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On Microclimatic Islands

The Garden as a Place of Intensified Thermal Experience

Sascha Roesler

Verweilst du in der Wlt, sie flieht als Traum;
Du reisest, ein Geschick bestimmt den Raum;
Nicht Hitze, Kälte nicht vermagst du festzuhalten,
Und was dir blüht, sogleich wird es veralten
Johann Wolfgang von Goethe (1819), “West-
östlicher Divan¹”.

- Gardens have always been appreciated as places of particular microclimatic qualities. Seen within the broader context of Enlightenment, gardens can be conceived as places of intensified thermal experience and as man-made concentrations of climate. In what follows, fundamental approaches to the microclimates found in gardens and green spaces shall be discussed. In the first part of the article, remarks on the *aesthetics* of microclimates, based on the perception of gardens, will be presented. I will refer to the writings of architects and historians in order to sketch the outline of an emerging aesthetic discipline highlighting thermal differences. In the second part, the *scientification* of microclimates and its entanglement with concepts of urban green spaces shall be discussed. Over the course of the twentieth century, gardens and green spaces became mitigating measures, fighting severe microclimatic conditions of cities, in particular the so-called urban heat islands. In the third part, the central role of *movement* in recognizing thermal differences in cities will be highlighted. The growing demand to manipulate microclimates at an urban scale leads to a research methodology that imitates the thermal experiences of citizens and integrates the two perspectives of aesthetics and the science of microclimates. Our very understanding of microclimates in general, as I would like to show, has been shaped by our perception of gardens and green spaces, since they integrate both the transient and the periodical dimensions of microclimates.

Thermal Delight

- 2 In her 1979 essay *Thermal Delight in Architecture*, the American architect Lisa Heschong coined the term “thermal delight” for the multi-sensorial and synesthetic experience provided by “thermal places” such as gardens. Emphasizing the exemplary significance of gardens for the notion of thermal delight, the publication’s cover is decorated with a gardener’s hat. Heschong highlights for instance “the Islamic garden” as “perhaps the richest example of a thermal place with a profound role in its culture²”. “Islamic gardens (...) offer delights for each sense³”. Thermal delight is always linked to multiple forms of experience provided by the body. Exemplary in this respect are the Moorish gardens where, as in the case of the Alhambra in Granada or the Real Alcázar in Sevilla (Spain)⁴, the conscious combination of architecture, vegetation, water and topographical measures (subsidence) led to a surprising abundance and quality of microclimatic experiences (fig. 1). “Historical descriptions and recent measurements confirm the pleasant microclimate” both in the gardens of the courtyards and inside the buildings⁵.

Figure 1. Great Mosque of Córdoba (Spain), section.

Credits: Hagen, Katrin, “Mit Sinnen und VERSTAND. Gestaltungsprinzipien maurischer Gärten als Inspiration für eine klima-sensitive Stadtgestaltung,” *dérive*, n 48, Stadt KLIMA Wandel, 2012, p. 21.

- 3 In the garden and *through* the garden, a man-made *concentration of the climate* is created. Such an intensification also becomes tangible in the light of twentieth-century modern culture, as in Mercè Rodoreda’s novel *Garden above the Sea*, in which “the sea’s air, the flowers’ colors, and lighthearted dialogues⁶” are inseparably intertwined or in the gardens of Richard Neutra’s houses in and around Los Angeles, which celebrate architecture as part of an overwhelming environment⁷. The garden represents a medium that is able to synthesize the aesthetic dimensions of thermal experience and to make them accessible. A cultural history of microclimate is therefore best seen in the context of the thermal experience of the garden. It is indeed the garden that makes a supreme aesthetic principle of the *transience* that results from the daily and seasonal fluctuations of microclimates. As a result, it is the visual techniques that remain on the trail of the ephemeral which dominate; the blossoming and fading garden is a symbol for this.
- 4 Lisa Heschong’s (late-modern) notion of thermal delight accentuated an idea emerging in enlightened eighteenth-century Europe, when gardens (and with them microclimates) were described as promoters of pleasant sensations. From an historical perspective, it was gardens that pioneered *the aesthetics of microclimatology*. At a time when microclimates were not yet measured scientifically, they were already described as part of a new emotional landscapes. “The excitement of pleasant sensations will thus be the general purpose of garden art,” writes philosopher Christian Cay Lorenz

Hirschfeld in his *Theory of Garden Art*, published in five volumes between 1779 and 1785⁸. In this romantic line of thought the garden is associated with numerous sensations transcending pure notions of beauty. Gardens also provide a *pleasant shiver*, giving the notion of thermal delight an ambivalent note. Thermal delight denotes a comparative mode of perception that builds on the ambiguity of changing microclimatic conditions. Drawing its pleasure from the volatility and difference of thermal conditions makes thermal delight a mode of perception that includes the unpleasant; it may be conceived as “an enjoyment” based on a “mixture of pleasure and pain”⁹.

