Shaping urban landscapes within an ecological urbanism

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Both EU- and UN-treaties have recently been signed with the distinct aim to stop the global decline in biodiversity, thus proving a consensus on the global political level[1]. This is however not the first time treaties have been signed on the matter, and unfortunately, probably not the last. Hopefully this time around, the good intentions showcased on the global level will materialize from policy to action-level. One of the problems is, however, that large scale nature-projects are costly, and area-planning in the classic nature-preservation planning often is in conflict with other area uses. At the same time, a paradigm in within the realm of urbanism has been gaining momentum - *landscape urbanism* - and more recently *ecological urbanism*. Within these urban '-isms', landscape architecture is seen as a catalyst for urban development-processes, and as a framework for a multitude of urban programs. Urban planning and landscape architecture become interdependent.

As mentioned in the description for this conference-track, there

> *"...is a need for an enhanced understanding of the dynamics, sustainability impacts, and possible alternatives or management options towards the current development of limitless metropolitan landscapes."*

To relate to the topic, the more specific purpose of this paper is to search for potentials in landscape-based urbanism concepts by the combination of landscape- and urban planning. The perspective is to showcase the synergy that lies implicitly within a new urban-nature ecology framework, thus investigating how an increased biodiversity can lead to a larger degree of diversity of usage and thereby tactile and visual experiences within the architectural planning-realm. In short: How can we create attractive urban landscapes that improve biodiversity in the cross field between urban- and nature-planning?

Change in the Danish planning context

Danish cities constitute an ever growing network of fragmented urban structures. This is, to a high degree, caused by the growing mobility, that since the 1960's have had a defining influence on the shapes of our city landscapes. Ever growing and overlapping commuters' catchment areas have creating a patchwork of intermediate zones, as non-intended spatial and functional 'blind-spots' between city- and landscape planning. All this has happened despite an explicit city-

1 The EU Biodiversity strategy to 2020 & The Nagoya Protocol under the UN Convention on Biodiversity (2010)

countryside dichotomy lying within the national planning legislation.[2]

After the 2007 Danish municipal-reform, there was a major change at the institutional level, as well as a reordering of the role of mandatory planning documents. Up until 2007 there was a clear distinction between city-planning, conducted by the local municipalities, and landscape- & nature planning, conducted by the regions. The reform effectively made the regions obsolete, while the local municipalities got 2-3 times larger. The municipality-level acts were extended to incorporate the regional-level landscape-/nature planning.

This new integrated municipal-level planning is where things start to get interesting from an *ecological urbanism* point of view. In the pre-2007-situation, local municipalities were held in check by the regions, and the city-land dichotomy was rooted in planning-document on different scales as well as institutions. After 2007 this institutionalized conflict-system disappeared as the larger local municipalities are now expected to initiate a more integrated planning of their territories.

So how to bring the two together. In this paper I cross two sets of understandings from separate paradigms. The role of shapes from a landscape ecological point of view and how ecology is perceived from an architectural city planning point of view.

From a landscape ecological point of view

Landscape Ecology as a science refers to the understanding of relations between landscape structures and their ecologies[3]. It has its origins in geography, ecology and land-use planning among others. One of the key-scholars within the paradigm, Richard Forman has identified *landscape ecology* as the field of relations between landscape elements, wildlife and human interventions (Forman, 1995). In his book *Land Mosaics,* he summarizes his review of a wide array of studies, by listing what overall properties has the largest impact on biodiversity. In order he lists 1) habitat diversity 2) (human) disturbances, 3) "landscape patch" interior size, 4) age, 5) differences between neighboring patches and 6) amount of isolation. This is merely one of the different parameters he highlights, but it functions as a useful starting ground for investigating the relation to specific *shape* and *the urban*, and as a beginning of understanding hierarchies in terms of cause and effect.

