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Establishing Boundaries: A Conceptualisation for the Comparative Social Study of Built Environment Configurations

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Abstract: It is readily acknowledged that the configuration of a built environment is shaped by the outer lines of the features it consists of. Yet, these boundary lines are not typically utilised in our theorisation of the built environment to further our social understanding of it. Studies of the built environment often originate in the study of cities: their most elaborate form. Rather than starting from conflated characterisations derived from urbanism, this paper presents a theory for studying built environment configurations by asking how they occur and how society is accommodated by them. This leads to two series of concepts (human being in the spatial world, and human being in the social world), which establish that boundary concepts are essential to the social study of built environment configurations, while they also retain the generality needed to enable comparative research.

Keywords: Built Environment, Boundaries, Urbanism, Sociality, Theory, Time

Introduction

EVER SINCE HUMAN beings settled we have been living in environments that are at least partly of our own making. The apogee of these built environments is reached in cities. In our rapidly urbanising world, it is easily forgotten that the processes of building cities have been ongoing for millennia. Popular definitions of the city tend to neglect the processes developing them spatially. Instead in the history of thought on cities there is an emphasis on what characterises or determines a city, including historical and archaeological work (e.g. Wirth 1938; Childe 1950; Wheatley 1972; Fox 1977; Graham 1999; Arnade et al. 2002; Smith 2008; Fletcher 2009; Joyce 2009). We look at the physical layouts we inhabit without asking the essential question of how they occur and how society is accommodated by them.

This paper offers an experiment in thought and conceptualisation that comprises a first step towards the comparative study of the built environment as a product of the continuous formation of space by human beings. As it is conceptual, it is, naturally, limited to relatively abstract configurative spatial information only and relies on a wide interdisciplinary background. Its premise is that cities are local historical contingent processes, which are constituents of the development of society (cf. Pred's (1984, 1986) theory of place as an historically contingent process, and Joyce's (2009) identification of a reading of urbanism as emergent from social relations). How could we study the spatial information derived from purpose-built urban configurations in order to understand their significance for the way society develops? That is to say, how does spatial layout play a role in the development of society and how does a given spatial layout accommodate its residing society? This paper introduces two series of conceptualisations, the aim of which is to provide a solid theoretical foundation

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that informs comparative research on urban built environment configurations. They tackle respectively human *being* in a spatial world and human *being* in a social world. From the insights the perspective following from the conceptualisations provides, it emerges that a focus on boundary concepts is both a viable and appropriate way forward for studying built environments comparatively.

The Unsuitability of Previous Work

While socio-cultural expressions of the built environment have been the subject of differing research efforts, the study of the constitutive role of social interaction within site layouts lacks a critical theoretical conceptualisation of the socio-spatial significance of the built environment. In archaeology there is a long standing assumption that the spatial configuration of built environments reflects social values and meanings. Research has been led by both the tacit idea that our being is necessarily spatial, so spatial organisation must reflect social organisation, and highly interpretive assertions about belief systems or direct analogies with ethnohistorical sources (see Carmack 1981; Fox 1987; Šprajc 2000; Ashmore & Sabloff 2002; Atkin & Rykwert 2005; for critique see Smith 2005; Smith 2007). Archaeological discourse on built environments may be criticised for under-utilising and under-theorising the value of the spatial information which is readily available from its 'silent' material remains. However, contemporary research is equally uncritical when it comes to spatial layouts.

Functional, architectural and sociological approaches to built environment layouts suffer from aspects of conflation, as originally noted by Lynch (1981). This conflation is often a confusion caused by using interpretive information outside of analytical limitations to infer the outcomes of analysis. In the complexity of urban studies this usually results from poorly defined research objectives (see Tilley 1967; Kropf 2009), but can also be found in the form of confused data presentation (Rutte 2008). Lynch (1981) referred to the immediate interpretive assumptions with regards to the meaning and function of spaces. In archaeology there is an inherent risk in interpreting space on the basis of information derived from other material remains, e.g. artefact information. As such it is not the spatial characteristics or configurations that are studied, but a conflated interpretation that is projected onto a spatial record. This research practice, focusing on the spatial visualisation power of GIS instead of spatial analysis, is apparent in typical applications of historical GIS (e.g. Jensen & Keyes 2003; Gregory & Ell 2007). Here the spatial distribution and occurrence of assumed categories and concepts are simply plotted on various maps.

