Sound as an integral part of the spatial landscape experience and design

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The active design of acoustic landscape qualities plays a central role in the creation of high-quality open spaces. In the course of this intervention I will present the approach of my doctoral research, which I am pursuing at the Institute of Landscape Architecture at the ETH Zurich. By relating auditory perceptual models with the tangible experience of concrete places, this research will develop new methods for the inclusion of sound in landscape architectural design.

Auditory impressions have a significant impact on how people perceive and evaluate their environment. The rustling of the leaves, the tapping of the rain, or children's voices as they escape from the schoolyard participate vitally in the aesthetic and spatial experience of what we call *landscape*. In turn, every landscape design influences the sonic conditions of a site – whether intended or not. With regard to the increasing densification of our cities, the active design of acoustic landscape qualities will undoubtedly gain importance in the forthcoming creation of high-quality open spaces. However, the prevalent design methods in landscape architecture are almost exclusively visually determined and in common planning practice the auditory dimension is only considered in terms of *noise*, or undesirable sound emissions. This paper considers sound as an integral part of the spatial landscape experience and design, and thus gives a summary of the approach underpinning *my doctoral research on The Acoustic Dimension of Landscape Architecture*[1], which I am pursuing at the Institute of Landscape Architecture at the ETH Zurich. By relating auditory perceptual models with the tangible experience of concrete places, this research is aiming at developing new methods for the integration of sound – the auditory and acoustic dimension – in landscape architectural design. This involves,

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in particular, understanding the mutual interaction of the auditory with the visual.

Sound *and* landscape

The experience of landscape could more generally be defined as a meaningful and dynamic relationship between people and their environment. Given that the *soundscape* approach developed in the 1970s, calling for an open-minded attitude toward the auditory environment, was barely successful in contributing any pertinent implementation concepts to the practice of landscape architecture, a juxtaposition of the two might reveal some reasons for this gap. The field of landscape architecture is our physical environment. In a physical environment, the auditory dimension is always an integral part of the human's fundamental sensual and aesthetic experience formed by the superposition of different perceptual modalities. In contrast, the term *soundscape* has been established based on the isolated consideration of ambient sounds as the *other* realm – the auditory counterpart of the *landscape* identified as a visual construct. At the same time the definition of a soundscape refers to the term landscape inasmuch as it qualifies the sonic environment, as the individual subject perceives it. A strong emphasis on the individual construction of perception can be observed in the field of soundscape research, and on the other hand, a missing link to the other side of the phenomenon: the sensory perception of objects, the physical, the material constellation of our environment.

The consideration of direct landscape experience emphasizes, on the one hand, its poetical and emotional and subjective existence. On the other hand, it reveals a fundamental trait that has formed western landscape architecture since early modern times: the consideration of human perception as a basis for design. In this context the understanding of human perception links sensual experience with pragmatic aspects, as it integrates physiological preconditions of perception. Furthermore, through the culturally driven ordering of landscape elements – such as water, vegetation and terrain – according to principles of

perception, beauty and meaning is created. Landscape architecture shapes the concrete environment. Yet, at its essence, lies the design of space. In this regard, while the prevalent noise control techniques, whose critique was at the origin of the soundscape approach, are based on the measurement of a single sound parameter (loudness), the current process of soundscape research has also a tendency to assess single sound events, and thus to veer away from the concept of a spatial *gestalt*, which was part of the original proposal by Raymond Murray Schafer[2]. While the Canadian pioneer of the soundscape movement referred mostly to foreground-background composition – categories established in (landscape) painting – it seems important to develop a more dynamic idea of *gestalt* and *spatiality* in order to better understand the relationship between sound and place, auditory recognisability and landscape identity.

