Making sense of breaks in landscape change

Hannes Palang · Anita Zariņa · Anu Printsmann

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Abstract

Context The paper studies the possibilities of how the cultural explosion theory and path dependence approach could be used for exploring landscape change. The former is an approach (not theory) used in humanities and social sciences to study the processes that happen when culture changes rapidly—how new cultural processes are created and how the past ones are integrated or forgotten. The latter is an approach developed also in social sciences, mostly economy, to study how the current decisions are dependent on the past decisions.

Objectives To demonstrate the possibilities the two theoretical approaches might offer.

Methods We discuss the ways landscape change could be analysed using, first, cultural explosion theory and, second path dependence approach, and demonstrate this on the example of the post-Soviet military areas.

Results Both approaches are indeed useful in understanding landscape change. The demo case on military landscapes allows for distinguishing three different development paths for the future of the areas: set-aside, active use, and neglect. Similarly three different ways of relating with the past are found: ignorance and oblivion; acknowledging the past; and making use of the past.

Conclusions Landscapes have time boundaries and these two analytical tools in fact help us to navigate through these boundaries, understand better the trajectories of change and the importance (or the lack of it) of the past.

Keywords Cultural explosion · Path dependency · Landscape change · Coping strategies · Post-Soviet · Military areas

Introduction

This paper is being written in spring 2021, termed ‘coronotope’ by some. The COVID-19 virus has effectively stopped most economic activities globally thereby creating a different scene. Social or more correctly physical distancing has closed factories causing trade chains cutoffs. Limited mobility has decreased regular traffic. International travel has stopped, which in turn has halted all tourism.

1 A paraphrase of Bakhtin’s chronotope, see Remm and Kasemits (2020) for more.
Agriculture struggles while countries bend their health regulations and mobility bans to import seasonal workers (and makes better profits than ever elsewhere). We do not know whether or when the ‘normal’ situation will be restored, and if not what would the new normality look like. It is a situation when many, if not all, future options are unknown and possible. Do we have theories or approaches to study these situations or even predict the possible directions for future change? How the ‘old’ is being translated into the ‘new’ and with what losses?

The question of how and how much should past landscapes be included in studies of the present is one that pops up every now and then (see e.g. Palang et al. 2005, 2011; Hernandez Morcillo et al. 2017). Antrop (2005, p. 21) argued that “the processes and management in past traditional landscapes and the manifold relations people have towards the perceivable environment and the symbolic meaning it generates, offer valuable knowledge for more sustainable planning and management for future landscapes”. While ‘landscape biography’ (Roymans et al. 2009; Kolen et al. 2015) suggests how this dynamical view of landscape history can be made operational in future strategies for protection, management and development, this paper goes a little further and explores the possibilities of two approaches in explaining situations like the current coronotope, one being the cultural explosion originating from the works of the semiotician Jurij Lotman and Grishakova (2009), the other being more historico-socio-economic path dependency (Mahoney 2000; Zariņa 2010, 2013). The former is an approach (not theory) used in humanities and social sciences to study the processes that happen when culture changes rapidly—how new cultural processes are created and how the past ones are integrated or forgotten. The latter is an approach developed also in social sciences, mostly economy, to study how the current decisions are dependent on the past decisions. Since dealing with the past, for example in landscape planning, is one of the core directions of the discipline of landscape, understanding the relation of people with the(ir) past becomes crucial, as no planning can start from a blank sheet (Luz 2000).

By definition, landscape is an area as perceived by people (ELC 2000). It is thought to have meaning to people and act as a storage and medium of national memory (Lowenthal 1986; Cosgrove 1998 and many others). Surprisingly, while many landscape researchers study the meaning and understanding of landscape, semiotics is very seldom used. Claval (2005) was amongst the first who explicitly pointed towards the possibilities semiotics can provide in studying landscape changes. He thought that geographers—landscape researchers—could borrow tools from linguistics in order to better understand the functioning of the landscape. In his opinion, landscape scholars “may rely on: (1) the dialectical relations between words and things at all stages of evolution (the naming of soil, plants, environments), the naming of the countryside itself; (2) the models of structural linguistics and generative grammars for classical forms of agrarian landscapes; (3) semiotics for the aesthetic and social readings which were so important in the religious fields of purely rural societies, or in the ideological ones for modern urban societies” (Claval 2005, p. 19). But he also warned that none of the tools provides us with a universal key for reading and interpreting landscapes.