More specifically on the *scale* dimension, Forman also addresses the relation between scale, biodiversity and classifications of biological organisms. A specific study on old oak forests in New Jersey, has shown at what scale-levels, the 'cost-benefit' of landscape-element sizes is at its best from a biodiversity point of view. The study mentioned here relates to the different biodiversities based on different patch sizes. Figure 1 shows, for instance, that in order to gain a high biodiversity for insect-

[2] §13(2) and §§ 35-36 in the Danish planning act (Danish Ministry of the Environment, 2009)

[3] Ecology is in here defined as the study of interactions between organisms and their environment

eating birds you need significantly more space than you need for the seed-eating birds. (Forman, 1995, p. 60)

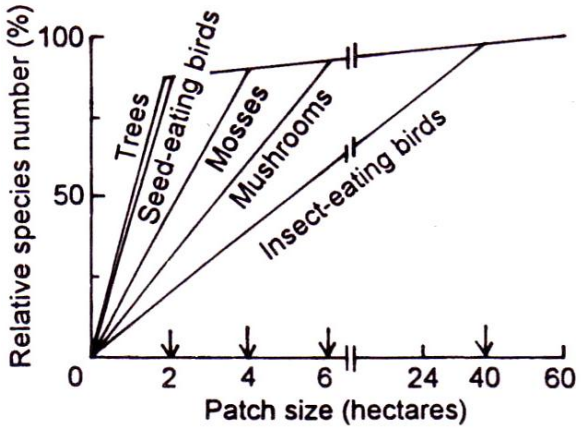

Figure 1 - biodiversities' dependencies on size

An earlier Danish meta-study made in 1982 by a research-group at the University of Roskilde, made a list of generic "all-other-things-being-equal" recommendations, of how the changing of different landscape structures can alter the biodiversity potentials of these structures. (figure 2, Agger et al., 1982, p. 26)

These two should only be seen as small examples of the field of landscape ecology, but even though these rules-of-thumb from both Forman and Agger *are* quite generic, from an architect-planners point of view, they have an appeal, given their concise spatial expressions and recommendations. The relevance of these spatial recommendations should, from an architect's point of view, seems very obvious to remedy the agenda of biodiversity in the role of designing the urban.

A more quantitative approach to evaluate the interactions between man and environment, lies

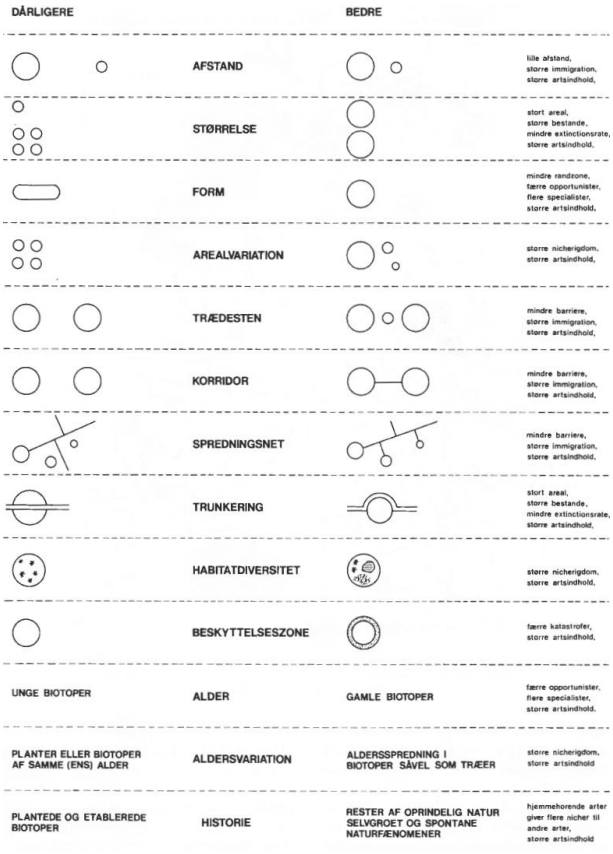

Figure 2 - Catalogue of spatial parameters

in the realm of simulating ecologies. Ever more powerful computers give the possibility of combining knowledge regarding animals and their relations to different habitats, with a GIS model, that. A model that, in years, can become more and more detailed. Within the simulation, the movement of virtual agents (animals) can be traced. This is now used to evaluate consequences of farm-planning, crop-rotation etc. Different landscape-structures form the base for flora- and fauna movements thus potentially giving way for the testing of different scenarios. Since the approach is based on standard GIS-data, it is, in principle, open for a wider use including urban planning.

