

# DESIGNING LANDSCAPES AS EVOLUTIONARY SYSTEMS

MARTIN PROMINSKI

Universität Hannover, Germany

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*In the last 20 years, the theoretical debate has shifted 'landscape' from a green, arcadian opposite of the built environment towards a comprehensive embodiment of our artificial modernity. Examples from this debate are J. B. Jackson's definition of landscape as a 'dynamic system of manmade spaces' or R. P. Sieferle's concept 'Total Landscape', where the former antagonists town and country have dissolved into a homogeneous structure completely characterised by the accelerated processes of modernization.*

*This new perspective highlights three previously neglected issues: uncertainty, processes and relations. As a spatial and temporal terrain, a landscape is continuously changing in an unpredictable way, steered by the relations of the site with its specific context - an evolving system instead of a static image.*

*Landscape architecture, the profession which is responsible for the demanding task of designing these evolving systems, has produced some conceptually remarkable projects in recent years. The paper discusses three examples of contemporary landscape architecture which offer insights into designing evolutionary systems. These projects deal with the problem of determinacy versus indeterminacy, the integration of time in design and systemic openness for changes in the design environment. Furthermore, they express comprehensively the ability of design to deal with complexity, uncertainty, uniqueness and value conflicts as described by Donald Schön. Finally, they allow an outlook for changing a classical, scenic aesthetic to a relational aesthetic or 'systems aesthetic' which the art critic Jack Burnham already announced in 1968.*

*As a conclusion, the question of how these insights from designing landscapes could add segments of knowledge to the general design theory debate is discussed.*

## INTRODUCTION

Landscape is one of the most complex design subjects, combining various natural and cultural layers which are in continuous flux. This offers a lot of potential for inspiring designs, but until very recently the products of landscape architecture were theoretically rather dull and could not add anything relevant to the general design debate.

This paper starts with briefly sketching the main reason for this poor condition - the established, restricted concept of landscape. Then recent theoretical developments in the theory of landscape are described which allow for a new unfolding of landscape architecture's potential. This is illustrated with three conceptually remarkable projects which express a professional shift towards designing evolutionary systems. Finally, an outlook on the relevance of contemporary landscape architecture for design theory is given.

## THE IDEAL OF STATIC IMAGES

For a long time, the perspective on landscape was restricted: it was seen as a green remedy, a compensation for the pressures of modern life. As a result, designed landscapes resembled Arcadian paintings like the ones of Lorrain or Poussin; the goal was the creation of ideal, static images which allowed for the contemplation of a balanced unity of man and nature. Over many centuries, this idea of landscape has settled deep in our collective mind. John Brinckerhoff Jackson, the great American landscape researcher, criticised this scenic approach as too narrow a concept, but at the same time he was conscious of the ongoing power of this concept which he called 'Landscape Two': 'In matters having to do with the natural environment, we are most of us children of Landscape Two. From that parent we have learned not only to study the world around us but also to lavish care upon it and bring it to a state of lasting perfection. It was Landscape Two that taught us that

the contemplation of nature can be a revelation of the invisible world and of ourselves. But it was also Landscape Two that impressed upon us the notion that there can be only one kind of landscape: a landscape identified with a very static, very conservative social order, and that there can be only one true philosophy of nature: that of Landscape Two.' (Jackson, 1984, p155)

The question is this: can the concept of Arcadian scenes, composed of meadows, hedges, trees and water, be useful in the design of our contemporary landscapes which have to address contemporary elements like infrastructural lines, derelict industrial sites or wind power masts?

There are still attempts to re-cultivate open-mining pits back to a pristine, pastoral appearance, or to concentrate wind power masts in areas that would leave as much landscape as possible untouched by these technological invaders - but facing the sheer quantity of technological elements in our contemporary landscapes, these efforts are only of marginal use. Arcadian landscapes might be relevant at specific locations, e.g. in tourist areas dependent on 'unspoiled' scenery or as preservable historic monuments like Central Park in New York, the Tiergarten in Berlin or the Bürgerpark in Bremen. Yet, for the design of contemporary landscapes, the monopoly of this landscape concept must be replaced by new approaches.



Figure 1. Arcadian Landscape/Landscape Two (© Helmut Rippl).

