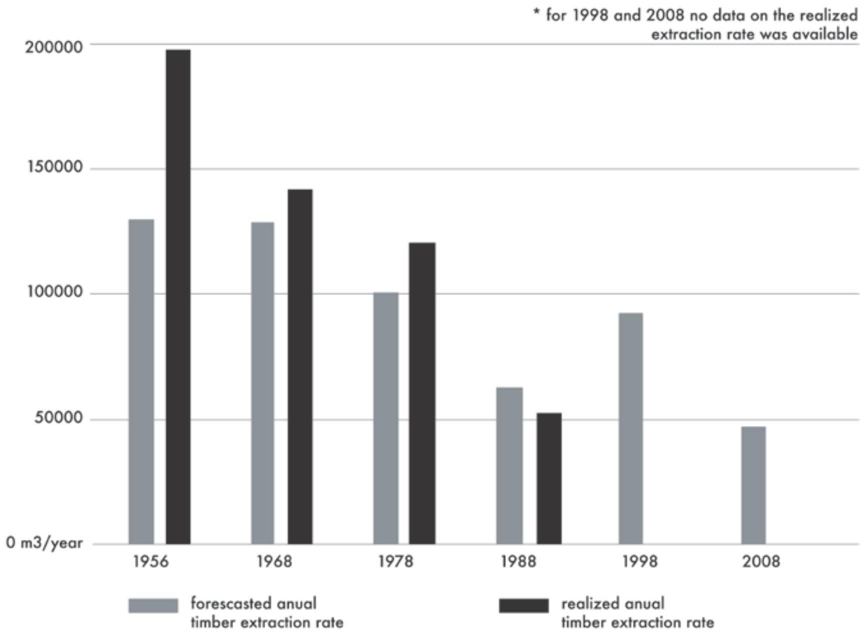
One of these moments, of a wind strong enough to fell down areas of trees, I've witnessed myself during fieldwork in September 2017. To the forestry engineers that I accompanied on the field to evaluate the damage produced, the felled timber was to be removed, the surfaces cleared, and the resulting timber quantity fitted into the predictions calculated by the Forestry Plan. During the walk however, the issue of how to make the forest more resilient to these kinds of events emerged as a correlative to the issue of the 'free' timber given by nature. While the straightforward answer is the planting of new trees, as directed towards the optimisation of the forest, forestry practice will aim 'to create intermediary structures that would gradually lead the forest in the area towards a new structure with respect to the specific natural fundamental forest types existing in the area' (2008 Forestry Plan: 184). It can thus be said that to the forestry engineers the forest on the ground is a disturbed forest, be it by natural or human hand, a forest that they will aim to optimise, even though the optimum will be never achieved.

Territorial construction. Indexing the forest

The Forestry Plan and the Forestry Maps that accompany it institute forms of *indexing* the forest according to age class for the purpose of logging (Scott, 1999), according to water courses that provide accessibility, to zones of protection and extraction. They attain the 'permanence of a device' (Secchi, 2013) of territorial control and security. The Forestry Plan makes use of the fractal model of the forest to calculate the possible amount of timber that can be extracted from a forest. Extraction, according to scientific principles is a matter of abstract possibility. As it emerges out of the 60 years of records of the Vișeu Forestry Yard, the possibility is not cast in stone. There is considerable variation between what was planned and what was achieved. Table 1 illustrates this variation. As can be seen, the annual forest extraction rate gradually decreased from 1956 to 2008 to approximately 1/3 of the 1956 forecasted rate, even though the total forest surface of the administered forest only decreased between 1998 and 2008 as a result of reconstitution of property rights claims, an issue that will be discussed in the following section. At the same time, the difference between what was planned and what was achieved varied greatly. Though there was no available data for the 1998 and 2008 Forestry Plans, judging on the tendency, it can be assumed that the achievements were near to the forecasts, or even lower. This variation can be ascribed to socio-economic and political factors, and indeed during the 1950s and 1960s, Romania was still paying its war debts in round wood (Nicoară, 2001: 90). They are however, external factors to the science of forestry. Looking into the internal obligations of the practice and the requirements set on the forest this variation can be attributed to the internal zoning of the forest, its *sorting* into accessible and non-accessible, extractable and non-extractable areas, and the various manipulations of the ground.

Table 1.

Forecasted and realised annual extraction rates 1956-2008



Source: Realised based on data available in the 2008 Forestry Plan, pp. 358-361.