- 5 The ambiguity of the thermal sensations provided by gardens has been illustrated by the garden historian Osvald Sirén in his description of the “Chinese treatise of gardening” *Yüan Yeh*, published in the seventeenth century. Referring to the New Summer Palace near Beijing¹⁰, the pavilions of the palace’s garden appear “intended for the ‘retention (enjoyment) of the spring’, and others offering protection against the summer heat.” “Here is created an atmosphere that evokes deep feelings¹¹”. Gardens provide these “deep feelings” of “enjoyment”. The multi-sensory qualities of gardens were made visible in Chinese miniatures with their simultaneous display of vegetal and architectural diversity in the medium of painting (fig. 2). “A successful garden is one where the scenery changes at each step, providing new viewpoints created by intentional framing processes. The winding route of a path helps to guide the walker’s gaze and to frame his view. The notion of dissimulation and discovery is essential in the creation of a garden. A Chinese garden only reveals itself as the walker advances, through a subtle operation on space and time¹²”. In gardens, a space of experience is implemented that can be described as an emotional geography. It is not Euclidean geometry but rather topology that forms its epistemic model; noticeably in gardens it is not primarily the proportion of discrete elements that is all important, but rather the gradual and uninterrupted transition from one zone into another. Ethnographic and earliest historical manifestations in the field of domesticity and horticulture are the empirical archives of such a knowledge on microclimates.

Figure 2. "Seeking Coolness in the Water", painting on silk, by Li Sung, China, 12th century.

Credits: Boyd, Andrew (1962), *Chinese Architecture and Town Planning*. 1500 B.C. – A.D. 1911, London.

- 6 In a cross-cultural perspective, gardens are characterized by two types of (thermal) environments: on the one hand by green open spaces, structured by plants and filigree architecture (pavilions), and on the other hand by courtyard houses with interior gardens. In the first case, the architecture is part of the garden, in the second case, the garden is part of the house. The courtyard house cultivates the garden inside the building, while the green open space, on the other hand, places the architecture in a floating relationship to the surrounding garden¹³. In both cases, the architectural boundary between inside and outside is dissolved or at least extenuated; the inside unfolds into the outside or the outside is taken into the inside of the house. This constellation of the consciously initiated crossing of borders between inside and outside areas forms the starting point of every architectural theory of microclimates, with gardens serving as important anthropological references. Gardens are places where horticulture and house building overlap; the architectural historian Andrew Boyd described the vegetal interior of a traditional courtyard house in Beijing (China), providing a sense for the atmosphere in a pre-industrial urban garden:

The outer court (...) was paved with stone slabs. There was a small pool with lotus growing in it near the centre of it. A screen covered with morning glory stood in front of the service rooms which backed on to the street and faced north. A "date" tree (*Zyzyphus vulgaris*) and a crab apple grew in this courtyard, and many flowers in pots were set out round the edge. This was not a mere service courtyard. There were guest rooms and some family rooms in the side buildings. (...) This inner court, encircled by a verandah, was also stone paved. There was an "artificial mountain" or strangely shaped stone in one corner, and two raised beds of shrub-peonies faced one another, one of each side. The wooden columns of the building and the verandah were all painted red, and the beams and other decorated woodwork other

bright colours. (...) In summer the table was set in the open air in the inner courtyard, or, if it rained, on the verandah¹⁴.

- 7 Traditional Chinese gardens had certain recurring basic elements: in addition to the walls surrounding the gardens, there are various forms of water such as ponds, canals or small rivers; artificial and natural rocks that further structure the garden and give it an artificial topography; and vegetation that depends on the seasons. In this respect, the Chinese garden is a simulacrum of the natural landscape. The appropriation of nature took place first and foremost in the form of “gardens, sacred landscapes, and nature symbolism¹⁵”.
- 8 Gardens are transcultural spaces *par excellence*: there are close conceptual ties between Islamic and Italian gardens of the Renaissance or Chinese and English gardens and landscape parks of the eighteenth century¹⁶. The central idea of English landscape parks, “beauty without order”, was widely conceived “as a Chinese idea, actually realized in Chinese gardens¹⁷”. Gardens have always been places of reception and recognition of ‘the Other’ and thus of cultural adaptation¹⁸. Travelers, not least European ones, have taken a special look at the ideal places abroad¹⁹. The garden – and later the city park – appears as a symbol of such an ideal, even paradisiacal place²⁰. In this respect, the garden is indeed, as Michel Foucault pointed out, a “heterotopia²¹” at a small scale, forming a perfect thermal place despite all adverse surrounding climatic conditions. The garden forms a special zone that demarcates itself from the surrounding environment. One “aspect that is common to all gardens is the demarcation from the environment. Through the wall, the hedge, the fence or the moat, the garden becomes a garden²²”. China’s urbanization was indeed characterized by the walls of gardens and courtyard houses, as Osvald Sirén pointed out.

Walls, walls and yet again walls, form the framework of every Chinese city. They surround it, they divide it into lots and compounds, they mark more than any other structures the basic features of the Chinese communities²³.

- 9 Although microclimatology as a field of scientific knowledge emerged only at the beginning of the twentieth century, in parallel with the genesis of the modern European city, the experience and language of microclimatology rely on the long cross-cultural history of gardens. Therefore, cultural historians and historians of gardens in particular are important mediators of the long history of microclimates. In times when microclimates were not measured yet by scientific means, they have already been described as part of poetry and painting (highlighting the “enjoyment” of gardens) or in the treatises of gardeners and botanists such as *Yüan Yeh* or in such works as the *Theory of Garden Art*. Within these writings on gardens, thermal experiences appear as part of synesthetic sensations; in terms of aesthetics, the garden is a place where sensations of thermal delight are cultivated. In the sense of Roland Barthes’ *Fragments of a Lover’s Discourse* (1977), the historical accounts of gardens thus provide a cross-cultural vocabulary for the microclimatic description of thermal environments today – this is my main argument here.