### FROM STATIC IMAGES TO EVOLUTIONARY SYSTEMS

One of the first theoreticians who thought about an alternative concept of landscape which could serve as a new basis for design was J. B. Jackson. He was fascinated by the rapid changes in the American landscape, including fast food restaurants which are torn down after a few years, fields where crops are changed according to the demands of global agricultural markets, trailer parks that come and go, etc. These landscapes do not fit into the stereotype of a Landscape Two which is orientated towards ideal, scenic goals. Thus, Jackson developed a process-orientated definition which he called 'Landscape Three':

'Landscape is not scenery, it is not a political unit; it is really no more than a collection, a system of man-made spaces on the surface of the earth. Whatever its shape or size, it is never simply a natural space, a feature of the natural environment; it is always artificial, always synthetic, always subject to sudden or unpredictable change. We create them and need them because every landscape is the place where we establish our own human organization of space and time. It is where the slow, natural processes of growth and maturity and decay are deliberately set aside and history is substituted. A landscape is where we speed up or retard or divert the cosmic program and impose our own'. (Jackson, 1984, p156).

With this definition, Jackson expresses clearly that landscape no longer has an ideal state - the pastoral scene - but that it is a temporally and spatially open system.

This approach to landscape has been taken up and developed further in several cultural fields in recent years. One of the most consistent descriptions of this 'new' landscape has been given by the environmental historian Rolf Peter Sieferle. He has discussed the great transformation of the landscape which occurred 200 years

ago, caused by industrialization and modernization. Fossil fuels allowed mass production of goods as well as their easy transport, which led to an increasing homogenization of elements in the landscape. In our modern age, prefabricated houses, shopping malls, industrial estates, petrol stations, farms, roads, etc look roughly the same everywhere. Today, these processes of industrialization and modernization have spread throughout urban and rural landscapes to an extent that Sieferle is only able to identify a single, remaining homogeneous landscape type - the 'Total Landscape'. One result of this assessment is the impossibility of distinguishing between the city and countryside: 'The contrast between cities and the countryside has been of constitutive importance for agrarian civilization. This contrast is now dissolving and to some extent, this classical relationship between the city and the countryside, of urbanity and provinciality turns into the opposite...The city is quiet, the countryside is loud...The countryside is busy, pragmatic and lacks tradition; the city is tranquil, sluggish and takes care of its monuments. Ultimately, the city is environmentally conscious, while the country hates nature and tries to root it out wherever possible'. (Sieferle, 1997, p192f). Thus, Sieferle sees the entire landscape as an artificial system - even nature reserves are constructions because they totally depend on human decisions and care.



Figure 2. Total Landscape/Landscape Three (© Martin Prominski).

Besides this artificiality, the 'Total Landscape' is characterised by a lack of any style. Due to the continuous flow of energy, only ephemeral patterns without any characteristic, stable climax can arise. This creates a wild mixture of extremely heterogeneous elements underneath the overall homogeneous appearance: 'Pampas grass next to blue spruce, horse collar next to satellite dish, vintage car next to mobile phone, toads' road-crossing tunnel next to hens' laying battery, porn shop next to peace memorial, garden gnome next to Bauhaus lamp' (Sieferle, 2004, p7) Instead of a style that matured from certain regional or cultural traditions, the product line of the global do-it-yourself chains is now a main influence on the appearance of the landscape. All this leads to a 'Total Landscape' in continuous change: 'The current phase of transformation has no identifiable goal. It is not like in previous transition periods that there is a change of a stylistic identity, that an older type is replaced by a newer one. Instead, we find a general loosening-up, a cultural de-centralization where nothing stable can be built. It is exactly because of the specific character of this situation that a stabilisation of structures is impossible. Instead of a specific, stylistic colour which could be labelled 'modernity', we now have a whole kaleidoscope of colours' (Sieferle, 1997, p181f)

This new perspective on landscape makes any longing for specific and durable images nearly impossible. The ongoing acceleration of modernization processes forces us to adapt to a landscape in an almost fluid state.

In conclusion, this new approach to landscape highlights three previously neglected issues: uncertainty, processes and relationships. As a spatial and temporal terrain, the landscape is continuously changing in an unpredictable way, steered by the relationship of the site with its specific context - an evolving system instead of a static image.