As an instrument of practice, the possibility does not oblige. It rather provides the basis for making judgements in specific situations. What is possible in the abstract space of planning is not necessary to happen on the ground. Furthermore, what is legible from the Forestry Maps is that extraction is a matter of zoning, as the scientific principles inscribed in laws *oblige* the forestry engineers to sort extraction areas, tending areas, limited or no-intervention areas, seed reserve areas, different types of protection areas, thus placing different *requirements* on differentiated forest bodies. Cuts within the body of the forest are performed, that account for the varying topographical, geological, hydrological conditions on the ground, and the economic objectives set for the forest.

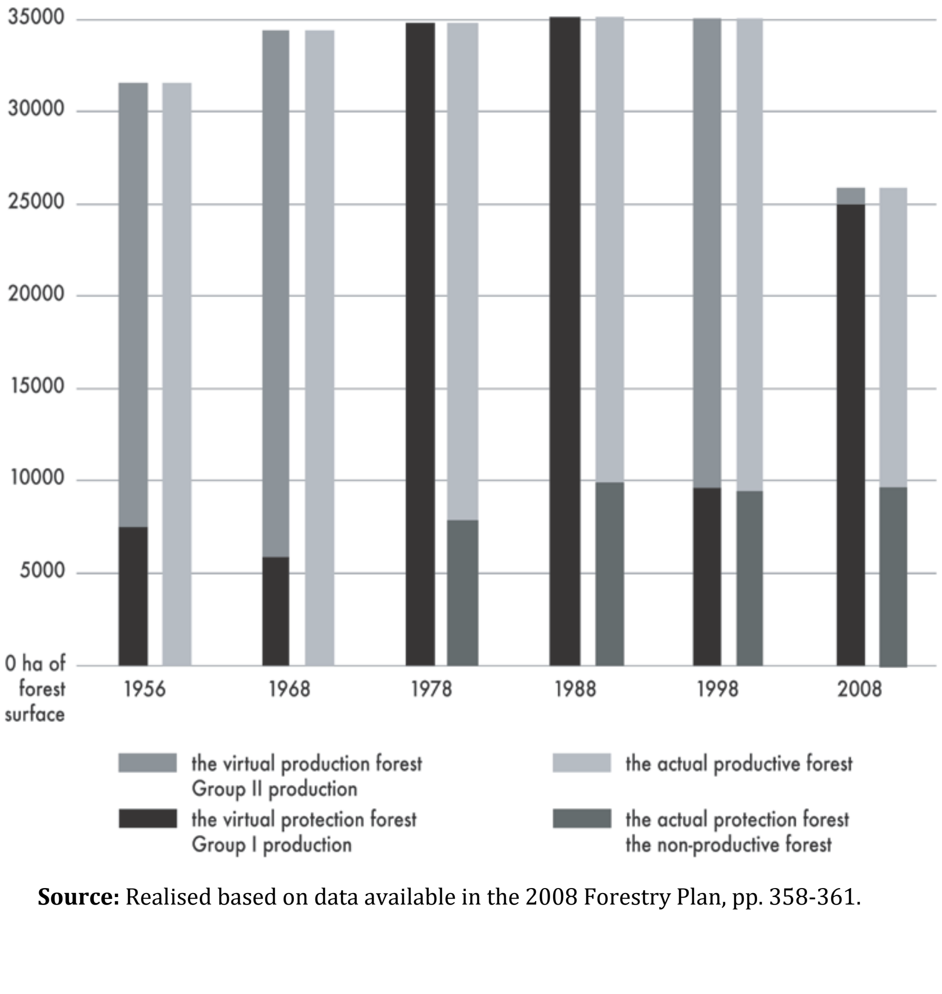
To begin with, the 1948 Forestry Plan did not predict any amount of extractable timber. While the lack of calculating the possible amount of timber to be extracted was judged to be 'unscientific' by the planners that wrote the 2008 Forestry Plan, it can be argued that the objective of the 1948 plan was first of all to organise a productive territory according to the organisation principle of 'the natural flow of timber products' (1948 Forestry Plan: 19). This 'natural flow' institutes a geographical principle of organisation of the forest with respect to the valleys of rivers and springs that allowed the forested mountains to be accessible and timber to be transportable. The territory ascribed to the Great Forestry Production Unit Vișeu, as it was named in 1948, was comprised of 10 'series' - 10 bodies of forest cut out of the whole forest according to the valleys that cut the mountainous landscape. If the forest is indexed by *age classes* as Scott (1999: 14) remarks, the territory of the forest is indexed by *water courses*.