Urban Heat Islands

- 10 “Microclimatology” as a science was established by systematically examining the autonomous behaviour of the layer of air two meters above the ground²⁴. In this novel area of research, the global perspective of meteorology was expanded by including

microclimatic factors. Microclimates are formed in that area of the earth where the higher-level global climate and the local, often manmade conditions are superimposed on and mutually impact one another – in other words, where the “abstract three-dimensional geophysical system” and the “intimate ground-level experience” overlap. “This is a space in which the ‘natural’ atmosphere gets entangled with human energy²⁵”. The modern basis of this research was developed in Germany and Austria in the Interwar period. German climatologist Rudolf Geiger emphasized the interdisciplinary character of microclimatic research. In 1941, Geiger pointed to the fruitful “progress of microclimatic research methods in allied sciences, in the habitat research of botany, in forestry and gardening, in zoology, biology and medicine, in agriculture, planning and even in the technical aspects of traffic and construction work²⁶”. Epistemologically, microclimates are an exemplary hybrid topic at the intersection of nature and culture, but also of architecture and landscape architecture. As a science, microclimatology draws on insights from various disciplines with evident references to man-made interventions via design and construction. British climatologist Gordon Manley identified three fundamental influencing strategies that are of critical importance for the microclimatic approaches of architects and landscape architects: 1) the manipulation of plants and green spaces, 2) the manipulation of topography and soil, and 3. the manipulation of buildings and streets. An architectural theory of microclimates relies on all these three fields of intervention – plant life, topography and buildings²⁷. Moreover, Manley foregrounded the learning effect through “the more detailed work of the botanist whose technique and results may often be of interest to the architect engaged in the study of small spaces, or the problems of what happens at the surface of his materials²⁸”. In other words, the thermal differences in plant life become a model on what happens thermally in and between buildings in cities.

- 11 Earlier than the idea of turning entire cities into a garden, small-scale gardens have been elements of cities. According to historian Osvold Sirén, traditionally “the gardens in the Chinese towns have probably always been more numerous than those in the country”. Gardens have been conceived as “a substitute for real landscape at their town dwellings²⁹”. However, since the twentieth century, urban gardens and parks have been increasingly considered as climatic counter-worlds within the man-made urban atmosphere, devoted to overcoming the noise, the smell, and above all: the heat. Gardens and green spaces became influencing microclimatic factors in the city. According to urban planner Carl Kassner (in 1910)

the dryness in more extensive cities is mainly caused by the higher temperature, and this again is a consequence of the stone masses of the houses, for if they are irradiated by the sun during the summer, they heat up considerably and collect such an amount of heat that at night not as much cooling as in the countryside will happen³⁰.

- 12 Cities with their prevailing *mineral* building materials are struggling with increased temperature rates, what causes to the so-called “urban heat islands;” this term was in all likelihood introduced in the English-speaking world in 1947, referring to the English city of Bath (see below)³¹. According to Rudolf Geiger, these islands of increased thermal stress are due to three main influencing factors: the hermetic sealing through buildings and streets, the artificial input of heat, and the pollution of the air³². As a critical countermeasure, climatologists such as Albert Kratzer emphasized the “climatic impact” of green areas: “They mitigate the strong warming effect and they collect the dust of the streets³³”. In his seminal work *The Climate of Cities* of 1937, Kratzer mentions

Le Corbusier's idea of making the urban territory available for the development of green areas through the construction of high-rises; according to Le Corbusier "85 to 95% of city land" is to "remain available" for green areas (fig. 3)³⁴.

Figure 3. Le Corbusier comparing New York and "the city of the present age" (in *Urbanisme*, 1925), reprinted by Albert Kratzer (in *Das Stadtklima*, 1937).

Credits : Le Corbusier (1929), *Städtebau*, Stuttgart.

- 13 Two models have shaped the discussions with regard to the development of urban green spaces of the evolving modern city: the idea of *the garden city* and the idea of *the high-rise city*, as brought into play most prominently by Le Corbusier who merged the two models in one overall rationale. Within the framework of CIAM 3 (1930) with the programmatic title "flat, middle or high-rise construction", these two models of modern city planning were discussed prominently³⁵. From urban gardens to gardens and high-rise cities – this was, among other things, the modern architectural vision of a deliberate planning of microclimates in 20th century urbanization. The *green urban landscape* and the *green urban facade* became architectural tools for mitigating the city climate, overstepping the anthropological ability to cultivate sensations of thermal delight via gardens. German architect Martin Wagner used Camillo Sitte's distinction between "sanitary green" and "decorative green" as part of his 1915 dissertation *Das sanitäre Grün der Städte. Ein Beitrag zur Freiflächentheorie* in order to align green spaces with the new requirements of the evolving modern metropolis. In the context of new city climate phenomena, Wagner clearly conceived green spaces as a means to ventilating and cooling Berlin.

What is this "sanitary green"? All green areas and green facilities, which have an influence on human health, can be described as sanitary green. (...) The green areas can become indispensable for the large city's population as they are big air reservoirs and air improvers, without the population having to come into closer contact with the green areas³⁶.