## DESIGNING EVOLUTIONARY SYSTEMS

Understanding landscapes as evolutionary systems is a big challenge for the profession of landscape architecture. Traditionally, it is committed to the romantic concept of 'Landscape Two' with its static images. For example, one of the few theoretical accounts of the profession from the 1990s concludes with the following recommendation for designing parks: 'The openness of a grassy or scintillating space is the most important quality for the ordinary park: long sight lines to dream away in, the tranquillity of simple spaces in which to entertain one's thoughts, and the enchanting rhythms of the regularity and repetition of interconnected trees and hedges' (Baljon, 1992, p236). The predominance of those Arcadian ideals is not only valid for the designing of parks but also for bigger landscapes. Large-scale landscape planning mainly operates from an ecological paradigm which should have nothing to do with images or scenes. Yet the German geographer Gerhard Hard was able to show that landscape ecology unconsciously adopted the pastoral landscape as the ideal embodiment of a sustainable and diverse environment. He commented with no little irony that the hard science of ecology is trapped by a painterly, romantic idea (Hard, 1991, p14). Landscape planner Beate Jessel has a similar opinion when she self-critically speaks about 'the difficulty, that we too easily tend to interpret landscape as an ideal image...Especially in landscape planning we often think that we have to create ideal landscape states like painters, or rather maintain them with an intensive and detailed care' (Jessel, 1995, p8).

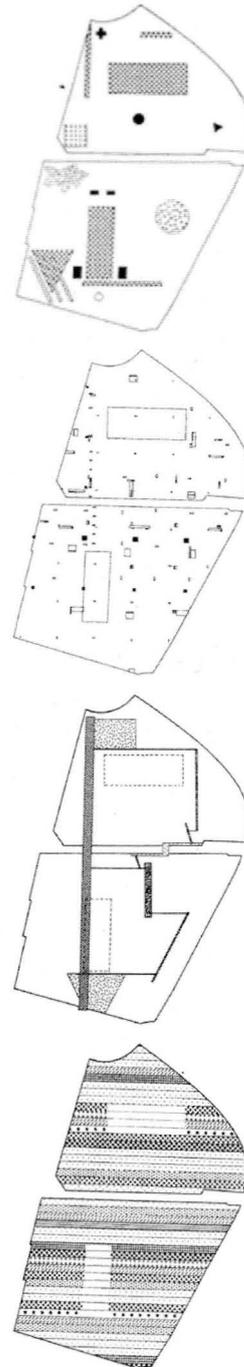
These statements express the importance the scenic approach still has in the profession. But during the last few years a shift from Landscape Two towards Landscape Three as the guiding concept has become visible. In the following section, three projects are presented in order to illustrate this development.

The proposal by the Office of Metropolitan Architecture (OMA) for the Park de la Villette competition in Paris in 1982 was perhaps the first landscape architectural design that was specifically designed as an adaptive, evolutionary system. This highly acclaimed entry, which received second prize and was never built, is based on the idea of unpredictable change: 'It is safe to predict that during the life of the park, the program will undergo constant change and adjustment. The more the park works, the more it will be in a perpetual state of revision. Its "design" should therefore be the proposal of a method that combines architectural specificity with programmatic indeterminacy.' (Koolhaas and Mau, 1995, p923). The design concept consists of an overlay of four layers (Figures 3-6):