The 60 years of operations of territorial construction on the Vasser Valley sorted within the territory of the Vișeu Forestry Yard different other territorial bodies. Interior boundaries arose as the forest was divided into plots of land, upon which different requirements were set. These requirements effectively sorted the forest territory into a productive and a protected forest. However, the specific indexing placed on forest bodies by the science of forestry engineering produce a virtual productive and a virtual protected forest, as well as an actual productive and an actual protected forest. Table 2 is a comparison between these *virtual and actual forests.*

Scientific forestry indexes the forest territory according to function. Production and protection are the two functions of the forest. However, they coalesce within the same forest, while in practice, one is privileged over the other. Attached to the principle of assuring the permanence of the forest, the protection of the forest is implied with respect to practices of forest regeneration either through 'natural' regeneration or artificial plantation. In the language of scientific forestry, the forest is indexed according to production group. Group I is where protection is privileged over production, and Group II where production is privileged over protection. These categories are what I have called the virtual protected forest and the virtual productive forest. At the same time, through the specification of these Groups according to the conditions of the ground, the actual protected forest and the actual productive forest emerge. I call *the actual productive forest* the forest where extraction is regulated according to the protection and production requirements, while *the actual protected forest* is the forest where extraction is not regulated according to the same requirements. The following discussion specifies how the differentiation between production and protection in the virtual and in the actual was made throughout these 60 years, and what requirements were placed on differentiated forest bodies.

Table 2.

Virtual and actual production and protection forest 1956-2008.



Source: Realised based on data available in the 2008 Forestry Plan, pp. 358-361.

The 1948, 1956, and 1968 Forestry Plans though they categorized a virtual protected forest that corresponded to the protection of alpine pastures, avalanche gutters and special areas where the protection of the soil was privileged, this remained in the virtual, as all forest was thought to be the actual productive forest. What this means is that there was no forest that was thought to be a non-productive forest. Actual protection areas were only instituted with the 1978 Forestry Plan, as it extended the virtual protected forest over the whole forested territory. With this Plan, the economic purpose of obtaining high quality timber for extraction came second to the economic objective of assuring a ‘balanced hydrological regime of the entire region’, that came with the initiative to plan and build two storage lakes on the Vasser and its affluent, the Novăț river. They were never constructed on the ground, but the requirements they set on the whole forest territory regulated production only in certain conditions, as the protection of water sources was more important. With the 1978 Plan, the non-productive forests emerged as the sum of forest belts around alpine pastures, avalanche gutters, special areas where the protection of the soil was privileged, and seed reserves. After two decades, the indexing of the forest was changed with the 1998 Plan that gave up the hydropower dream, and regulated production for most of the forest territory. Consequently, only 27% of the forest area was indexed as protection forest, categorised as Group I. This corresponded in the virtual as well as in the actual. The forest areas that were fitted in this category were, to the most part, the ones corresponding to implicit economic objectives - where logging would be detrimental to other activities in nearby territories - forests situated on high slopes and/or rocky soil (*grohotișuri* in Romanian), forests along roads and railways situated on areas with high slopes and land slide risk, the forest belts around alpine voids, forests situated on sloughing lands, forests situated at high altitudes where regeneration happens under extreme conditions, forest belts situated next to mining residues deposits, forests within and around city perimeters, and forests designated for seed harvesting and for the preservation of genetic material. The legal inscription of the Maramureș Mountains Natural Park in 2004 that incorporated the Vișeu Forestry Yard changed the indexing of the forest according to protection and production as inscribed in the 2008 Forestry Plan. Through this plan, the virtual protection extended over most of the forest area, as 97% of it was indexed as Group I. This includes the following: forests situated on high slopes and/or rocky soils (16%) forests along roads and railways situated on areas with high slopes and land slide risk, the forest belts around alpine voids (2%), plantations of degraded soils, forests on sloughing lands, forests situated at high altitudes where regeneration happens under extreme condition, forest belts situated next to mining residues deposits (1%) forests situated within and around the city of Vișeu, natural reserves of varying surfaces of land and water, constituted by law for the purpose of the conservation of genetic material and of the environment[5] (8%), seed harvesting and genetic material conservation forests (1%) secular forests, as they are referred to in scientific forestry, or virgin and quasi-virgin forests, as they are referred to in legal texts and public discourse, of an non-estimated value inscribed in the plan and approved by Ministerial order (91,7 ha) forests constituted as buffer zones of the natural reserves constituted by law (69%). The remaining 3% is divided between Group II, production forests - 1% - and land without forest function - 2% (2008 Forestry Plan: 12-13). Through this Forestry Plan, the difference between the virtual production forests and the actual production forests is constituted by what is categorised the buffer zones of the natural reserves, the 67% of the whole forests that is virtually protected, but is actually a productive forest.