In contrast *space syntax* is a well-known methodology which specifically focuses on studying spatial configurations as a dimension of social life (Hillier & Hanson 1984; Hillier et al. 1987; Bafna 2003; Pinho & Oliveira 2009). However, on closer inspection it focuses virtually exclusively on the use and reaction to the communication of space. Similar to architectural communication theory (Rapoport 1982; Smith 2011) space syntax suffers from a lack of knowledge about spatial cognition (Bafna 2003). Contradictorily it then favours the quantitative metric opportunities for analysis, e.g. axial maps, edges, vertices, over creating analytical units that follow directly from the asserted human and social conceptions (Pinho & Oliveira 2009; Vis 2009). As such current space syntax approaches offer probabilistic models which are incapable of creating an understanding of the socio-spatial significance of built environment configurations in the development of society. Alternatively, *urban morphology*'s primary objective is to construct a history of urban form most forcefully put forward

by Conzen (1960, 2004). This has also become important for developing preservative planning strategies (see Whitehand 2007), although the adaptation for historical conservation is argued to be not yet complete by Samuels (2010). Recent years have seen increasing interest in integrating existing approaches to study the built environment (e.g. Kropf 2009; Pinho & Oliveira 2009; Griffiths et al. 2010; Whitehand 2010a), but due to its specific purpose this paper takes yet another direction, which chimes with Whitehand's (2010b: 361) remark that "the development of further specialities remains an integral part of the expansion of knowledge."

In order to understand built environment configurations as emergent products that accommodate the human formation of space through time, a different set of concepts needs to be formulated. These concepts should be appropriate for the human and social research objective and directly relatable to the type of information available, i.e. outlined spatial layouts.[1] The series of theoretical concepts that follow will allow for the appreciation of boundaries in the built environment and the construction of the missing link between a socio-spatial understanding of the built environment and spatial data sets. Indeed, as such the theory presented in this paper is the first step in constructing what could be called an empirical theory, in the sense proposed by Smith (2011): the connection between high level theory and empirical application. The conclusion that boundaries incorporate this potential follows from asking what the role of space is in our being and how it accommodates our social lives. If the built environment is a world filled by human made boundary partitions, how did this occur and what does it signify to living in that environment? In a recent discussion on the study of territory as a topological category Elden (2011: 306) argues that "there is definitely agreement that the approach to be taken should emerge from the questions asked, rather than being defined in advance." As a consequence the conceptualisation here sets the agenda for future attempts "to allow the object of analysis [boundaries] to dictate the way in." Elden (2011: 306)

Series of Concepts

The two series of concepts that will be presented below pertain to an *a priori* understanding of being human (for a full treatise see Vis 2009 on the 'axis of human space') reasoned from the bottom up. It presupposes the human necessity of a world to be in as formulated in the existential philosophy of Heidegger (1972) and the anthropological idea of embodiment, which assumed persuasive presence through the practice theory of Bourdieu (1977; Low & Lawrence-Zúñiga 2006). In addition, it is acknowledged that the physical and temporal condition of having a body means we occupy time and space as argued in the time-geography of Hägerstrand (1975; Pred 1977). Furthermore it embeds these ideas in the wider realm of the action theory of Von Mises (1998), which includes the idea of individual subjectivism and self-referential understanding of the other. An important premise is that human beings act by being there, which therefore comprehends the choice not to act. Von Mises' action theory in turn has heavily influenced the constitutive phenomenology as proposed by Schütz (1967), which focuses on acquiring a social experience and lived experience of the world. The phenomenological bi-implication of man and world (see Ingold 2000) centralises inter-

[1] This restriction to the outlines of spatial layouts results from the aim to allow for comparative work through time and therefore the use of the typically coarser detail and more fragmentary nature of archaeological data.

pretive human science around our embodied perceiving and experiencing being. We start by placing this perceiving, acting, and experiencing socio-spatial human being in the world. For heuristic purposes this thought exercise is divided into human being in the spatial world and human being in the social world, which will create a better understanding of why the two cannot be separated.