Antrop (1997, 2005), in his search for traditional landscapes has found that there have been periods in history when the amplitude of landscape changes has been much greater than in calmer times in between. These turbulent times usually coincide with greater changes in the society that shake the established situation, such as the French Revolution, the industrial revolution, the world wars etc. He also points out that the concern for the quality of the changes has not always been there; he sees the first emergence of that concern only in the beginning of the twentieth century and the next one in the end of that century (Antrop 2005, p. 32).

However, not much attention has been paid to how these ‘breaks’ caused by these radical changes work (see for example Jepsen et al. 2015 discussion on Europe’s land-management regimes’ changes during the past 200 years). That landscapes have limits in time was pointed out already by the founder of cultural geography, Sauer (1925). According to him, nature is the material from which humans make the cultural landscape. Nature is material, culture is the agent, cultural landscape the outcome. He also stated that “Under the influence of a given culture, itself changing through time, the landscape undergoes development, passing through phases, and probably reaching ultimately the end of its cycle of development” (Sauer 1925, p. 46). The important conclusion
here is that finally every landscape reaches the end of its temporal development.

This idea was decades later elaborated by Cosgrove (1984) into a theory about each socio-economic formation creating its own landscape with its characteristic meanings, symbols etc. Antrop distinguished between two types of landscapes: traditional ones, where several human generations live in one landscape, and modern ones where one human generation sees many landscapes. From there, some scholars have tried to find the time layers of the past (Vos and Meekes 1999; Palang et al. 2006). Furthermore, Palang et al. (2011) noticed that the “fundamental difference between eastern and western European landscapes is that in the east one has to consider the political changes of the twentieth century, which all have left their imprint in the landscape” (see also Jones 1991).

While the twentieth century experienced globally violent periods, Eastern Europe saw turbulent times in Antrop’s (1997, 2005) sense where landscape developmental trajectories witnessed the end of cycles (Sauer 1925) with three ‘breaks’ in systems. One rapid turn after WWI when the Russian and Austro-Hungarian Empires disintegrated and instead a number of independent countries emerged; another during 1940s when socialist order was established and land mostly collectivised; and one in 1989–1991 when the communist system collapsed and private property was restored, with all relevant consequences (see Palang et al. 2006 for more). After each of these changes, the landscapes of the previous formation (sensu Cosgrove) obtained a different meaning, and they became valued differently with the time passing. One also notices that after some time people do not understand any more how that past landscape functioned (Widgren 2004). Thus, the landscape consists of time layers separated by ‘breaks’, which disturb the understanding of the functioning of a particular layer and one has to delve into time-space political, social, economic, cultural context of the time that created that very landscape (Jones 1991; Palang et al. 2006, 2011; Widgren 2012).

We have pretty good knowledge of how landscapes change during stable times (i.e. traditional landscapes in Antrop’s terms; see also Jepsen et al. 2015) but we need to know what happens and how it happens when the formation changes that seem to act as time boundaries. Here Lotman’s theory becomes handy. While Antrop (2005) explained this change mostly through functional terms (see also Widgren 2004) and Cosgrove (1984) through symbols, Lotman and Grishakova (2009) offers a semiotic glimpse. So this paper tries to explore whether and how these two approaches, cultural explosion and path dependency, might be useful in landscape studies, also in landscape ecology, to better understand some processes linked with the history of landscapes.