Making the plan operational

While the previous sections discussed the obligations and requirements of the Forestry Plans, that instituted forms of indexing a forest territory thought of as a fractal structure, the next section will present the manipulations and negotiations going on at ground level.

On the ground, making the plan operational is a matter of *spatially distributing* logging surfaces so that the *dual purpose of assuring the permanence of the forest and accounting for the flow of timber* is achieved. There is no obligation to push the plan to its limit - to log the abstract possibility calculated on the basis of the fractal model of the forest. Rather, operationalising the plan implies making adjustments, and manipulating the forest so that the things that happen on the ground fit into the plan. Manipulating the forest implies the manipulation of individual plots of land, of technologies of extraction and treatments applied to the body of the forest, and intervention in case of unpredictable events. As the forest is indexed also by property, the manipulation of properties is key to achieving the solidity of the forest as a territory to be governed. The solidity of the forest territory was, to a certain extent, 'forced' with the legislation pushed between 1947 and 1959 by the communist regime. As forest properties were all joined together, and the forest was legally inscribed as a 'common good', this erased previously existing properties. Erasure took place within the legal domain and only partially on the ground. On the ground, forest properties were re-inscribed within the body of the forest, as

[5] Authors' translation. The exact scientific text from the 2008 Forestry Plan in Romanian is: *păduri destinate conservării unor medii de viață, a genofondului și ecofondului forestier în România*.

their manipulation was ascribed to the newly created production units. That is to say that while the law aimed at erasing property boundaries, for purpose of territorial managements, those boundaries either remained in place or were re-traced. The subsequent 1991 and 2000 laws concerning property right reconstitution dissolved this 'forced' solidity as the previous manipulations of forest properties were considered abusive even in the 2016 Forestry Code.

While the diminishing of the territory of the Vișeu Forestry Yard between 1988 and 1998 with around 600 ha, and the subsequent diminishing with around 9,000 ha by 2008 was a direct consequence of these laws, the question that arises is what happens with the dismembered forest bodies that passed from state into private hands. Do they preserve their solidity or become 'liquid' timber? With Andrea Branzi's (2006) conceptualisation of a 'weak modernity', we can think that the solidity inscribed in law is of a weaker type than the 'forced' kind of solidity that constructed the forest territory between 1947 and 1990. The principle of territoriality inscribed in the 2016 Forestry Code allows, but does not oblige. Forestry Yards can include other surfaces not directly ascribed to them into their management system, but only at request. Forestry Plans are obligatory for forests larger than 100 ha in surface, while forests that are smaller than 30 ha can be adjoined to these larger territorial bodies (Art. 97 of the Forestry Code). In between these two numbers, and within the gap left by the principle of territoriality that allows but does not oblige, vulnerable forest surfaces arise. Forests that are left outside of management structures, and lose their solidity, enter into a state of *'liquid' disappearance*. Liquidity here results out of the lifting of the obligations to securitise a territory, that are ascribed to forest management structures. My guides through the forest territory of the Vișeu valley often referred to them as 'self-service forests'. The drop in employees in the forest services in the Maramureș County after 2007 (Drăghici et all, 2016) can also be attributed to the manipulation of forest properties through the reconstitution of rights claims and the lifting of the security regime. The forestry engineers that accompanied me within the forest often decried the fact that in case of theft from an unprotected forest you can only count the leftover sectioned tree trunks (*cioatele* in Romanian). As they told me, inscribed in forest management is a direct accountability towards every managed tree. In case of theft, they are directly accountable for the volume of timber stolen, as the equivalent amount of money is retracted from their salary.