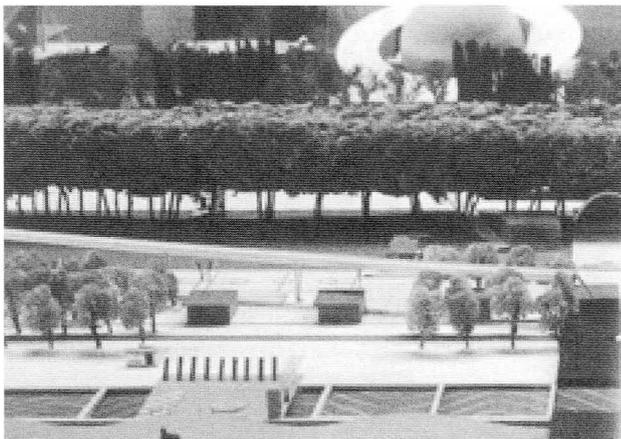
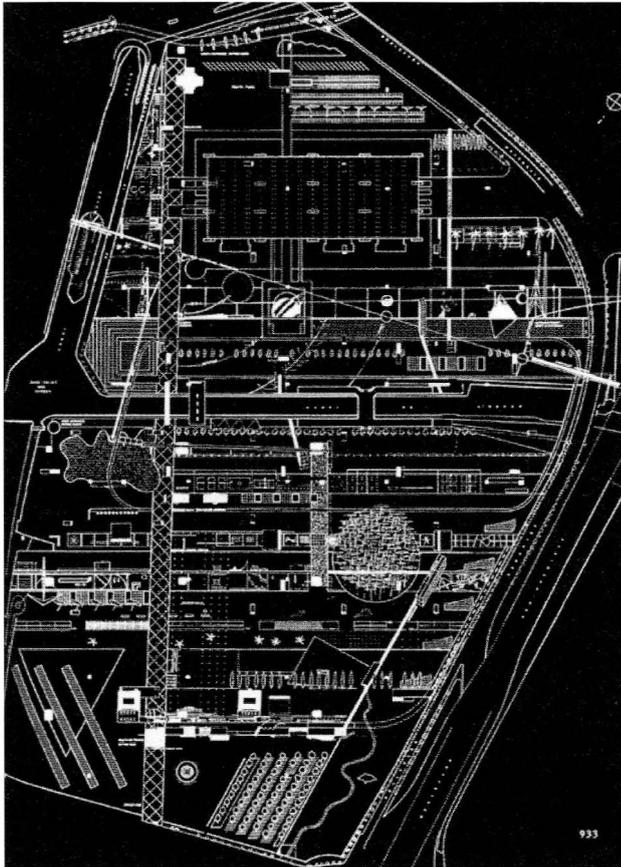
1. 'Major elements' with existing or proposed large-scale buildings like museums, music halls, etc
2. 'Confetti' with small-scale elements like kiosks, toilets, etc, which are distributed according to a mathematical formula which guarantees a desired frequency
3. 'Access and Circulation' with the Boulevard as a central axis and the Promenade reaching specific areas in the park
4. 'Strips' with a width of sixty metres which can accommodate all conceivable programmatic categories like playgrounds, theme gardens etc.

The 'Strips' layer is the most important one for the flexibility of the design: on the one hand the strips guarantee a durable spatial structure ('architectural specificity', see above); on the other hand, their contents can be changed according to new demands ('programmatic indeterminacy', see above). Koolhaas summarises by saying that this strategy has no fixed form, but is a frame which is open for the adventures of the future: 'Finally, we insist that at no time have we presumed to have produced a designed landscape. We have confined ourselves to devising

a framework capable of absorbing an endless series of further meanings, extensions or intentions, without entailing compromises, redundancies or contradictions.



Figures 3 to 6. 'Major Elements', 'Confetti', 'Access and Circulation', 'Strips' (© O.M.A).



Figures 7 and 8. Overall plan as overlay of four layers; model photo (© O.M.A).

Our strategy is to confer on the simple the dimension of adventure'. (ibid, p934)

With its openness and adaptability, the park challenges traditional pictorial expectations and serves as a good

example for an evolutionary approach which is able to deal with indeterminate processes.

A project from the Dutch countryside adeptly illustrates the possibility of skipping pictorial, conservative approaches also in large-scale landscape designs. Drawn from the Clay, a design created in the 1990s by the Dutch office Vista, is based on the strategic manipulation of the water table. They subdivided a polder area of 500 hectares into 16 rectilinear polders and developed 5 different management concepts for vegetation and the regulation of water levels. These 5 concepts were then applied to the 16 polders: depending on how much water was added or drained off, a different type of landscape developed in a single polder. If the water table is lowered, either woodland or, in combination with grazing cattle, meadows developed. A continuous high water table led to peat marshes while a fluctuating water table produced reed-filled marshes. Finally, flooding a polder created ponds. This strategy guaranteed a high biodiversity and a varied visual appearance without allowing prediction of the exact spatial or temporal development.

According to the Dutch landscape critic Michiel den Ruijter, 'The special aspect of this method is that it does not seek to achieve a final ideal state. Rather, the planning sets out the natural and anthropomorphic parameters within nature will be allowed to develop. The result is to be a kind of self-evident order, marked by a contrast of rectilinear and organic forms.' (den Ruijter, 1999, p36)

With the acceptance of indeterminacy, the celebration of processes and the productive use of systemic relationships for design purposes, this project is a perfect example of how landscape architecture is able to deal with complex problems. Its evolutionary perspective is designed for 80 years, but it is easily recognizable that this project will continue to evolve beyond this arbitrary time frame (Figure 9).