**Cultural explosion**

For cultural geography, the ability of humans to read landscape, i.e. treating landscape as a text or a system of signs, has been clear since at least the emergence of the ‘new cultural geography’ in the early 1990s (see Duncan and Duncan 1988; Daniels and Cosgrove 1993 etc.). More recently, the discipline of ecosemiotics has also risen, through the works of Almo Farina (Farina and Belgrano 2006), Kalevi Kull and many others (Maran and Kull 2014; Maran 2020; Kull and Maran 2022). The focus is, very broadly speaking, on how humans read and understand nature.

A model that might be useful in studying abrupt transitions in landscape could be found in a book by a semiotician, Juri Lotman and Grishakova (2009). Lotman does not explicitly study landscapes, instead he used the term cultural space. This space is experienced; humans have emotional ties with it and it has cultural significance. Lotman claims that each cultural space is characterised by a certain normative standard of behaviour and discourse.

Usually semioticians study the translation from one sign system to another. Lotman, instead, focuses on borders within one system, and the translation possibilities that the border creates, i.e. the continuity or persistence and the change of the system. Changes in systems are not always gradual: Lotman distinguishes between gradual and explosive changes. During the former, the transition from periphery to centre and vice versa takes place in a gradual way and existing hegemonic structures are replaced in a slow transition. During epochs of explosive changes, all the existing semiotic structures get shattered and there

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2 This section is largely based on Lotman and Grishakova (2009, originally published in 1992 in Russian) and Lindström et al. (2018).
follows an explosive growth of semiotic processes. Many competing new scenarios of development emerge at this point of disruption, only one of which finally consolidates and achieves the central position. In the same way, we can distinguish periods of gradual and explosive changes in landscapes, where in the epochs of explosive change a disruption with previous landscapes is produced. In such a way, the semiotic model of change allows for a description of dynamic non-equilibrium change processes, the outcome of which is not always dependent on ecological necessity or practical needs, but can be a result of religious, irrational, aesthetic semiotic values that hard science models cannot normally take into account (Lindström et al. 2018; see also Palang et al. 2011, but also Antrop 1998).

Lotman used the term semiosphere—inspired by the term biosphere—to denote the space in which meaning making works. Boundary is the most active zone of this semiosphere—it is something that separates ours and theirs, but at the same time functions as a translator between us and them. New semiotic and why not landscape structures could emerge only after these boundary mechanisms have been able to translate the strange structure into a language understandable and acceptable for the current structure. In this key landscape changes could be studied in a similar way as for instance the spread of innovations: something that crosses the boundary could obtain a whole different meaning, use or interpretation in the new structure—as distortions are an inseparable part of the translation process. As said before, there are time boundaries in the landscape and the translation processes also work there—how and what do we understand about other time layers?

This might have many implications on understanding landscape change, both in terms of handling the past and accepting the future. Concerning the past, Lotman stresses the importance of describing the links with the period before the explosion—only then that system could be understandable for the current one. However, this description cannot be done during the explosion itself, but only when the turbulent period is over. If this description—translation of the past into a language/sign system/landscape that is understandable for the current system—is successful, the past (landscapes) becomes part of the today (landscapes), if not, the link is lost (see Palang et al. 2006; Zariņa and Krumberga 2018). So, for instance, Applebaum (2003) claimed that collectivisation destroyed forever the links the Russian peasants had with their land. On the other hand, Viik et al. (2015) showed how the Estonian society, led by (nature) conservation and tourism industry, have managed to incorporate the Baltic German manors—symbols of hatred and foreign power in the late nineteenth century—into the current landscape ideal of Estonia.

However, one has to admit that this theory offers a very good conceptual framework for analysing the time breaks and landscape change, but fails to offer a clear methodical apparatus or a set of tools that could directly be applied to study.