Traces of acoustic design practice in the history of landscape architecture

Music is the art of "designing the audible". Its basic element is tone, or sound[3]. Through the combination of different sounds, this art form creates moving forms, or audible shapes. Music is the oldest branch of sound science that we call acoustics today[4]. As early as the sixth century BC, Pythagoras studied euphonious tone combinations. To theoretically express the phenomenon of consonance in numerical proportions, he began to relate the perception of different pitches to the concrete physical reality of different chord lengths. Like musical figures, landscape architectural space emerges only through the relationship of various sensual elements to one another. How can we define the elements of an active and positive design of our

[2] R.M. Schafer distinguishes between *keynote sounds*, *signals* and *soundmarks* (cfr the new and revised edition of R.M. Schafer, *The Soundscape. Our sonic environment and the tuning of the world*, Destiny Books, Rochester, Vermont 1994 (1st ed.: *The Tuning of the World*, 1977), p. 9.

[3] W. Henckmann, K. Lotter, *Musik*, in Iidem, *Lexikon der Ästhetik*, C.H. Beck, Munich 2004, p. 258.

[4] F.V. Hunt, *Origins in Acoustics: the science of sound from antiquity to the age of Newton*, Yale UP, New Haven - London 1992.

acoustic environment, relating it to a complex and multisensory notion of landscape? And which are the preconditions for integration the sonic dimension into «the art of place-making»[5]?

A closer look at – or rather listening to – examples from the history of landscape architecture reveals traces of acoustical design practices which tell us: the knowledge of the link between space, sound and landscape has been existing for a long time, and has not to be reinvented, but rather it has to be reactivated in terms of the challenges of our time. A chronological trace of an *acoustic culture* of landscape architecture could be drawn, starting with the early choice of cultic sites driven by natural acoustic phenomenon, proceeding with the choice of location for the construction of the Greek open air theatre following acoustic qualities as described by Vitruvius, which are purposefully optimised through the human construction, transmitted to the Roman villa garden, with its valorisation of nature as a sensual experience, a practice finding its climax in the Italian Renaissance garden and echoes in the 19th century urban public parks, where acoustic elements such as cascades and rocks manifest the alternative draft of a "quiet" landscape as a counterpart to the roaring city.

Gardens play an important role for the exploration of the acoustic dimension of landscape architecture. They act as models of places stimulating sensual experience through particular design elements, which are adjusted to the human scale and the immediate perception of people. An in situ analysis of the Italian Renaissance gardens Villa Lante and Villa D'Este[6], shows the manifold potential of landscape architectural design elements – in this case particularly of water – for the creation of sonic spatial qualities. Also the following periods have fully drawn to the possibilities of acoustical design by water. Bearing witness to that observation are not only the surviving gardens

[5] This definition of landscape architecture is borrowed from John Dixon Hunt, *Greater perfections. The practice of garden theory*, University of Pennsylvania Press, Philadelphia 2000.

[6] A detailed description of the in situ analysis of the garden of Villa D'Este conducted by the author can be read in N. Schütz, *Le Projet du Paysage. Une approche créatrice de la dimension sonore*, in R. Barbanti e P. Mariétan (sous la direction de), *L'écoute du monde*, Actes du deuxième congrès mondial d'écologie sonore (CMES), Lucie Éditions, Collection Musique/Environnement 2016.

themselves, but also written sources, such as Dezallier d'Argenvilles Théorie et Pratique du Jardinage (1732): «Les fontaines sont, après les plantes, le principal ornement des jardins; ce sont elles qui animent par leurs murmures et qui causent de ces beautés merveilleuses, dont les yeux peuvent à peine se rassasier […]»[7]. In addition to acoustical design elements and spatialities, also specific definitions of the relation between sound and place are of great interest for the discipline of landscape architecture: in the 1st century BC. Vitruvius wrote his famous architectural treatise *De Architectura*[8], which is presumed to be the earliest written source linking explicitly acoustical phenomena with architectural production. In the chapter on the construction of Greek theatres, Vitruvius describes the choice of the place of location according to the appropriate environmental conditions as the basis for the acoustic optimisation of this building typology. In this context, he also proposes a classification of places according to their acoustic features.