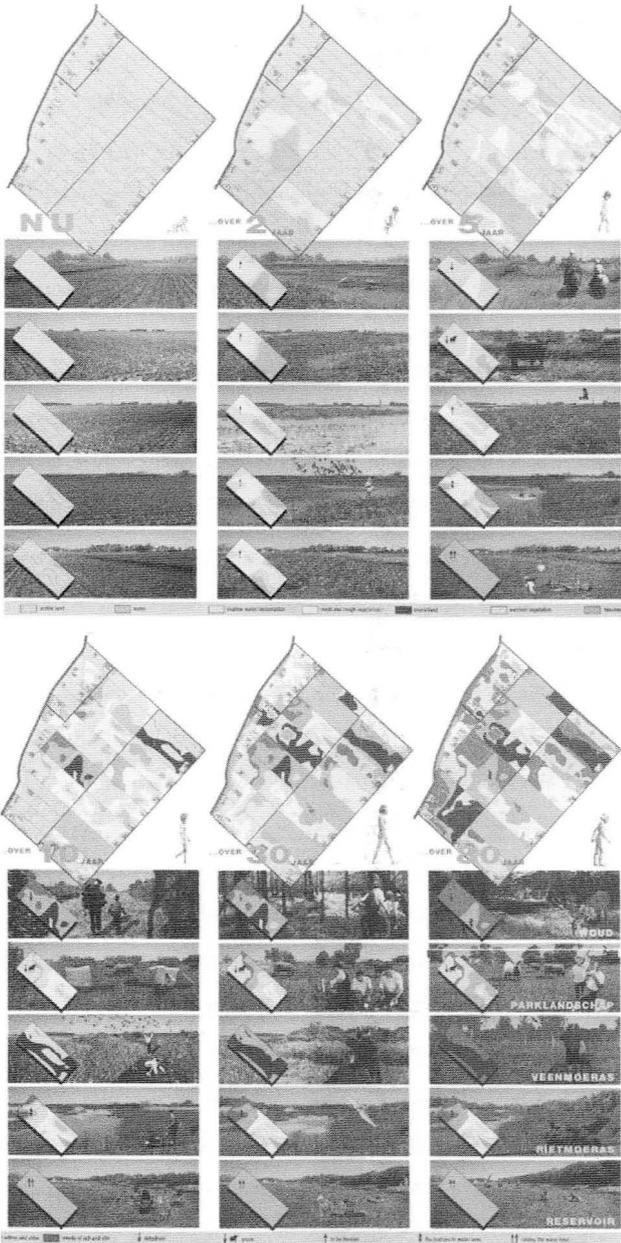
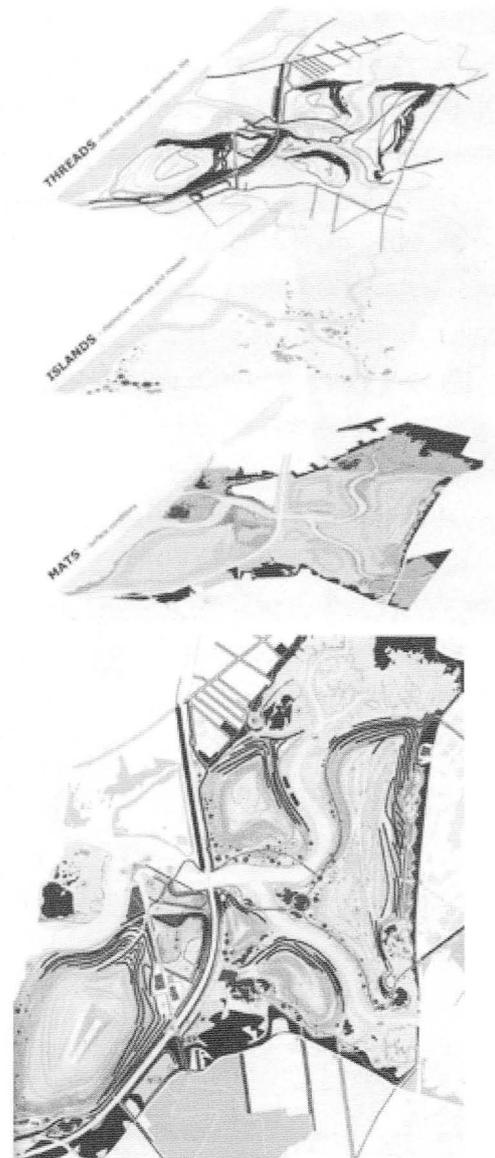


Figure 9. Evolutionary perspective for Drawn from the Clay (© VISTA).