**Path dependency**

For many years, historical geographers have wondered whether the path dependence theory can be useful in landscape studies. The concept originates from economics and social sciences (David 1985; Arthur 1989; Goldstone 1998; Pierson 2000) and has been used in geography mostly by economic geographers. So, for example, Martin and Sunley (2006) and MacKinnon et al. (2009) have studied the possibilities of path dependency to understand the role of social factors and institutions in the process of regional development. It has been successively applied also for rural studies (e.g. Clar and Pinella 2011; Wilson 2014), analysing community ‘lock-ins’. In landscape studies the path dependence approach is not used that often. The few examples include Orderud and Polickova-Dobiasova (2010), Zariņa (2010, 2013), Meyfroidt (2016). In a recent review paper Tappeiner et al. (2021) discuss the path dependence theory for understanding landscape pathways in the framework of landscape ecology.

In landscape research the attention to causal complexities to understand landscape change process, involving the notion of events and/or various contingencies has been out of focus, due to the reluctance, as Zariņa (2013) argues, to seriously engage with social and economic theories. However, the reconstruction possibilities offered by path dependence approach could become important in explaining why landscape has developed in one or another direction and what kind of causal relationships and what sort of circumstances have determined the landscape outcome within the studied time span. By using the path
dependence theory, it is possible to understand processes, where landscape is created by a complex interplay of necessity and chance and by social practices. Path dependence theory activates discussion about temporal and chronological time frameworks and the role of contingency in the context of landscape change and stability. Even though it does permit subjectivity in a researcher’s interpretation of landscape change, it is at the same time open to the participation of the local inhabitants in the creation of a landscape narrative and locals’ contemplation of change. Moreover, this approach allows the incorporation of more-than-human actants (e.g. Allen 2011) in the interpretation of a particular landscape pathway, for example, in understanding how landscape change trajectories can be caused by unexpected encounters, cataclysms or persistent cultural or socio-economic materialities.

How does path dependency work? Simply put, path dependency is used for explaining the sequences that are marked by relatively deterministic causal patterns and that the outcome of a sequence cannot be predicted by looking at the initial conditions alone (Mahoney 2000, p. 511). There are particular historical sequences that can be explained only in terms of path dependence, in which, according to Pierson (2000, p. 263), the earlier parts matter more than the later ones.

Mahoney (2000, pp. 508–509) distinguished two dominant types of sequences, based on the nature of path-dependent systems. First, self-reinforcing sequences characterise the formation and long-term reproduction of a given institutional pattern, and second, reactive sequences describe chains of temporally ordered and causally connected events. From a landscape point of view, as Zariņa (2013) notes, by the former we describe the fixity of practices, while by the latter the particular development of (or changes in) landscapes. Thus, one could say that path dependence in landscape is about the eventuality that can have either unique character—taking place once and setting into motion a particular chain of events, or eventuality having ordinary quality, events that repeat over time, but not having less importance as the everyday landscape forming practices.

While studying the history of landscape changes through the path dependence lens it is necessary to deconstruct its development into the following aspects:

- Reactive sequences—what are the mutually related events that have led from one event to another; when such sequence might have begun (were there those so-called initial conditions that could have predicted such outcome); was it unavoidable?
- Self-reinforcing (institutional) sequences—what are the practices that form and maintain a landscape? We might find many institutional linkages to such landscape formation, for example, landlord and peasant mutual relationship that had their expressions in landscape (specific land uses—no forests, farm location etc.), inheritance institution, land management practices etc.
- The outcome of the sequences, i.e. the present-day landscape.
- Path dependence estimation—how dependent we are. According to the theory, once a path-dependent sequence has started to run, it has certain inertia (some kind of movement velocity, direction), it is determined.

The epistemological challenge here is to investigate and estimate the degree of path dependence of a landscape—is it the early stage of a determined pathway or a firmly established pathway, which requires a strong intentional agency to break up with the path; or is a landscape path-dependent at all. In the context of the latter, Mahoney (2000) proposes using comparisons with other cases and general understandings of what is historically possible. That would suggest the broader understanding of landscape development (the horizontal perspective) in which one can determine: (1) the landscape’s presumed initial situation (environmental conditions, geographic location and the socio-political, historical background); (2) landscape’s periods of radical socio-political change and adaptation; (3) breaking point(s) in the landscape development trajectory.