From in situ analysis to integrative design

While written sources can offer precious indexes for the identification of acoustic/auditory design practice in different epochs, the landscape meaning of such statements can only be revealed in situ. One of the examples of acoustic site localization most integrally preserved to date is the theatre of Epidaurus (Peloponnese, GR) dating to the 4th century BC[9]. In order to reach the largest possible audience with a clear voice, the natural slope of a valley was used, and further optimized through the circular construction of the tiers. Sitting there, on the spot, the stone construction seems to constitute a kind of clearing within the homogeneous vegetation on the slope, the countless pine trees from which a continuous cicada sound texture emanates,

[7] M. Conan, *Dictionnaire historique de l'art des jardins*, Hazan, Paris 1997, p. 104.
[8] M. Vitruvius Pollio (1st century AC), *Zehn Bücher zur Architektur*, translated and commented by Jakob Prestel, Valentin Koerner, Baden-Baden, 1974.
[9] S. Gogos, *Das Theater von Epidauros. Mit einem Beitrag zur Akustik des Theaters von Georgios Kampourakis*, Phoibos-Verlag, Wien 2011.

that seems to hover like a sonic sphere over the theatre evoking thus an impression of interiority. At the same time falls into place that the acoustically driven choice of the site also led to a specific visual setting that turns the landscape to the scene of the theatre.

These in situ observations at the Epidaurus theatre reveal a fundamental principle of complementarity in multisensory landscape perception – the distinction between proximity and distance. With regard to this complementary distinction, auditory impressions stand out due to their capability to bridge these categories dynamically. The garden of Villa Lante in Bagnaia (IT), construction period 1574-1600[10], features an acoustic design element, which coalesces proximity and distance, local physis and virtuality in a dynamic counterpoint. The water steps cascade *Catanea del Gambero*, located at the bottleneck between *wilderness* and *culture*, *chaos* and *order* in this garden[11], is laterally accompanied by steps for people framed by man-high hedges. While elsewhere water rushes over large steps and roars, it bubbles and gurgles here through a variety of small steps of a few centimetres in height sloped carefully along the gently descending terrain. This movement is additionally stretched through the refined shaping of the flat waterbed, which tunes the sound of water into a language-like articulated stream. The lateral delimitation of the view excludes visual distractions in the space of proximity and ensures that the sounds own intimate spatiality comes into effect. At the same time, this visual frame enhances the illusion of depth that appears when looking down and thus moves the adjacent parts of the garden into the distance[12].

These historical examples, that we can still experience in situ, help to constitute an understanding of sound as an inherent element of landscape architecture, by detecting the knowledge embodied in built sites and sometimes hidden behind the common definition and representation of designing landscapes as a

[10] I.D. Mazzoni, *Villa Lante (Bagnaia): Hermetische Weltsicht*, in Idem, *Gärten & Parks, Gartenkunst von der Antike bis heute*, Gerstenberg, Hildesheim 2005, pp. 76-81.

[11] The vis-à-vis of these worlds is staged along the central axis of the in the sloped garden of Villa Lante, in which fountains and cascades – from thunderous to rhythmically controlled and muted – play an important role.

[12] Sound example online: <www.vimeo.com/154766524>, Password: soundlandscape.

mere construct of visual culture. Today, we are confronted with a quite different starting position than our ancient and modern predecessors. In the last two centuries, urbanisation and mobilisation led to a fundamental transformation of our sonic environment. But our ability to act is not limited to raising noise abatement walls or spreading sound absorbing asphalt. Beyond the abstract notion of "calm"[13] – still the only and indifferently idealized planning paradigm until now – we will discover that sounds can contribute to a rich landscape experience, offering space for imagination and communication. A landscape architectural *cultivation* of auditory spaces also in urban contexts could open up novel dimensions of landscape figuration. Because the interrelation between the audible and the visible is space-forming, neither an exclusively visual nor an exclusively aural conception of landscape *gestalt* can embrace the entire range of our actual sense of place. Thus, I will conclude by arguing in favour of a multisensory conception of space: only through the relation between our different senses, particularly in the difference and relation between the visible and the audible can landscape space come into being.

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[13] Meanwhile there is wide recognition of the social significance of ambient sound qualities other than noise emerging at institutional level. However, most concrete proposals focus on extending noise abatement strategies by the idea of preserving and creating "quiet areas", a strategy also postulated by (cf. the European Environmental Noise Directive – END, Council Directive 2002/49/EC).

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