Human Being in the Spatial World

Empty Space

In order to appreciate what the built environment signifies it is a logical step to start building theory by assuming a world that is completely empty.[2] Emptiness can commonly be imagined as implying there are no confines whatsoever to and within any space we would be in. Such a notion of empty space remains abstract as being in space would refute its emptiness. Ingold (2008), taking after Gibson (1979), explains that the absence of textural differences creates the perception of an empty void. None of the surfaces we normally perceive are present. Thus, emptiness is boundlessness: a void in which nothing exists. With no surfaces to experience empty space would be unintelligible. It goes beyond the human condition as embodied being in the world, continuously perceiving and experiencing encounters with that world. As Ingold (2008) puts it, we inhabit the world. An alternative way of thinking about emptiness is to imagine a world unaffected by human presence. For this type of emptiness I use the concept of primordial space.

Primordial Space

The notion of primordial space principally remains an abstracted perception of the world we would encounter if it remains unaffected by human presence. Yet it would contain everything we would otherwise perceive and experience. This idea is close to what Ingold (2008) calls the 'as if' world. Such an 'as if' world also encompasses the imaginary assumption that the physical properties of the spatial world we have experienced remain in existence when we are no longer there to experience them. Primordial space is imagined, but includes all the features that set the scene for potential habitation (cf. Gibson (1979) on the 'furnished environment' and 'affordance').

We could tentatively exemplify space that is unaffected by human presence. Primordial space may resemble the landscapes we regard as wild and natural or not cultivated and inhabited by human beings (cf. Deleuze 1984), not unlike the world's great natural reserves. One should be careful with this assumption as what appears wild and untouched is typically a partial illusion. However, the fact that we may not recognise any human presence by the apparent absence of (traces of) physical transformations makes the primordial world imaginable and intelligible. Lived embodied experience creates an understanding of opportunities to use and interact with the world's physicality and resources. Regardless of the (past) presence of others primordial space could accommodate Ingold's (2008) 'life in the open world'. Ingold explains that the world and all it contains is in continuous flux, a world entirely

[2] It is acknowledged that emptiness can be a philosophically laden term, but instead of pursuing a deeper investigation of its metaphysical traits an appeal is made here to consider emptiness by analogies to the imagination.

composed of comings and goings, which we get to know through lived experience (life paths) rather than static, exiled viewpoints.

Our ability to appreciate and understand the world through the opportunities for habitation will remain an important notion throughout this series. Understanding the physical need for protection and survival Appleton (1975) proposed an evolutionary prospect-refuge theory for assessing the aesthetic appreciation of landscape. In theory primordial space could be appreciated in this way before any human transformations take place. By experiencing 'life in the open world' we started using caves as dwellings and gathered fruits of the land for subsistence. There are opportunities to inhabit the world to various extents without the need to physically make it habitable. The process of experiencing primordial space would entail constructing conceptions resulting from recognising textural and spatial distinctions (see Gibson 1979). We can imagine the abstract notion of primordial space by excluding the effects of human presence in space, while retaining our essential ability to perceive differences and experience opportunities associated with them. In human life it is through experiencing the spatial world as indistinct or equalitarian that we encounter the idea of emptiness.