Whereas for the landscape’s path dependence properties, event and effects of institutional and/or sequential inertia (the vertical perspective) is in the focus, which directly or indirectly determines the radical breaking stages in landscape development and/or institutional succession paths influencing landscape form and social functions (Zariņa 2013).

Is path dependence at landscape level a negative outcome in terms of landscape development? Tappeiner et al. (2021), drawing on the economists’ analysis
of eventually inefficient long-term reproduction of an institution and sociologists’ analysis on lock-in effects point out that at landscape level socially and culturally produced lock-ins might have positive, but, in terms of ecological sustainability, it more often has rather negative effects. Indeed, path dependence can be accountable for many of the valuable heritage landscapes, however, in terms of social and ecological resilience such deterministic pathways might not be, as such, positive.

The strong point of path dependence is that it demonstrates: how small changes can produce large downstream consequences; the lock-in mechanisms and effects in praxis and mind-sets; the interplay of different actors and factors; opens space for the participation of locals in narrative-type explanation. At the same time, the wide interpretation space can be considered as a weakness of the approach. It provides a set of qualitative explanatory models for analysing and overcoming causal complexity (see Mahoney 2000; Zariņa 2013; Wilson 2014; Tappeiner et al. 2021), but there is the threat for a generalisation and soft interpretations that “past influences future”.

A demo case: the end of the Soviet military landscapes

Let us explore the analytical possibilities of these approaches on the example of former Soviet military areas in Estonia and Latvia—the last two ‘breaks’ of Eastern Europe of the tumultuous twentieth century, focusing on the last one. Their 55 years long existence has been compared to an alien visitation (as one informant in Palang and Rammo (2021) described; a hint to the novel Roadside picnic by the Strugatsky brothers and the movie Stalker by Tarkovski). Both the appearance and disappearance of these landscapes could not be predicted by the inner development logic of these landscapes, but rather coincide with much larger societal processes—that could well be called explosion in Lotman’s terms.

The first Soviet military bases in the two countries were created in the autumn of 1939, about a year before the occupation and weeks after the Soviet government had ultimately demanded that the Estonian and Latvian governments allow for Soviet military bases to be created. The last troops left in August 1994, three years after the countries had proclaimed re-independence and all political agreements had been reached. For the purpose of this paper let’s leave all politics aside and focus on the landscape issues.

The creation of military bases originally on a foreign turf foresaw their autonomy. These were separated from the surroundings by high and impenetrable fences; access was granted only for the military personnel. Contacts across the fence were kept minimal. Buildings and infrastructure within the fence were kept as autonomous as possible, without major (local) interference from the outer world.

The decision to withdraw the troops ended this isolation and from the path dependence point of view it served as the trigger of further events. When the troops left, the bases were handed over to Estonian and Latvian defence forces. The upkeep level of the bases was very different—some were handed over in full order, with flowers in vases, some others were torn apart and everything that was thought to have any value was loaded on evacuation trains. However, the idea of what to do with the areas that laymen had no access to for around 50 years was not clear—all scenarios possible, as envisaged in models both by Antrop (1998) and Lotman and Grishakova (2009).

From there on, three different development parts could be distinguished. First, many of those former military areas were set-aside in almost as-is condition. Most often these are areas that were used as training grounds or coastal areas that were declared a border zone and where therefore both access and pollution were relatively minimal and all development was hampered were fairly well suited for nature protection areas or even as nature reserves (see Krumberga 2022) (Fig. 1).

Second, some former installations have found active use. Sometimes Estonian or Latvian armies have found use for some of the bases; some are used for industries, but most often real estate development has taken over, especially in the vicinity of bigger towns (Fig. 2). In Estonia, examples of these developments are shown by Kasemets et al. (2019) and Palang and Rammo (2021). Moreover, the new building of the Estonian National Museum in Tartu is

3 But this very minimal interaction (boundary functions as a translator in semiotics) over the border was important both for locals as well as for military personnel. They had to seem autonomous but they were not. Majority of the stories next to bases are like that of helping/hating each other.
Third, and the most common option is neglect. Large majority of the buildings have found no use whatsoever and are left for decay and nature to take over (Fig. 3). One can find ruins and barbed wire in sometimes quite unexpected places and then trace their origin back to some former military installation.