- 14 Over the course of the 20th century, widespread green areas in cities, inheriting the “formerly land ‘held in common’³⁷” in the countryside, gained importance in large cities such as Berlin, Paris, or London. The green “urban commons,” such as in the case of Wimbledon in London, provide “comparatively sheltered climates within large city ‘heat envelope’³⁸”. They comprise a diversity of microclimates and they make a thermal difference compared to the surrounding urban landscape. Urban commons “provide the best and largest range of natural habitats we have in single units to represent much of what is implied in the term ‘nature in cities’³⁹”. While thermal delight in English gardens represented the individualized sensation of the (bourgeois) climber of the nineteenth century, green urban commons opened up access to comfortable and pleasant microclimatic conditions to broader strata of society. As means for fighting urban heat islands in large cities green commons stand for the democratization of increasingly urbanized and overheated societies in the second half of the twentieth century.
- 15 Post-war Berlin, largely flattened by bombing, was characterised by new intermediate zones (brownfields) that gave the formerly densest city of Europe a new green character. Berlin proved to be an incubator for green planning principles, that took the fragmentation of the city as a starting point for a new urbanism, weighing the interplay between the urban fabric and the renaturalized areas of the city. Most prominently in the competition on the “Capital Berlin” of 1957/58, architects like Hans Scharoun, Jørn Utzon, and Alison and Peter Smithson conceived Berlin as a strongly greened city, interspersed with buildings and megaforms. The idea of a city structured by fragmented islands was further developed by architects Oswald Mathias Ungers and Léon Krier, promoting the concept of “the city within the city” (Krier 1976) and “the archipelago city” (Ungers 1977) (fig. 4)⁴⁰. They appear as important providers of keywords for an urban-rural integration, which has great implications for the conscious design of urban microclimates. Without being explicitly committed to the urban climate, the fragmentation of the urban landscape was accompanied by the emerging phenomenon of urban heat islands. The fragmentation of urban planning principles (islandisation) promoting the conceptual upgrading of green spaces in cities, can be conceived of as an echo of these two developments. It provided architectural approaches for a deliberate design of isolated thermal environments.

Figure 4. Proposals for urban islands in West Berlin, 1977, by Oswald Mathias Ungers and Peter Riehm.

Credits: Hertweck, Florian and Sébastien Marot, *Die Stadt in der Stadt. Berlin: Ein grünes Archipel. Ein Manifest von Oswald Mathias Ungers und Rem Koolhaas mit Peter Riemann, Hans Kollhoff und Arthur Ovaska. Eine kritische Ausgabe*, Baden, Lars Müller Publishers, 2013.

Microclimatic Walks

- 16 In the second half of 20th century, landscape architects and architects aimed at reconciling the two aforementioned perspectives – the aesthetics and thermodynamics of urban microclimates – in a new understanding of microclimatic urban design. By reassessing the city's nature, new accounts of gardens and green spaces in cities emerged. The overall goals of ecology and democratic participation in urban development went along with new methodologies how to explore and how to design the city as a green city, taking into account the perspective of the citizens themselves. These pioneers, who examined the “intimate ground-level experience⁴¹” of the city with bodily-sensory means, are to be found in the 1960s in the fields of architecture and landscape architecture. Their ideas emerged in the context of a general *empirization* of the city as promoted by Kevin Lynch, Donald Appleyard (and others), as well as in the context of the emerging field of ecological urbanism. The systematic exploration of the urban experience led to precisely designed routes and associated notation systems, reconnecting the fragmented urban islands via precisely designed walks through the city. The routes, indicated in “choreographic scores”, implied “time, process, and change”⁴². According to the “scored’ structure⁴³”, the participant or visitor walked “over a prescribed ‘course⁴⁴’” comparable to developments in *Fluxus* or in the *Theatre of the Absurd* – e.g. Yoko Ono’s “instruction pieces” or the rituals in Samuel Beckett’s plays. In what follows two of these pioneering projects, aiming at exploring the

environmental “archipelagos” of cities, shall be highlighted. The (garden) cities of Bath (UK) and San Francisco (USA) have been the urban territories for two such multi-sensorial walks, both of which took place in 1966.

Peter Smithson in Bath (UK)

- 17 The first walk, elaborated by architect Peter Smithson, took place in the English (garden) city of Bath. Since Roman times, Bath has been famous for its microclimatic diversity in the hilly urban landscape. Accordingly, Bath has been the site of one of the first comprehensive scientific accounts of a city’s climate. In the 1947 study “A Microclimatological Investigation of Bath and the Surrounding District”, the meteorologists Balchin and Bye speak of striking “micro-climatic differences” in the urban landscape.

Daily journeys from the city area to the surrounding heights clearly revealed the susceptibility of the area to conditions of temperature inversion and associated fogs. This and other phenomena (...) suggest that an investigation into local climatic conditions might yield some interesting results⁴⁵.

- 18 The basis of the study was a system of measuring stations, which enabled a scientific comparison of the thermal differences and the microclimatic diversity of the city (fig. 5).

Figure 5. Locations of measuring stations in Bath (UK).

Credits: W.G.V. Balchin, Norman Pye, « A Microclimatological Investigation of Bath and the Surrounding District, » in *Quarterly Journal of the Royal Meteorological Society*, 73, 317-318, 1947, pp. 297-323.

- 19 In 1966, the architect Peter Smithson provided, how I see it, kind of an architectural echo to the climatological insights based on four precisely designed walks through the

city. Published in 1969 as *Bath: Walks within the Walls*, the essay comprises a precise description of Bath as garden city (fig. 6).

Bath is Rome in England: (...) it appears today like a city of palaces and gardens. Turned over to other uses. A shell of a city – as was Rome in the 18th century – with overgrown terracing and mounds, disused waterways and bridges, springs, farmhouses, cows, pigs and horses, gardens and allotments all “within the walls”⁴⁶.