Equalitarian Space

Equalitarian is used as the qualitative description of the experience of the spatial world as continuously indistinctive by repetitions of the same. Equalitarian space is therefore related to empty space in the sense that repetitions of the same occur to our entire perceptive horizon. In equalitarian space there is essentially a binary difference of delimiting equal things that repeats itself in a constant rhythm. When equalitarian space occurs in the primordial world its scene of features would appear to us as a sensory limitless stretch of repeated equality (there is some similarity to Gibson's (1979) open environment). True equalitarian space is as abstract as empty space and therefore unlikely to exist. One could, however, imagine examples that come close.

Taking after Ingold (2008) and Gibson (1979) one could imagine being on sandy plain, a level surface of sand that stretches as far as the eye can see, under a cloudless sky. Such a space does not inhibit life and interaction per se, but it offers no features to enable inhabitation. We can only identify all as an equal distinction: an endless body of sand and an endless stretch of sky. This would leave us uncomfortably perplexed. It may appear as simplicity, but such a world would be beyond comprehension because we cannot distinguish anything in it and establish our own relative location. Complicating the example the surface of sand can have relief: hills and slopes. We can distinguish one hill from another through perception and experience. However, the endless, equal repetition of similar hills will still entail the same limitations as before. Orientation would be hard if not impossible. Another example of this could be a dense pine forest. Despite the opportunities offered by trees, the environment would remain largely unintelligible. All trees would be similar and we would be confused by its repetition. In a humanly constructed environment the same might occur, e.g. endless stretches of similar fields or an urban environment repeating buildings to our horizon. Despite being characterised by a primary distinction equalitarian space is unintelligible.

In the world we encounter, the heterogeneity of repetitive landscapes composing a homogeneous space that appears empty is typically a temporary condition. We expect that by moving in any direction we will eventually reach differences in environment and, when visible, celestial bodies help navigation. If we would start inhabiting primordial space this

is how we would expect it to occur to us. Since we not only occupy space (as in time-geography) but inhabit the world (cf. Ingold 2008) observation and interaction will allow us to get to know primordial space in all its complexity. The occurring distinctions composing that complexity allow inhabitation.

When we start inhabiting and thus interacting with and experiencing primordial and/or equalitarian space we both recognise the relative habitability as well as the ability to modify our environments. It is through this lived experience that their physical properties become intelligible regardless of the presence of other people.

Marked Space

Marked space entails the modifying effects (deliberate and involuntary) of our lived experience of space. While most equalitarian space would probably start showing instances of recognisable distinction on closer inspection, our physical presence in space leaves traces itself. Moreover, if such instances of distinction are too few or too concealed we may use our body to interact with the physical properties of the environment and modify it to mark our presence for future reference. These traces and modifications, or markings, will enhance the intelligibility of space previously unintelligible and unaffected by human presence. Marked space is determined by the introduction of further (contextual) distinctions to the physical properties of the spatial world, like carvings in tree barks or flattening earth and cobbles into paths.

By marking space we introduce lasting physical effects to the processes of formation (see Ingold 2008 on fluxes) that are already ongoing in the world we encounter. In some ways marked space is only a transitional concept. Marking implies that we modify or enhance the distinctions that are already there or leave traces on surfaces involuntarily. Marking space is not yet the full transformation of physical properties to create distinct subdivisions ourselves. The traces left by e.g. a camping ground we would probably perceive as a continuous area of past human presence. On the basis of scattered marking we may subjectively project dividing distinctions in space. In this sense marked space conveys only the start of a process by which we 'fill' space previously unaffected by human presence.

Both by recognising and making distinctions we introduce intellectual markings which fill the environment we inhabit. Without understanding distinctions and the markings that enhance or introduce them it would be doubtful if human beings could function in a spatial world. Distinctions are as diverse as the properties which allow for their sensory recognition and the methods we have to mark or modify materials. All distinctions originate through the simple processes of perception and experience which results in conceptual constructs which become anchored in our knowledge (see Schütz 1967). In this way lived experience builds up a stock of knowledge, which consists of distinct elements of things that occur on our life paths. The appreciation of our environment on the basis of recognising distinctions is a continuous subjective process while not withstanding that also without our presence the world is not a static place, but in continuous formation. We introduce human processes into the world by living and acting (participating) in that spatial formation (see Ingold 2008).