Ecology from an *urbanism* point-of-view

One of the key figures in viewing urban settlement and ecological flows as a whole is American landscape- and city-planner Ian McHarg (1967). To McHarg the urban and the environment are closely knit, and only by overlapping the two through mappings, a more appropriate land-use planning may emerge. This total-view on the landscape can also be seen in newer approaches like the German *zwischenstadt*-concept first coined by architect and urban planner Thomas Sieverts (2003). To Sieverts, the *overlapping* of spatial and functional features are a key issue, in a context where individual mobility has made the city-countryside dichotomy irrelevant.

The total-view on the urban landscape is to a high degree also shared by American landscape architect Anne Whiston Spirn (1996). In her article on Frederich Olmsteds practice, she argues, that a landscape is never truly *artificial* or *natural*. On the contrary, she views this distinction as counterproductive:

> *"Seeing humans, ourselves, as solely or mainly a contaminating influence prevents us from appreciating the potential beneficial effects we might have, and limits what we can imagine as possible" (Spirn, 1996, p. 111)*

The standpoint that development can be beneficiary might be just as valid, and most likely more productive and sustainable

A paradigm in urban-theory, that tries to encompass both this total view on the urban landscape inherited by McHarg parallel to Sieverts, and investigating the potentials of human interaction with its surroundings that Spirn highlights, has since the late 90s emerged - the so-called *landscape urbanism*. The term was first coined by landscape architects James Corner and Charles Waldheim who are the main proponents for applying a 'landscape view' on the development of urban areas.

Furthermore, in the last couple of years, a new *'-ism'* has emerged from this landscape urbanism - called *ecological urbanism*. It had its origin at a conference at Harvard in 2010 of the same name. The massive publication following it, gathers the many papers, including the one by before mentioned Charles Waldheim. On the potentials of a new urbanism, Waldheim as well as Dutch urbanist Rem Koolhaas, emphasized the need of adapting *landscape urbanism* into a paradigm that to a higher degree can relate to ecological and socioeconomic conditions (Waldheim, 2010a & Koolhaas, 2010) a view Waldheim further explains in an article in Topos, where he sees the ecological and environmental turn as a result of a midlife-crisis of the paradigm of landscape urbanism, hinting also that a more operative approach is needed (Waldheim, 2010b,)

Synthesis of the two paradigms

Landscape urbanism, as coined by Waldheim and especially Corner can be difficult to grasp in their emphasis on open-endedness and processual development. Theorists like Spirn, Sieverts and all the way back to McHarg share the view of the *total-landscape*, an urban landscape that encompasses the territory in its entirety. This is the necessary first step of integrating urban- and nature planning -

viewing the landscape in its entirety as potential for positive human influence, and not just as a negative.

The next step lies in the discussion of the processual and the spatial respectively. One of landscape urbanisms key selling points, is an emphasis on the processual, be it natural flows or discussions of infrastructures. It owes this focus partly due to its origin in landscape ecology. (Shane, 2003) Common for the two is their methodological framework, an emphasis on directing a process rather than drafting the master plan. This does, however, not change the fact, that things still have to be built, forested, planted, irrigated or transformed, and have a geospatial reality. This spatial dimension is just as crucial as the processual. To remedy this 'need for the spatial', other parts of landscape ecology are useful. First of all, the countless ecological design guidelines, that do come out of this paradigm should be translated into something useful in an architectural planning realm.

Understanding how Forman's' hierarchy and scale figure as well as Aggers "rules-of-thumb", for instance, can be used as specific design guidelines, is a natural step when researching how city-planning can remedy a sluggish effort on improving biodiversity. The *site* will then be determining what relevant tools are ultimately relevant to be used on what scale.

Sketch of a possible development-process

The *site* can in an architectural discourse imply a multitude of different spatial and cultural parameters, but in order to build with and for natural processes, thus achieving a rise in biodiversity, the *site* also has to encompass the ecological context of the site, ie. soil-types, draining networks, mosaic-structures etc.