- 20 The thermal diversity demonstrated by the climatologists is reflected in the diversity of the built environment as described by Smithson. Distinctive details are combined with the view of the whole city, written observations with photos and maps of the routes. Gutters in the streets, damp cave entrances and mossy rubble walls are just as important as the famous historical architecture of the curved “open-to-nature” crescents. Smithson’s descriptions are coined by a simultaneous inclusion of typologies, materials, construction methods, and urban green spaces; thus opening up an insight into the material culture of Bath’s urban microclimates. As early as 1962, near the town of Bath, in the foothills of Wiltshire’s famous landscape park Stourhead, Alison and Peter Smithson built their weekend home (the Upper Lawn Pavilion), which anticipated the sensorial diversity within the walls of a small plot of land, creating a microclimatology in miniature.

Figure 6. Photo taken from Bath: “*Walks within the walls* by Peter Smithson” (reprint).

Credits: Peter Smithson, “Bath: Walks within the walls: a study of Bath as a built form taken over by other uses,” in *Architectural Design*, October 1969.

- 21 In his four walks through Bath, Smithson orchestrated both *the routes* and *the tempi*:
 Behind Augusta Place quiet gardens and allotments with a marvellous view down the river and over to Camden Crescent high up on the opposite bank. Afterwards walk as quickly as you can up the hill and pause at the junction with Rosemount Lane. From now on the walk is real *rus in urbe* for behind the present walls and hedges are the mounds and terracing of previous occupancy now in transition⁴⁷.
- 22 The movement in the space of the city plays a decisive role in the description of microclimates. Until the early twentieth century, the movement was the only means of

experiencing the thermal differences and thus the microclimatic diversity of urban landscapes. It can be referred to seventeenth- and eighteenth-century writers and travellers such as John Speed and Celia Fiennes, who had provided early microclimatic accounts of the region around Bath. Smithson ties in with this tradition of building the microclimatic description on movements. In his city tours one can detect approaches to an architectural methodology of how urban microclimates can be perceived and made fruitful for architecture and its regulation. The identification of the “thermal places” of a city (as places of particular cultural and social value), such as the gardens and spas of Bath, are the initial ingredients of any architectural approach to microclimates and urban climate.

Lawrence Halprin in San Francisco (USA)

- ²³ Another city that, like Bath, is characterized by extraordinary urban microclimates, is San Francisco (in California). The city and its surroundings set the scene for a series of walks elaborated by landscape architect Lawrence Halprin and his wife, the dancer and choreographer, Anna Halprin in 1966 and 1968. The “kinaesthetic awareness” of the movement and the everyday experience of the urban environment played a critical role in the work of the two artists. Their walks “represented a curiously potent encounter between architecture and dance⁴⁸”. The three sites of the twenty-four-day workshop “Experiments in Environment” were downtown San Francisco, woodland Kentfield, and the coastal Sea Ranch.
- ²⁴ The walks, “involving designers, dancers, musicians, visual artists, writers, teachers, and psychologists⁴⁹”, started in San Francisco by providing a “city map” and a master “score to stimulate direct interaction with the physical environment of downtown⁵⁰”. The master score “indicated the sequence in which each participant was to visit the places along the route, the time to get there, and how long to stay⁵¹”. Each participant had different time requirements, so that a complex choreography of the group was created through the city. While in Kentfield the bodily experience was in the foreground (fig. 7 and 8); on the territory of Sea Ranch the found environment was in the centre of the activities. The participants had to observe and transform the environment: a “village” had to be built using the found drift wood. The general guidelines were designed to stimulate a multisensory approach to the environment:

Be as aware of the environment as you can ... This will include all sounds, smells, textures, tactility, spaces, confining elements, heights, relations of up and down elements. Also your own sense of movement around you, your encounters with people and the environment AND YOUR FEELINGS⁵²!

Figure 7. Merce Cunningham performing on Anna Halprin's dance deck, Kentfield, CA, 1957.

Credits: <https://www.documenta14.de/en/artists/13511/anna-halprin> (9/10/2019)

Figure 8. Blindfold walk in the frame of the "Take part process, a community participation methodology," Kentfield, CA. Experiments in Environment Workshop, 1966.

Credits: Courtesy Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania.

- 25 Two years before launching the workshop (1964) Lawrence Halprin had designed the layout for the 10-mile-long area of second homes (fig. 9). "Halprin's widely acclaimed (...) work on the Sea Ranch (...) shaped his attitude toward open space in the city⁵³". While working on the Sea Ranch, Halprin spent time together with the ecologist Dick Reynolds on site to document the location and to lay the foundations for the overall planning. In Halprin's words:

We spend a lot of time just spending time there and studying the land and we did a lot of what was then unusual kind of studies. Studies of the soils, of the geology and the geography (...), wind studies, he (...) made investigations on natural winds, from where they came from, how they were affecting things. Wind was a very difficult problem. It was so violent (...). It was clear from the beginning that if people would live there and enjoy being outdoors, that I had to do something about it⁵⁴.

- 26 Research on winds has led to a comprehensive regulation of the layout of the Sea Ranch's buildings. An adequate proximity to the trees was given great importance; the distance of the buildings, for instance, could not be more than 10 times the height of the trees. The planning process of the Sea Ranch provides retrospectively some insights, on how Halprin had imagined the architectural work *after* the walks. The deliberate exploration of the environment is the precondition for the design of a new urban environment. In numerous projects, Lawrence Halprin has taken the "bodily movement through the city" as the basis for his designs. The walks are the basis for his design attitude.

Figure 9. View over the Sea Ranch, 1987.

Credits: André Corboz Collection, Accademia die architettura, Mendrisio (Switzerland).