Filled Space

Filling space is the complete process of making space both intelligible and habitable. Filled space refers to the idea that the physical properties of the spatial world are fully transformed

by human interaction with the material environment. As such it is merely an extension of marked space. Marked space occurs in a space otherwise unaffected by human presence, making use of its already existing properties. In filled space its physical properties are continuously contained and transformed by human interaction. One could argue that on that basis the entire world has now been filled, but this is not the place to discuss the extent of the effects of human presence. It suffices to understand that there are still vast regions and scattered patches of the world in which physical properties are not fully or notably determined by human action (e.g. the aforementioned natural reserves). In filled space the spatial world is divided in partitions, including those containing primordial residuals, that have been created by efforts of physical transformation or building. Our environment has become a built environment.

In a built environment marking actions are extended to become building actions which transform space. According to architect Van der Laan (1983) the creation of architectonic structures are man's attempt to make space habitable. Therefore it is not surprising the human structures in the landscape (e.g. houses) are often focal points for our aesthetic appreciation in prospect-refuge theory (Appleton 1975). As we have seen, the spatial world is already habitable in various degrees without building, but in enhancing the intelligibility of and eventually creating habitability in our environments we may go beyond markings to truly introduce entities that create human spatial distinctions in the world. In this way the spatial world becomes entirely invested with human lived experience and familiarity. We physically construct the distinctions that previously existed as concepts in our mind and link up markings and associated ideas about them to form correspondent entities introduced through distinguishing transforming acts.

The built environment thus consists of physical boundaries: the distinction between one space and another by a division of extended markings (e.g. from posts to fences) or transformations (e.g. earthen embankments). We create solid and voids, insides and outsides, by building spatial structures (see Van der Laan (1983) for a more specifically architectonic treatise of this process). Despite the binding and unbinding of the fluxes of the world (cf. Ingold 2008), these physical boundaries seemingly introduce uniform spatial concepts on both sides of the boundary.[3] Nevertheless the building of space is a process of the world in formation. Although many physical constructions last over long periods of time, many will disappear or transform at later stages. It is important to realise that filled space immediately becomes part of lived experience and all the characteristics of perception, appreciation, affordance, modification and transformation apply to it. Boundaries, conceptual and material, are themselves emergent realities. Therefore all the humanly induced spatial configurations we experience are ephemeral consolidated stages of the built environment (see Vis 2009). Part of the persistence of the configurations of filled space may be accounted for by these affordances, but it is likely that in the actual world this is the result of their relationship to social formation (see Giddens' (1984) routines for consolidation and cf. De Certeau's (1988) resistance in everyday life practice for change). After all, in the modern day world we cling to built heritage and often contest physical changes made to the places we live in, while at the same time we may lobby for desired improvements to our material environment.

[3] Intellectually the understanding of the space on the other side may differ depending on which side of the boundary one is located. Experiential and temporal spatial gradients may also occur as the world is in constant formation and depending on location towards the boundary. However, the division of one side to the other is uniformly binary.

In its most elaborate form filled space as a built environment accommodates the entire perceptive experience and encompasses the full extents of human daily lives as recurring parts of our life paths (cf. Pred 1977, 1984, 1986 on the geographies of daily life). Such intensity of living in a world filled with human spatial divisions would most likely resemble life in an urban environment. There it is possible that all necessary activities and relations take place within filled space. However, this goes beyond human being in the spatial world. A single human being in the spatial world is unlikely to succeed in creating and surviving in a world exclusively of his own making. We do not inhabit the spatial world alone in isolation from others. We inhabit a world with others, a world that is quintessentially social.