A quite recent landscape architectural project based on a 'Landscape Three' approach deals with one of those many contaminated post-industrial sites which are an important design task in the near future. The site is the Fresh Kills landfill on Staten Island, New York and the concept Lifescape, by an

interdisciplinary team directed by landscape architect James Corner, has a complex open-ended strategy. Fresh Kills is the largest landfill in the world and was closed in 2001, after 50 years of use. Immediately upon closure a design competition (by invitation) was held with 5 interdisciplinary teams. Lifescape was the winning entry and is currently being constructed. The design consists of a matrix of overlaying 'Threads', 'Mats' and 'Clusters' (Figure 10): 'Linear threads direct flows of water, energy and matter



Figures 10 and 11. Lifescape, matrix and plan (© Field Operations).

around the site, injecting new life into otherwise homogenous areas. Surface mats create a patch-like mosaic of mostly porous surfaces to provide self-sustainable coverage, erosion control and native habitat. Clusters of islands provide denser nests of protected habitat, seed source and program activity.' (Field Operations, 2001)

This matrix should maximize opportunities for access and movement - the movement of seeds and animals as well as people and activities. It sets up an initial framework from which the site can evolve and adapt to become a more and more diverse, self-sustaining environment. It offers an overall identity but is at the same time flexible in order to accommodate unforeseen future needs. This conceptual openness, this rejection of a fixed formal solution, is almost visible in the graphics, which are unusually 'rough' or imprecise compared to Corner's refined graphics from previous projects (Figure 11). In conclusion, Corner describes Lifescape as a design that is more guided by time and process than by space and form.

#### LANDSCAPE ARCHITECTURE AND DESIGN THEORY

Three general themes which may have relevance for a design theory addressing evolutionary aspects can be extracted from these three projects presented.



Figure 12. Lifescape, perspective (© Field Operations).

#### 1. Design and ecology

In recent decades, ecology was either seen as an ideology or as an analytical science. While the latter has little relationship to design, the former pulls design into a very conservative area. As described, ecology adopted static images, representing a desirable equilibrium and resulting in very conservative designs. In his article 'Ecology and Landscape as Agents of Creativity' from 1997, James Corner criticised this restricted view of a restorative ecology and argued for a new, critical ecology as the basis for landscape architecture: 'A truly ecological landscape architecture might be less about the construction of finished and complete works, and more about the design of processes, strategies, agencies, and scaffoldings - catalytic frameworks that might enable a diversity of relationships to create, emerge, network, interconnect and differentiate. The aim for the design of these strategic grounds would be not to celebrate differentiation and pluralism in a representational way, but rather to construct enabling relationships between the freedoms of life (in terms of unpredictability, contingency and change) and the presence of formal coherency and structural/ material precision - a double aim' (Corner, 1997, p102). At Fresh Kills Corner was able to show how this new theoretical attitude towards ecology could produce an innovative design. If ecology is understood in this systemic, open-ended sense, it is not only conceptually almost similar to an evolutionary approach, but also an agent for creativity. Until today, ecology was usually linked to the issue of sustainability which - unfortunately - was often seen as restrictive for design. The 'new ecology' as described by Corner could enrich the debate about sustainability by extending the perspective beyond questionable goals of equilibrium. As expressed especially by Lifescape and Drawn from the Clay, sustainability can be combined with stirring design

ideas. This proves that ecology could be an inspirational tool for designers.

## 2. Evolution and uncertainty

Evolutionary processes are not exactly predictable.

Thus evolutionary design has to deal with uncertainty.

Following the metaphor coined by Donald Schön, it acts in the swampy lowlands of messy, confusing problems which defy a technical solution (Schön, 1987, p3). Vista's project Drawn from the Clay gives an example how this messiness can be turned into a stunning beauty. Uncertainty is not seen as something that has to be resolved, but as an integral part of the design. The project creates a curiosity because nobody knows how the development in the different polders will relate to each other and the overall, rectangular structure - a regular visitor will always experience different relationships in terms of aesthetic as well as ecology.