The Climatological Gaze

- 27 Although environmental factors such as the sun and the green spaces remained important starting points of the architects' investigations on microclimates, another point of reference becomes more and more relevant in the design of urban microclimates: the bodies of the citizens and their capacity to move through the city and to experience selected microclimates⁵⁵. Even more than being geometric and spatial entities, microclimates relate directly to the body with its thermal sensations. The movement-oriented and body-centred (multi-sensory) approaches of Smithson and

Halprin are historical forerunners of today's interest in the exploration and cultivation of the microclimatic dynamics of cities and their social and cultural values.

- 28 Microclimatic walks in a very literal sense have only recently been established in the case of the *Jade Eco Park* in Taichung (Taiwan), designed by architect Philippe Rahm and the landscape architect Catherine Mosbach (completed in 2019); the project refined the approaches outlined in the 1960s in a strikingly palpable way. On different paths throughout the park visitors encounter various thermal sensations based on actively and passively conditioned microclimates, designed through the consideration of heat, humidity and pollution (fig. 10). One could see these microclimates as a continuation of Bernard Tschumi's "follies" in his *Parc de la Villette* in Paris, which opened in 1984, because it is the event-character of these experiences which is being cultivated in the *Jade Eco Park* (fig. 11). The non-moral thermal approach of Rahm and Mosbach – which goes beyond conventional ideas of comfort – appears as a model for how the microclimates of today's cities might be consciously designed. The experience of being indoors is in this case also provided in the so-called outdoor space – and vice versa (fig. 12). There is at the same time a *reflection* of the thermal requirements of the contemporary city and a *play* on the artificiality of urban microclimates. In the form of a new methodology, Martin Wagner's notion of "sanitary green" has been connected with Oswald Mathias Ungers' idea of the green "archipelago city". The experience of thermal differences in parks such as *Jade Eco Park* undermines the insensibility materialized in the "well-tempered environment" (Peter Reyner Banham) provided by a twentieth-century notion of comfort. The large city with its polluted air and urban heat islands forms a place of diverse and ambivalent thermal experiences that exceed the premises of modern comfort. Urban gardens and parks are testing grounds for urban environments based on changing thermal conditions. Rather than providing stabilized thermal conditions, they convey the dynamics and interdependency of changing microclimates. In a nutshell, gardens and parks provide a model for how to condition indoor environments in the future.

Figure 10. Heat mapping for the design of the Jade Eco Park, Taichung, Taiwan.

Credits: Philippe Rahm architects, Mosbach paysagists, Ricky Liu & Associates.

Figure 11. Parc de la Villette (Paris, France), Axonometric of folly, by Bernard Tschumi, 1984.

Credits: <https://www.moma.org/collection/works/85> (9/10/2019)

Figure 12. Detail of Jade Eco Park, Taichung, Taiwan.

Credits: Philippe Rahm architects, Mosbach paysagists, Ricky Liu & Associates.

- 29 Both in the long cultural history of *thermal delight* and the short scientific history of *urban heat islands*, gardens and green spaces (in cities) played a critical role. In an anthropological perspective, the garden is the place where sensations of thermal delight are cultivated while in twentieth century urbanization, gardens, parks, and green areas received a major role as mitigating structures. These highly biased approaches are amalgamated in microclimatic walks⁵⁶. As part of those walks, “the relation between urban morphology, microclimate, and thermal comfort” is examined from the perspective of the user one to two metres above the ground, exploring the thermal qualities of the city⁵⁷. Only recently Vasilikou and Nikolopoulou speak of “the assessment of variations in the thermal sensation of users through ‘microclimatic walks⁵⁸’” The main goal of these walks addressing “physical, psychological, and physiological⁵⁹” aspects of microclimates is “to identify a specific change in the thermal conditions and define its quality⁶⁰”. The methodology includes the
- monitoring of microclimatic conditions, field surveys with questionnaire-guided interviews with the public, statistical analysis, evaluation of the environmental performance of urban textures, comfort mapping, social study of open spaces, and design guides and proposals⁶¹.
- 30 For a deliberate design of urban microclimates, new collaborations must be established, combining the climatologists’ urban climatic maps with an (aesthetically informed) climatological approach of architects and landscape architects, promoting *thermal difference*. Building on a term introduced by German climatologist Karl Knoch in 1962, we could speak of a “climatological gaze” in architecture and landscape architecture,

that integrates quantitative and qualitative, visual and thermal, aesthetic and scientific dimensions of microclimates.

The experienced climatologist can estimate for a certain purpose the quality or disadvantage of a situation by the mere visual inspection. He will separate the windy layers from the sheltered areas, the possibility of cold air accumulation in the deeper areas (frost holes), spots of preferential fogging, sunshine duration and more. Although this simple method, referred to as “climatological gaze”, cannot be expressed in climatological numerical values, it is sufficient, in special cases, to excrete the very unfavorable positions, and this is already worth much⁶².