Human Being in the Social World

Human Being

As sociology and social theorists have repeatedly shown, unravelling the social and societal world that human beings constitute is a complicated subject. In no regard can this paper do justice to all the literature and ideas that exist about the development of society. Elsewhere (Vis 2009) I have given this matter more detailed attention and the below can be regarded as a selected and concise summary of the constitutive perspective I find most informative and productive in the current context.

Inevitably human being in the social world starts with the condition of being human as discussed before. As members of the same species we can understand the position and situation of others to an extent self-referentially. We understand the implications of our physical and temporal being and our abilities to perceive and experience with our bodily functions. We have emotion to assess our states of mind, and we have cognition which enables us to think. Through the command of our body we can perform actions and the space our bodies occupy makes action necessarily spatial too. Therefore all action is essentially interaction with our environment. “Human action is purposeful behaviour” (Von Mises 1998: 11): the expression of our subjective disposition to improve our position and situation, although we may not achieve our intended outcomes (see J. Vis 2010). As we understand ourselves within the world we become naturally prepared for encounters with others. Due to the fact that the same space cannot be occupied twice, our individual position and situation is always unique throughout our life paths. This means that the knowledge and understanding we gain through lived experience is never equal. However, because in the social world this condition is common to all of us there will be an empathetic self-referential understanding of others to various degrees of inaccuracy (Vis 2009).

Encounter

The fact that position and situation are always unique means that space is a necessary condition for encounter in the social world. Whether it is seeing from afar, e.g. nodding to a stranger in the street, or intimate closeness, e.g. embracing a friend coming to visit, we occupy distinct positions in space and distinct situations in lived experience. Our means of communication are initially limited to corporal and verbal abilities. What we truly mean or intend becomes translated, first, into what we are able to send and secondly in how it is received; a translation through the receiver’s unique position and situation. Here we relate the encounter

and its associated communication to ourselves which conditions our understanding. Through a similar process we recognise and interpret traces and transformations of human presence left behind by others (e.g. the house or camping ground). In this way social relations can be extended into situations where it is not necessary to have two people present in their respective mutual perceptive environments (Vis 2009).

Not only do encounters necessarily involve space, when we encounter we set and respect a certain distance to each other. This is already exemplified by nodding to a stranger and embracing a friend. It was anthropologist Edward Hall (1959, 1968) who, inspired by biological ethology, devised a field of a study of the interpersonal distances that are respected in social relations. He attempted to uncover the cultural differences in this 'distance setting' under the field of study he called proxemics.[4] The personal territories that emerge from the process of distance setting are the first voluntary spatial differentiations in the social world. Here it suffices to take into account that people will create interpersonal distances in every interpersonal contact that occurs and appropriate to each activity that occurs. Human beings negotiate territories, or comfort zones, for each activity they engage in. It is a first step in the organisation of the social world spatially which occurs through the relations established in encounters.

Projects and Institution

In the social world we set ourselves goals for our activities, or projects, which typically involve arrays of human relationships. Critically building on ideas of i.a. Giddens (1984) and Michel Foucault, Pred's (1981, 1984, 1986) adaptation of time-geography demonstrates how the social relations of projects along our life paths in time-space operate. Projects can be either individual, as if alone in the spatial world, or institutional. The latter can be described as an individual's participation in projects that involve other people's participation. It is the practice of the constant intersection of individual life paths and institutional projects that dialectically creates structure (consolidating and transforming our relationships with others), while at the same time the emergence of social values, biography formation and the transformation of nature occurs (see Pred 1986).

Given the local, temporal, and personal constraints on these occurrences along time-geographical life paths and their constant intersections in time-space specific social situations, the foundation is laid for the emergence of spatially distinct autopoietic socio-spatial systems proposed by Koch (2005). These auto self-creating systems are the components of the inhabited social world. The intensive collision of biographies that are closely related in time-space in the projects that transform and shape space, creates the sense of place that is present in Pred's theory of place as historical contingent process (for more detail see Vis 2009). Together these processes convey the emergence of the socio-spatial world.