Similarly, there seem to be three strategies for dealing with the past. As Lotman argued, in order to make the past talk to us, become part of our (current) landscape, we have to describe it and make the link...
to it, to make the past landscape understandable/readable (Palang et al. 2006).

The first strategy applies when this link is not created—ignorance and oblivion take over. It is nobody’s or somebody else’s past, the ruins are there to mar the landscape, the sooner they are torn down the better. Or, alternatively, let nature take over, without human interference. All meanings and stories are forgotten and eventually lost.

The second strategy implies acknowledging the fact that the military past is there. There are still people alive for whom these bases were everyday reality, who remember how the system worked, and who are still able to describe to others the system and thereby create link for the younger ones. As one informant in Palang and Rammo (2021) put it: there is always somebody who remembers the past, is able to keep the memories alive, perhaps even participated in the making of that landscape. People are aware that the past is there, it has become part of their everyday life and they do not bother too much with what was there before.

The third strategy would involve making active use of the past to make the landscape more attractive. The biggest obstacle here seems to be that landscape change has inertia. Former emotions, meanings, etc. that are connected with landscapes cannot be erased momentarily. The military landscapes (as the whole Soviet layer) are value-laden. It takes time to forget and reconcile and it takes time for new meanings to arise. In many other countries abandoned military structures have been turned into tourist attractions (such as Waterloo or the sites connected to the war for liberation in 1919–1920); here the inertia of the Soviet past is still too fresh to allow for this.

Post-Soviet-military landscapes are an interesting case in understanding the framework of path dependence theory. First, from today’s perspective all the post-Soviet-military landscapes are path-dependent, at least to some degree, as they have been created and recreated by a puzzling interplay of necessity and chance—the placement of the military installations and post-military transformations did not follow the logical development of the landscape, but rather some contingent outside decisions, although sometimes they replaced some other military structures from earlier times. This contingent event for specific places and landscapes—a decision to create a military space somewhere—starts a path-dependent reactive sequence, characterised by inertia movements that includes both institutional reproduction of military practices and reactive chain of events (e.g. relocating locals, disturbing and changing local ecologies by training practices). But it also entails diverse and unknown futures of the places and landscapes, when the path-dependent practices or event-chains are stopped by, once again, contingent events happening within the larger political breaks, in this case,
the Soviet Union collapse and withdrawal of military forces. Meta-theoretical explanation models, offered by sociologists (e.g. Mahoney 2000), also interpreted in landscape contexts (Zariņa 2013; Tappeiner et al. 2021), use utilitarian, functional, power, and legitimation explanations to understand the mechanisms of institutional reproduction (continual militarisation of places, inertia) and change (for example, the possibility of breaking up with the militarisation of a place). To break up with a path-dependent institution, according to the aforementioned explanation models, a complete derangement of these mechanism is required. The idea here is that path-dependent development is moulded together by the interplay of these four dimensions or frameworks—power (who has the control over the territory and access to infrastructure, how strong are the power relations between involved actors), legitimation (land tenure issues, customary legacies, the questions of right and wrong in reference to history and contemporary uses of places), utilitarian (rationality of actors in terms of cost-benefits to keep up with or change the institution), and functional (the places and institutions are cog-wheels in larger systems and mechanisms). Due to the geopolitical events, the pathways and institutions of military places and landscapes are in many cases strongly shattered, in some cases even broken down completely. But bits and pieces are still there—built military structures, memories and meanings, military pollution, restricted access, changed ecologies, complex land tenure issues etc. Their further development pathways may differ (for example, the three strategies described above), but still, some sort of specific futures are for them depending on the contingencies potentially taking place.