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NOTES

1. Johann Wolfgang Von Goethe, "West-östlicher Divan", in *Goethes sämtliche Werke in sechzehn Bänden*, Band 11, Goethes Übersetzungen und Bearbeitungen fremder Dichtungen, Leipzig, S. 678. Goethe refers to the Persian poet Dschelal-Eddin Rumi, 1923 [1819].
2. Lisa Heschong, *Thermal Delight in Architecture*, Cambridge, The MIT Press, 1979, p. ix.
3. *Ibid.*, p. 29.
4. See Benito Jiménez Alcalá, "Aspectos bioclimáticos de la arquitectura Hispanomusulmana", *Cuadernos de la Alhambra*, 35, 1999, pp. 13-29.
5. Katrin Hagen, "Mit Sinnen und Verstand. Gestaltungsprinzipien maurischer Gärten als Inspiration für eine klima-sensitive Stadtgestaltung", *dérive*, n 48, Klima, Wandel, p. 23. "The microclimatic effect of such a spatial formation can best be explained by the patio-pórtico-torre concept (courtyard-arcade-tower): the lushly landscaped courtyards with their water features can develop a specific microclimate thanks to the insulation provided by the adjacent building façades; the openings of the self-contained buildings are positioned on the courtyard side and in the upper part of the tower-like main room, whereby the cool and humid garden air is sucked through the interiors; the shading by the superior arcades counteracts heating". Translation by the author. See also her dissertation, assessing comprehensively both historical sources and contemporary measurements in Moorish gardens. Hagen, Katrin, *Freiraum im Freiraum: Mikroklimatische Ansätze für die städtische Landschaftsarchitektur*, Wien, Techn. Univ., Diss., 2011.
6. The literary scholar Roger Willemsen emphasizes the high capacity of this literature "to hint something as immaterial as the floating of a mood, the condensation of a climate, such as the composition of the sea's air, the flowers' colors, and lighthearted dialogues". Roger Willemsen,

“Epilogue”, in Mercè Rodoreda, *Der Garten über dem Meer, Der Garten über dem Meer*, Hamburg, Marebuchverlag, 2014 [1967], p. 228.

7. See David Leatherbarrow, *Topographical Stories. Studies in Landscape and Architecture*, Philadelphie, University of Pennsylvania Press, 2004.

8. Christian Cay Lorenz Hirschfeld, *Theorie der Gartenkunst*, Bd. 1, 1779, p. 155. Angaben gemäss: Hans von Trotha, (1999), *Angenehme Empfindungen. Medien einer populären Wirkungsästhetik im 18. Jahrhundert vom Landschaftsgarten bis zum Schauerroman*, München, p. 9. See also Alexander Gottlieb Baumgarten (1750-1758), *Ästhetik*, Meiner, Hamburg, Meiner, 2007.

9. Mark Fisher, *The Weird and the Eerie*, London, Repeater, 2016, p. 13.

10. Osvald Sirén, *Gardens of China*, New York, Ronald Press, 1949, p. 5.

11. *Ibid.*, p. 6.

12. Chiu Che Bing, “The Traditional Chinese Garden: A World Apart,” in Frédéric Edelmann (ed.), *In the Chinese City. Perspectives on the Transmutations on a Empire*, Barcelona, Actar, 2008, p. 63.

13. Pavilion and courtyard house form two complementary architectural typologies, which led architect and theorist Werner Blaser to his fundamental distinction between “massive and filigree construction.” “The choice of skin-and-skeleton building as a means of joining and disjoining the indoor and outdoor world follows logically from the technological possibilities of combining the two archetypal dwellings: the cave and the tent.” Werner Blaser, *Chinese Pavilion Architecture. Quality, Design, Structure Exemplified by China*, Niederteufen, A. Niggli, 1974, p. 9.

14. Andrew Boyd, *Chinese Architecture and Town Planning. 1500 B.C. – A.D. 1911*, Chicago, University of Chicago Press, 1962, p. 79.

15. Clarence J. Glacken, *Traces on the Rhodian Shore. Nature and Culture in Western Thought From Ancient Times to the End of the Eighteenth Century*, Berkeley Los Angeles, University of California Press, 1967, p. ix.

16. The appropriation of the Chinese garden by Western researchers and architects, particularly in the decades after the World War II, have been conducted by the German sinologist Eleanor von Erdberg (*Chinese Influence On European Garden Structures*, Cambridge, Harvard University Press, 1936), the Swedish art historian Osvald Sirén (*Gardens of China*, New York, The Ronald Press Co., 1949), the English historians of science Arthur Lovejoy (*Essays in the History of Ideas*, Baltimore, The Johns Hopkins Press, 1948) and Joseph Needham (*Science and Civilisation in China*, New York, Cambridge University Press, 1956), the English architect Andrew Boyd (*Chinese Architecture and Town Planning. 1500 B.C.-A.D. 1911*, London, Alec Tiranti, 1962), and the Swiss architect Werner Blaser (*Chinese Pavillion Architecture. Quality, Design, Structure Exemplified by China*, Niederteufen, A. Niggli, 1974).

17. Arthur O. Lovejoy, “The Chinese Origin of a Romanticism”, in *Essays in the History of Ideas*, New York, 1960 [1948], p. 102.

18. In the sense of Goethe’s *West-Eastern Divan*. Johann Wolfgang Von Goethe, “West-Östlicher Divan”, in *Goethes sämtliche Werke in sechzehn Bänden*, Band 11, Leipzig, 1923 [1819].

19. Architect Ernst Egli, following climate deterministic thinking of his time, conceived the gardens of Bagdad not only modifying urban microclimates but more general the “imaginative world” of the residents. “Not much imagination is needed to tell oneself how different life is in the atmosphere of London, compared to that of Bagdad. Any European who has lived for a certain time in the dry zone of the earth knows how every inch of his surroundings will change in importance even for him: the garden, the trees, the water, the land, shade and light. The imaginative world of a person born in that country will be entirely different from our own, for he has quite different needs and desires”. See Ernst Egli, *Climate and Town Districts. Consequences and Demands*, Zurich, 1951, p. 64. See also Gaston Bachelard, *The Poetics of Space*, Boston, Beacon Press, 1994 [1958].