Many of the before mentioned rules-of-thumb are for the all-other-things-being-equal situations, and as with every other things in the world; no two things are equal. The discussion is instead, what tools are to be used at what point in the development process. Fundamental principles and rules-of-thumb should be a part of education of planners, be it landscape- or city-planners. It should also be part of the development process on the conceptual scale. Hierarchies, scales and generic shapes can give valuable input to the layout on an overall scale alongside rudimentary knowledge of nature types on-site and at-site. Moving downwards in the scale-levels, and onwards in the develop-phases, the ability to *test* the proposed landscape structures becomes more valuable, and this is where the simulations come into the picture. Whether the different development-scenarios are sketched by hand, on CAD-systems, or directly into a GIS, testing different structures are fairly easy to do, and the outcome is on a graphic- as well as on a quantitative level. The simulation should not be defining for the architects project, but should be used in the same way topological optimizations or wind-tunnel simulations are used to optimize and inspire, but not *define* structures and building units: in an iterative process between sketch and test.

Implementation across competences

Working proactively within an ecological planning, highlights the need for collaboration between nature-planner and city-planner.

Classic demarcation between the two often coincides with the city border. If the city, and thus the initiative and private capital that follows city-development, is to help remedy the underlying challenge of enhancing biodiversity, then this demarcation-line needs to be blurred out alongside the blurring of the *functional* city-border as Sieverts already brought to attention. City-planners need to be 'upgraded' with a sensitivity to ecological flows, and nature-planners must also be given the keys to the city alongside city-planners. As an extension of Spirns stance, one could say, that if city-planners know nothing of the ecologies of the site they are planning for, then they end up passing up on an obvious synergy effect, as well as spending money on technical fixes they could have avoided. On the other hand, if nature-planners only see the city as an entity opposed to nature, they miss the opportunity of creating new hybrid natures, as well as connecting existing nature-areas with these hybrids.

SO who has the initiative? The starting point in order to implement an integrated planning & development as outlined above, starts at one place - the municipalities, whether they do the planning themselves or put their money on consultancy. It is however also crucial to make the municipalities aware of the potentials that lie within this new planning. I have no doubt that they will want to search for a smarter way to do planning, as the current planning system inherited from pre-2007 has shown to be increasingly heavy on man-hours and scarce on innovation. Landscape-/ ecological-urbanists could showcase thousands of interesting and groundbreaking projects, as they should, but without the backing from the municipalities and the interest in transferring knowledge from academia to practice, this will take much longer than is necessary.

Conclusion

Improving biodiversity are one of the major global challenges we are facing today. The fact that it relatively easily can obtain a global consensus and be the center of EU- an UN-treaties shows in all clarity, that its relevance is inarguable.

The next question within the realm of urban planning should necessarily be: What can *we* do to remedy this challenge. Does the challenge necessarily lie solely within the realm of countryside nature planning. This paper roughly outlines how city-planning should make use of principles lying within the *landscape ecology* realm as well as using the tools lying within simulating ecology. Several urban theorists emphasize the functional interdependence of city and countryside into an overarching field of urban landscapes, while others put emphasis on using landscape structures as catalyst for creating more sustainable urban areas. Combining this opening within urban theory towards, not only landscape processes, but *also* incorporating more specific design guidelines from landscape ecology leads to new potentials. Using landscape ecology to guide structures on an overall level, and testing their ecological properties within a simulation afterwards gives way to a hybrid planning. This planning then again gives way for a new synergy that can, on one side improve biodiversity, and on the other side bring a haptic and aesthetical landscape-

diversity into our urban areas. This new planning can however not succeed without two key employee-groups working closer together. Urban planners need to be aware of ecological context and basic ecological principles, while nature planners need to be involved in the specific layout of urban planning, thus settling for solutions that are not perfect, but built on an as-good-as-it-gets principle.

Even though Danish architect Bjarke Ingels may not be specifically relevant in this hybrid planning discussion, he does have a productive key statement regarding sustainability. His concept of *Hedonistic Sustainability* (Ingels, 2011) puts emphasis on a common misimpression that sustainable solutions have to either look bad, or be a compromise between science and aesthetics. His argument is, that the challenges of sustainability should always be seen as an architectural potential, and not a cost. Leaving urban nature-projects to biologists without design-experience is simply a matter of missed opportunities, just like leaving the design of urban areas only to architects is. Put simply, the introduction of landscape ecology into architectural planning, opens up for a hedonistic sustainability through architectural design.

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