Two twists here. First, Wylie (2007, pp. 4–6) distinguishes between two approaches in studying the very concept of landscape. One, developed by Anglo-American cultural geography, sees landscape as something observable from afar, an aesthetic category. Another, departing from phenomenology and semiotics, sees landscape as inhabitable; we not only observe the landscape from afar, we also act and live our everyday lives in it. If one at all could take this distinction word-by-word, the development path of the military bases illustrates this to the point. An outsider was only able to observe the base from afar, without ever having an access to it to get closer. An insider—the soldier—was inhabiting it. Now that distinction is gone, and we have to find a new meaning for all this.

Which brings us to the second twist. Heritage is something that we value from the past. Not all from the past is or should be valued. As Jones (1991) pointed, cultural landscape—in the applied sense—is the valued features from the past. Through meaning-making—that happens constantly, but more intensively during these explosions—we are able to select between what becomes heritage and what does not. A culture could be called sustainable when it is able to absorb elements from other cultures, claimed Viik et al. (2015). Whether we can re-make the meaning for us of the Soviet military legacy decides how much of it will be incorporated into our heritage (our to be defined). Tourism, both internal and international, seems to work as the selector here.

**Discussion and conclusion**

So: are cultural explosion and path dependence theories useful in studying the past of landscapes? Landscapes have time boundaries and these two analytical frameworks help us to navigate through these boundaries, understand better the trajectories of change and comprehend the importance (or the lack of it) of the past. Path dependence approach seems usable for explaining different development paths of landscapes, including how they have gone through major changes, but in particular, how they relate to contingencies and conjunctions in relation to choices that actors make. Cultural explosion, on the contrary, helps to communicate bigger paradigmatic changes, realise the changing meanings of the landscape, translate meanings from one system to another—helps in making sense of the past and creating heritage.

The problem here is that cultural explosion especially does not offer a toolkit for analysing concrete landscape case studies so much but path dependence theory lends itself more easily, as Zariņa (2013) has shown. Rather, they work as a thinking aid/device on how to approach abrupt changes and help addressing/answering the central question of this special issue: lack of the methods to grow middle range and general social theory itself—case-based and regional scale studies of the social dimensions of land use, but few general concepts have been derived from them.
At the same time, the two approaches have common points as well. The explosion can be seen as a contingent event that triggers change that might have either institutional or sequential inertia, while the path dependence approach allows one to understand the nature of the landscape change process and to distinguish the development paths or trajectories, which are characterised by matters of chance: the initial situation and the confluence and the sequence of events. We suggest that the lag time needed for description in Lotman’s and Grishakova (2009) cultural explosion is called institutional reproduction or inertia in path dependence. For landscape ecology, of interest could be the framework of explanatory models used in path dependence analysis (see also Tappeiner et al. 2021; van Rooij et al. 2021), as well as the idea that path dependence narratives and explanations can also be easily communicated to local people thus making it an activity for public participation, awareness and deliberation.

What about the idea that not everything historical may be valuable, especially at different stages of the future, but some part we could value, because it shows history? An interesting example of creating links with the past is how landscapes were used in celebrating the 100th anniversary of independence in Finland, Estonia and Latvia (Printsmann et al. 2019). The anniversary inspired the countries to look back at their heritages and make a sort of selection. While Estonia and Latvia seemed to ignore one layer—the Soviet one—Finland brought forward some of its more contested landscapes, such as the Sami heritage or the civil war landscapes, both so far studied only from the winners’ point of view. In these celebrations the landscape was still more visual and less participatory, but still a clear attempt to link the past(s) with the present.