Autopoietic Socio-spatial Systems

The implication of the constitutive presence of space in the social world creates the basis for a view of spatial society. The components of society are socio-spatial systems that are

[4] Anthropological proxemics is not to be confused with the geographical notion of proximics introduced as part of the regional geography of Granö (1997).

in constant formation (Vis 2009). These socio-spatial systems are autopoietic (auto self-creative) (see Koch 2005 and Arnoldi 2001 for a full discussion), which means they are understood to simultaneously constitute themselves through differentiation from within and from without. According to Koch (2005) all elements remain independent (autonomous) and mutually constitutive: the social construction of spatiality and the spatial construction of sociality are mutually dependent. Social systems as such produce understandings of space through a process of differentiating themselves in their environment. That means they make the environment socio-spatially intelligible.

The constitution of intelligibility or knowledge through differentiation (heavily featured in phenomenological thought) is not concerned with simple opposites, but contains its own outside. Whenever a distinction is made, the system itself is constituted. "Through a structural coupling (a history of recurrent interaction leading to structural congruence) of two or more systems [in the environment], certain features of the environment are constitutive for the autopoietic process [...]. This makes the identification of the boundaries of an autopoietic system problematic, because some parts of the environment are internal to the system, i.e. the system is partially extended into the environment." (Vis 2009: 114) Clarifying the above, systems cease to exist when the actions that constitute the system are not performed (cf. Koch 2005). Whereas systems have constitutive environments, actions performing the system have constitutive (social) contexts (see Bruun & Langlais 2003). This means that existing spatial properties form constitutive environments while individual participants' biographies of lived experience form a social context for the actions that let systems emerge.

The process by which social systems are asserting themselves in space is usefully exemplified by a family and the house they inhabit (Koch 2005), though it is emphasised here that socio-spatial systems can operate on differing scales. Koch specifically ties the idea of autopoietic social systems to the physically delimited spaces they inhabit. I have argued that these spaces are created by performance of systems, which subsequently continue to be experienced and formed by that system (Vis 2009). Socio-spatial systems are responsible for the performance and emergence of society while they simultaneously make the world (further) inhabitable and intelligible through the spatial distinctions and transformations they constitute. They create boundaries from the inside towards their outside dependent for their definition on a constitutive environment and dependent for their existence on the contextual actions that operate them. Their ongoing processes shape the social world by taking place in space. Human being in the social world is as much a process of distinguishing, binding and unbinding, as human being in the spatial world.

Inhabited Built Environment

On this basis it is now possible to 'populate' the built environment, i.e. we can now consider the people missing from the discussion of filled space before. Without any humans inhabiting it, the spatial systems that compose the built environment receive their congruency as an architectural system. According to Koch (2005) the spatial system consists of geometry, topology, and fuzziness, and the associated architectural system consists of the materiality (structure) without which it could not emerge (be built). Koch's interest in the spatial system separated from the social system resembles the pre-emptive elements of territory, place, network scales and network in the topological discussion of socio-spatial relations by Jessop et al. (2008). Here the interest is more narrowly with developing the ability to understand

the elementary distinctions, that is the boundaries, of which the built environment is made up from the perspective of human experience and social relations producing and experiencing them. The spatial system therefore can no longer be regarded separately.[5]

Despite appearances, interpreting spatial configurations as systems cannot be separated from the understanding of their performative and constitutive social systems. This does not withstand developing a geometric and topological framework in support of configurations external to the social perspective. Interpretation depends on how systems persisted socio-spatially rather than physically. In archaeology we are presented with materialised approximations, fixed transformations, which we can self-referentially infer socio-spatially. "[T]he significance of [built] space is both spatially relational and necessarily material. Relational entails the extension of the borders of spatial entities to the relational constitutive dimension (cf. constitutive environments), while material simply refers to the fact that all [spatial] entities [...] are irreducible to a mental state. [...] Relations are not only social, they are also spatial, because we live and act in a materially heterogeneous world. This enforces that neither objects, nor spaces and communities can be reduced to something one-dimensional." (Vis 2009: 116–117) The elements at play in any systemic relation will remain distinguishable.