This attests to a dual purpose of indexing the forest according to age that accounts for the volume of the tree trunks. The mathematical calculations of the volume of timber to be logged serve not only the economic purpose of predicting the flow of timber, but also the purpose of assuring the permanence of the forest, as they become grounds for holding responsibility over the disappearance of individual trees counted one by one. On the ground, the leftover sectioned tree trunks become evidence. Manipulating the areas of extraction, the technologies of extraction and the 'treatments' applied to the body of the forest are so many decisions that rest in the hands of forestry engineers. From walking the Vasser valley in the company of forestry engineers, I could only see that in some places the forest was present, in some it was not, and that it had different ages. But as the forestry engineers themselves referred me to Google maps images (see Fig. 1), the spatial distribution of logging became apparent in the way they distributed and extended the extraction areas. From down below, as Certeau (1984: 92) also acknowledges, things are hidden to sight, there is a threshold at which 'scientific' visibility begins. The ground, and the Google images reflect the legal restriction to clear-cut logging, that binds forestry practice to the principle of assuring the permanence of the forest by allowing the forest to regenerate itself through a 'natural' process of seedling spreading, without the need for plantations.

Manipulating the technologies of extraction appears as a practice of paying attention to the ground. From what I've been told by forestry engineers, 'traditional' practices of dragging timber with a horse co-exist with modern practices of using industrial machinery as the ground allows for only partial accessibility of forestry roads, and attention to the herbaceous layer, the most fragile strata of the life supporting system of the arboretum is given. Dragging felled trees with a horse, in a 'traditional' way is considered by forestry engineers to produce less damage to the soil and the herbaceous layer than other 'modern' extraction technologies.

Manipulating the forest to obtain high quality timber, that to forestry engineers corresponds to the age class 5, 80 to 100 years old trees, implies manipulating different 'treatments' applied to the body of the forest. Though these treatments are inscribed in the forestry plans, my walks through the forest in the company of forestry engineers disclosed to me the value they place on them, and that is to guide the forest to grow beautifully, a beauty that can then be experienced from within it. Qualified by scientific practice as 'hygienic works', these treatments correspond to selective removal of young trees and tree branches. While practice obliges to these works, they are seldom of value to the timber industry, thus forestry engineers ponder between the decision not to prescribe them or to attach them to a logging contract in a neighbouring area. The 1948 Forestry Plan prescribed, for example, hygienic works to be undertaken in the protected forest belts surrounding alpine pastures only if logging was done in neighbouring forest bodies. During the 1980s and 1990s, the Forestry Plans record a lack of fulfilling this obligation. As the forestry engineers from the Vișeu Forestry Yard told me, they couple logging areas with areas in need of treatments and auction them together for logging companies to bid.