But this positive tension only works because uncertain, evolutionary processes are staged in a rigid structure which consists of specific instructions (for the water management) as well as a formal order (the polder structure). The same strategy is used in the other two projects, Lifescape and La Villette: A matrix of layers with specific formal and organizational guidelines is designed which then allows for the unfolding of uncertain processes. This approach could be called 'Limited Self-Organization', where the limits set by the designer are the key for a successful evolutionary design. This is a strategy relevant for all design domains. Yet one problem should be mentioned: since 'Limited Self-Organization' leaves a lot of future developments to natural and cultural processes independent from the designer, it calls for a humility many designers are not used to.

## 3. Systems and aesthetics

Designing systems is much more abstract than the common task of designing objects with a specific form. But a systemic approach is necessary if evolutionary aspects

like adaptability are to be addressed by a design. Since a 'systemic' design object is characterised by various relationships with its environment, which in turn influence its appearance and make it almost fluid, a more abstract perception is necessary - a move away from classical pictorial orientations. A promising perspective on this topic was already given in 1968 by the art critic Jack Burnham. He argued for a systems aesthetic which means a shift from objects to systems, from pictures or sculptures to more open forms of art. Burnham said: 'Where the object almost always has a fixed shape and boundaries, the consistency of a system may be altered in time and space, its behaviour determined both by external conditions and its mechanisms of control.' (Burnham, 1968) He speculated about a new aesthetic which concentrates more on the relations between things than on the things themselves - from a framed and static pictorial aesthetic towards an open and dynamic systems aesthetic: 'The systems approach goes beyond a concern with staged environments and happenings; it deals in a revolutionary fashion with the larger problem of boundary concepts. In systems perspective there are no contrived confines such as the theatre proscenium or picture frame.' (Burnham, 1968)

O.M.A.'s proposal for La Villette serves as a good example of how this systems aesthetic could be translated into a real design. With its combination of a fixed, formal structure and an openness to accommodate programmatic change, it realizes a delicate balance between abstractness and concreteness, between openness and closure. In a given structure, self-organizational processes are possible - the park can evolve into unforeseeable directions. O.M.A. challenged our aesthetic conventions and gave us an example of a new, more fluid aesthetic. The park is just one example of that which is necessary in the future to adapt our aesthetic abilities to evolutionary designs.

## CONCLUSION

Landscape architecture is a design profession with great potential for an evolutionary approach. For centuries it operated from the restricted paradigm of static Arcadian images. Today, with new concepts concerning the subject of landscape, like Jackson's 'Landscape Three' or Sieferle's 'Total Landscape', the profession is repositioning itself in the wider theoretical debate.

Contemporary landscape architectural projects deal with the problem of determinacy versus indeterminacy, the integration of time in design and systemic openness for changes in the design environment. Furthermore, they express comprehensively the ability of design to deal with uncertainty, complexity, uniqueness and value conflicts as described by Donald Schön. Finally, they allow an outlook for changing a classical, scenic aesthetic to a relational aesthetic or 'systems aesthetic' which the art critic Jack Burnham already announced in 1968. In terms of their relevance to the general design debate, the key issue seems to be the design of structures for 'limited self-organization'. The projects described here might serve as inspiring and transferable examples for designing formal and instructional frameworks as evolutionary systems.

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## BIOGRAPHY

Dr Martin Prominski is Assistant Professor of Theory of Contemporary Landscape Architecture at the Faculty of Architecture and Landscape at the University of Hannover, Germany. He holds a diploma in landscape planning from the Technical University of Berlin and a Master of Landscape Architecture from Harvard University, sponsored by a scholarship from the German Academic Exchange Service (DAAD). He worked as a landscape architect for Atelier Loidl in Berlin and Hargreaves Associates in Cambridge, MA. From 1998-2003, he taught design studios and theory classes at TU Berlin and completed his PhD thesis (*Landschaft Entwerfen*, Berlin, Reimer Verlag, 2004). His research combines landscape and design theory.

## ADDRESS FOR CORRESPONDENCE

Universität Hannover, Institut für Grünplanung und Gartenarchitektur, Herrenhäuser Str. 2a, D - 30419 Hannover, Germany.  
Tel: +49 (0) 511 762 2695. Fax: +49 (0) 511 762 4043.  
Email: [prominski@igg.uni-hannover.de](mailto:prominski@igg.uni-hannover.de)  
Http: [www.laum.uni-hannover.de/igg/lehrgebiete/theorie\\_akt\\_la/](http://www.laum.uni-hannover.de/igg/lehrgebiete/theorie_akt_la/)