The socio-spatial complexes that are formed in the ongoing binding and unbinding performances of systems are an immediate human and social reality with associated material affordances. As soon as a spatial configuration is introduced, e.g. construction of a fence around a green or a new residential block, it becomes part of the constitutive environment and experiential context of the ongoing systems. This means that the spatial features that result from the transformative operation of these systems should be understood in that context. Such an interpretive approach I have previously called the 'social positioning of spatialities' (Vis 2009). The fixity of the boundaries making up the configuration of the built environment we observe is not equal to how we understand their constant formation through time. They are merely material approximations of the outcomes intended by individual projects and the operation of socio-spatial systems. It is the internal logic of making sense of the environment by creating distinctions to the outside that creates the world of entities we most readily perceive. We perceive complexes as composite entities, aggregates, and our actions as inevitable reactions will adhere to them. Human being in the social world, as such, is constitutively meaningful on an all-encompassing fluid scale of time and space which sets depending on its action specific context.

Concluding

As has been demonstrated by following the bottom-up constitutive reasoning of human being in the spatial world and social world, for interpretive efforts of studying spatial layout of the built environment this separation cannot be maintained. Interpreting spatial configuration in terms of its relevance to the development of society is unavoidably dependent on a framework of socio-spatial understanding. It has become clear that human being in the spatial world needs distinctions to make the environment intelligible and may introduce further

[5] This paper is not the place to deliver a comprehensive critique of space syntax (Hillier & Hanson 1984; Hillier et al. 1987; Hillier 2007), in passing it could be noted here that this is an argument against the spatial analytical measures used in space syntactic research practice, though not necessarily an argument against all its foundational thought. The theory presented here does contribute to various socio-spatial theoretical and historically constitutive lacunae neglected in space syntax (cf. Griffiths & Quick 2005; Griffiths 2011).

distinctions and full transformations of the physical properties of the world to make it habitable. Further it has been demonstrated that human beings in the social world invest and understand their environment with distinctions of constitutive significance. These distinctions operate firstly as distance setting, creating a personal territory; secondly choosing activities and project participation, negotiating the abilities and constraints; and thirdly the adherence to context, depending on the constitution and perception of (aggregate) entities. These spheres of significance intrinsically combine the social and spatial.

Most importantly, throughout all of the concepts introduced in this paper, it transpires that recognising, conceptualising and creating distinctions are the key to understanding and inhabiting the world. At the moment of their encounter or introduction they assume a position of constitutive importance spatially and socially. Despite the propensity of thinking of the world in categories or entities (Jones 2009) it is through their delimiting distinctions that they are experienced and understood. The configurative outlines of the built environment are the aggregate complex composed of the boundaries that distinguish one space from another. As fundamental as the socio-spatial significance of distinctions is for human being in the world, so fundamental are the boundaries as the physically transformed approximations of space that represent these distinctions in the spatial configuration of the built environment. It is therefore the proposition of this paper that in order to gain an understanding of the significance of the built environment configuration of a place for the way society is or has been developing there, such a study should start with conceptualisations of boundaries according to the spheres of socio-spatial significance.

In fact the need for the prominence of an understanding of boundaries has been propagated independently in the field of boundary studies (notably Abbott 1995; Jones 2009; Smith & Varzi 1997, 2000; Smith 2001). Here it suffices to say that there are considerable parallels in the work of boundary studies that would merit further investigation in the light of the study of built environment configurations. Boundaries exist simultaneously in the physical reality of empirical science and the interpretive, intellectual understanding of social science. Moreover they are the foundational element of all built environments. To enable future research to generate comparative understandings of the socio-spatial significance of the presence of built environments to the development of society the formulation of an ontology of boundary concepts connecting the empirical and ideational counterparts is necessary.

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