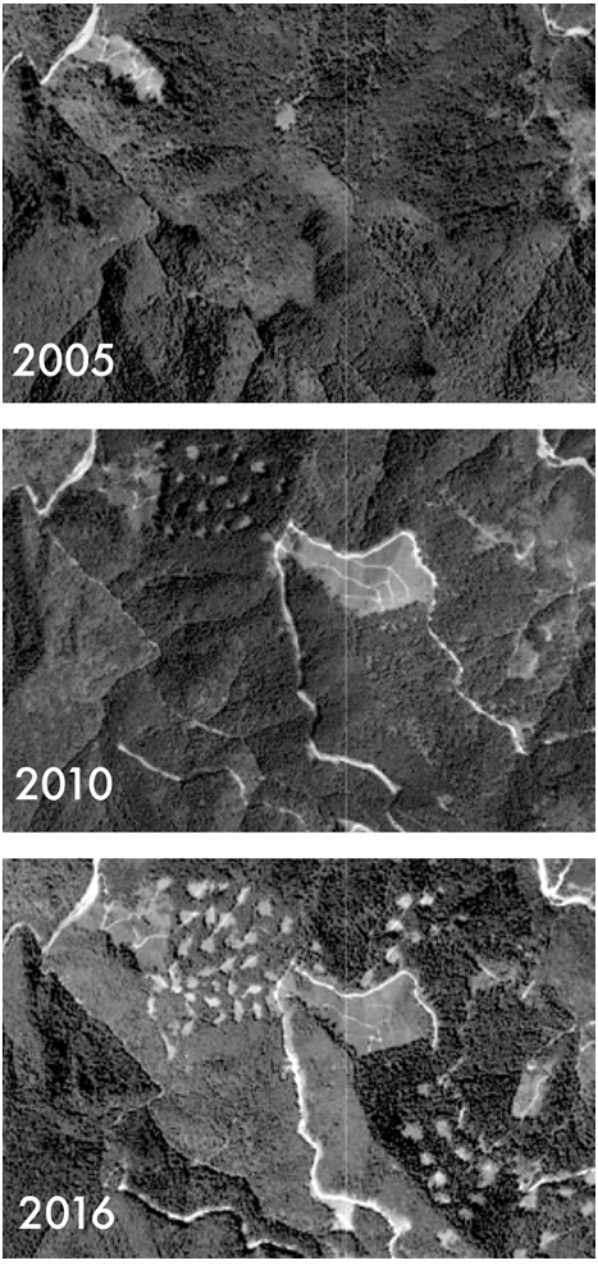


Figure 1. Spatially distributed logging surfaces within the legal constraint of not clear cutting more than 3ha
Source: Google maps

Manipulating the unpredictable accounts in the Forestry Plans for 'natural causes' like strong winds, pest attacks, avalanches, flooding, fires. While flooding, fires, and avalanches, that affected also nearby communities, not only the forest territory, were mentioned in conversations as moments that gathered all the people with a vested interest in the forest, strong winds and pest attacks were often grounds for disputes, suspicions, and mistrust. They particularly regarded the way an individual tree is seen in relation to the forest for the forestry engineer, and the environmental engineer. To the environmental engineer, a tree is part of the environment that the forest is in as much as it provides a home to other species, and from this respect a felled tree is first of all a home to insects and is integrated into the cycle of life of the forest. To the forestry engineer, a tree is part of the managed forest that serves the purpose of timber sourcing, and from this respect a felled tree is integrated into the cycle of production of the forest. While most fallen trees are seen as timber, ground conditions will decide whether the particular tree is engaged into the reproduction of the forest, and constitutes a life-bearing environment for seedlings. To relate to field experience, it was my impression that the experience gained within the forest gives forestry engineering the skill to identify with a glance of the eye the trees that are valuable for reproductive purposes with their neighbouring environment, and the trees that are valuable as timber as they belong to those monocultural groups that are seen as vulnerable to strong winds and have been felled by one such strong wind. Furthermore, the Forestry Plans record cyclical occurrences of strong winds, an information from the 'field' that is then integrated into the calculations of the fractal model of the forest.

Engaging with the Vișeu Forestry Yard the hierarchical structure of forestry engineering became apparent. Through the hierarchy, not only power is distributed, but most importantly trust. There is a huge amount of trust that goes in *operationalising* the forestry plan, as it becomes an act of entrusting faith to the people that know the forest on the ground in its details, the foresters and forestry engineers. Their skill resides in making the ground resonate with the plan and all legal requirements. At stake in their practice is negotiating the equilibrium on the ground, to which the equilibrium of the fractal model of the forest only serves as a guidance. Though the complicity of management structures (Herța, 2014) is necessary with regard to any illegal logging done in a managed forest, placing trust seems to be the most difficult thing to do in the current climate of anxiety generated by the recorded disappearance of the forest.

Conclusions

Throughout the paper I have shown how the forest is operationalised as an essential territory for planetary urbanisation through the inscription of a scientific rationality within a natural landscape. Using Isabelle Stengers' concept of the 'psychosocial constraints' attached to any scientific practice to analyse forestry engineering practices, both the practice of forestry engineers and the forest as a scientific object are made visible.

Forestry engineering emerges as a practice of manipulating the artificial and the 'natural' where the ground counts in its most intimate socio-natural aspects. The forest of the forestry engineers is already a disturbed forest, be it by 'natural' or human hand, far from the planned ideal optimum that nevertheless serves as a guiding principle. The manipulation of the forest through a scientific practice appears as a matter of responding to ground conditions. Questions of location, accessibility, attention to the life-bearing strata of the herbaceous layer, are aspects between which forestry engineers negotiate on a daily basis, in between the requirements set on the forest and the obligations inscribed in practice.

The forest emerges as a hybrid territory, inscribed with a bio-political rationality (Viganò, 2014) through the juxtaposing of different indexing according to property, to the accessibility of water courses, and to the differentiated functions placed on differentiated forest bodies. As it emerges, the matter of the protection of forested landscapes is a matter of ever greater specification of a territory that was constructed as it was mapped according to scientific requirements. Throughout the history of this construction, protection and production coalesce in the scientific imaginary, while they specify virtual and actual zones of protection and zones of production. Most important through this history, the emergence of non-productive forests with the 1978 Forestry Plan is made visible.

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