In the wider context, both cultural explosion and path dependence approach fuse well with landscape biographies. All three are wider approaches rather than concrete methodologies with their own specific toolkits (although path dependence is much closer to have one), all are useful for *longue durée* (sensu Crumley et al. 2017) changes in landscape, complementing it with guidelines on how to study specific turning points. It seems that explosive processes ensure the spread of innovation, while gradual processes support succession. There are already first steps done on this path (e.g. Shakespeare and Russell-O’Connor 2021). In this sense the belt from Finland to Albania could be considered a living lab for studying these *longue durée* changes—how will the layers and breaks/ruptures in landscapes seem so important today be described in 100 or 200 years’ time? Will they still stand out as separate entities or have they fused into one another to create one bigger (explosive) layer of change? This is exactly what the cultural explosion approach asks for—one cannot describe the changes during the explosion itself, but only when the explosion is over and the dust settled.

Twenty years ago Cosgrove (2003) lamented that there are two discourses in landscape studies—semitotic and ecological—that sometimes even do not understand each other. At the first glimpse it seems obvious that the approaches discussed here—especially cultural explosion—would further one of these discourses. In fact, they both fall well in line with the numerous examples of wider approaches to studying landscape change that have emerged since the Cosgrove’s paper—be it (cultural) ecosystem services (Plieninger et al. 2015) and its follow-ups into landscape services (Fagerholm et al. 2019; Keller and Backhaus 2019) and nature’s contributions to people, promoted by IPBES (Brauman et al. 2020). Better understanding of the past—i.e. creating links, understanding the drivers that created the past landscapes and incorporating the past meanings and values into present-day landscapes would also help towards achieving cultural sustainability of landscape, as explained by Soini and Birkeland (2014).

Following the same line, there seems to be an emerging understanding that climax thinking (i.e. thinking that a landscape is ready and no changes are needed) and not place attachment or NIMBY that influences the resistance to changes, as Chappell et al. (2020) explain.

Does path dependence and/or cultural explosion provide some clear toolkits that could be used for landscape analysis or planning? Not yet. Cooperation of landscape ecology with semiotics in general might help in explaining how borders work in landscapes—for example, how the predominantly urban population relates to the countryside, which for them is also behind a ‘time-barrier’, and creating a link here is similarly important. Path dependence approach to landscapes can offer an analytical framework to study how decisions made today start influencing the development ‘downstream’. But as well, if addressed,
it opens something that we could label as landscape ‘black box’, which in the circumstances of a ‘crash’, metaphorically speaking, would reveal landscape’s social complexities, namely, how, for instance, power, legitimacy, functional and utilitarian aspects penetrate landscape dynamics. The cultural explosion approach would perhaps not provide a key to planning futures, but rather helps us to understand, accept and appreciate the past, and through that influence the planning. The path dependence approach, on the contrary, could be developed into a framework that adds to the current debates on landscape transition and pathway analysis. Drawing on the notions of contingency, conjunctures, inertia, eventual inefficiency, lock-in effects, mechanisms of reproduction, path-dependent logic and alike would bring a new dimension to the social aspects of landscape dynamics. Detection of a path-dependent institution at landscape level, be it protection regime or agricultural practices, would provide an essential toolkit to steer landscape management and change into a direction that complies with the sustainability goals.

What could landscape ecology yield from these two approaches? A better understanding of how culture (and the social) relates to landscape patterns, processes and design. Landscapes, by definition are the result of the action and interaction of natural and/or human factors, and there is no such thing as non-landscape. That people have not just created artefacts in the landscape and then left, but they are still there, inhabit it and create new meanings. That this meaning-making is an on-going process that might have different speed in different periods. That these meanings influence the way people value landscapes, and this valuing is expressed in patterns and processes through management. That landscapes have a past—there have been decisions made in the past that influence (and sometimes determine) our decisions today. That landscapes also have a future: some decisions we make today might determine the development path of some future landscape; and the better we understand how and why a landscape functioned in the past the better we might be able to communicate about the values and services.

Finally, one issue landscape ecology could focus with the help of these approaches is how the COVID-19 situation will be recorded in the landscapes—and there is some research already done in that direction (e.g. Pikner et al. forthcoming). That said, we still support the idea of cultural psychologist Valsiner (2018) that while Lotman’s and Grishakova (2009) model suggests to live ‘off the past’, it is important to live ‘towards the future’.

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