20. See Gilles Clément, *“The Planetary Garden” and Other Writings*, Philadelphie, University of Pennsylvania Press, 2015.

21. Michel Foucault, "Des Espace Autres," in *Architecture, Mouvement, Continuité*, October 5, 1984, pp. 46-49.
22. Hans von Trotha, "Hortus conclusus. Der mittelalterliche Klostergarten", in Albert Lutz and Hans von Trotha (dir.), *Gärten der Welt. Orte der Sehnsucht und Inspiration*, Köln, Wienand, 2016, p. 161. In German: "Ein Moment, das allen Gärten gemeinsam ist : die Abgegrenztheit von der Umwelt. Durch die Mauer, durch die Hecke, durch den Zaun oder den Graben wird der Garten zum Garten."
23. Cited according to David Bray, *Social Space and Governance in Urban China. The Danwei System from Origins to Reform*, Palo Alto, Stanford University Press, 2005, p. 17.
24. Rudolf Geiger, *Das Klima der bodennahen Luftschicht, ein Lehrbuch der Mikroklimatologie*, Braunschweig, Berlin, Springer Vieweg, 1941 [1927], p. VI.
25. James R. Fleming, Vladimir Jankovic, "Revisiting Klima", *Klima, Osiris*, vol. 26, 2011, p. 4.
26. Rudolf Geiger, *Das Klima der bodennahen Luftschicht, ein Lehrbuch der Mikroklimatologie*, Braunschweig, Vieweg, 1941 [1927], p. VI.
27. On the intersections of these three fields see Stan Allen and Marc McQuade (eds.), *Landform Building: Architecture's New Terrain*, Baden, Lars Müller Publishers, 2011.
28. G. Manley, "Microclimatology. Local Variations of Climate likely to affect the Design and Siting of Buildings", *The Journal of the Royal Institute of British Architects*, vol. 56, n°7, May 1949 (read at meeting of RIBA. on 12 April 1949), p. 317.
29. Osvald Sirén, *Gardens of China*, New York, The Ronald Press Company, 1949, p. 5.
30. "Die Trockenheit in ausgedehnteren Städten wird vor allem durch die höhere Temperatur verursacht, und diese wieder ist eine Folge der Steinmassen der Häuser, denn wenn diese im Laufe des Sommers von der Sonne bestrahlt werden, so erhitzen sie sich beträchtlich und sammeln eine derartige Wärmemenge, dass nachts keine so grosse Abkühlung eintritt wie draussen auf dem Lande." Carl Kassner, *Die meteorologischen Grundlagen des Städtebaues*, Städtebauliche Vorträge aus dem Seminar für Städtebau an der Königlichen Technischen Hochschule zu Berlin, Band III, Heft VI, herausgegeben von Joseph Brix und Felix Genzmer, Berlin, Ernst & Sohn, 1910, p. 14.
31. "The distribution of the station sites also enables an assessment of the urban effect to be made. In winter the central city area is warmer than the surrounding country areas at similar elevation by a degree or so and exhibits the characteristic heat island within a built-up area. Much is doubtless due to the increased heat generated by the city itself and the higher absorption rate permitted by the increased atmospheric pollution of winter months which also reduces outward radiation. In summer, however, the city station showed lower maxima than the surrounding country sites at similar elevation to the extent of 1-2 degrees. This was an interesting conformation of other observations that the heat island effect of winter is not necessarily continued throughout the year." W.G.V. Balchin, Norman Pye, "A Microclimatological Investigation of Bath and the Surrounding District", *op. cit.*, p. 303f. See also Sue Grimmond, "London's urban climate: historical and contemporary perspectives", in Michael Hebbert, Vladimir Jankovic & Brian Webb, *City Weathers. Meteorology and Urban Design 1950-2010*, Manchester, University of Manchester, 2011.
32. Rudolf Geiger, *Das Klima der bodennahen Luftschicht, ein Lehrbuch der Mikroklimatologie*, *op. cit.*, p. 352.
33. Albert Kratzer, *Das Stadtklima*, Braunschweig, F. Vieweg & sohn, 1937, p. 66.
34. *Ibid.*, p. 67.
35. In his contribution to the CIAM Congress, le Corbusier interpreted the title as follows: "Should the surface of cities be extended or made smaller?" Le Corbusier, "Die Bodenaufteilung der Städte," in *rationelle bebauungsweisen. Ergebnisse des 3. Internationalen Kongresses für Neues Bauen*, Brüssel, November 1930, Frankfurt am Main, reprint 1979, Nendeln, 1931 p. 48.
36. Martin Wagner, *Das sanitäre Grün der Städte. Ein Beitrag zur Freiflächentheorie*, Dissertation TU Berlin, 27. Februar, Berlin, S. 1, 1915.

37. Ian Laurie (ed.), *Urban Commons*, in *Nature in Cities. The Natural Environment in the Design and Development of Urban Green Space*, Wiley, Chichester, 1979, p. 232.
38. *Ibid.*, p. 235.
39. *Ibid.*, p. 232.
40. See Florian Hertweck, “Berliner Ein- und Auswirkungen”, in *Die Stadt in der Stadt. Berlin: Ein grünes Archipel. Ein Manifest (1977) von Oswald Mathias Ungers und Rem Koolhaas mit Peter Riemann, Hans Kollhoff und Arthur Ovaska. Eine kritische Ausgabe von Florian Hertweck und Sébastien Marot*, Baden, Lars Müller Publishers, 2013.
41. James R. Fleming, Vladimir Jankovic, “Revisiting Klima”, *Klima, Osiris*, vol. 26, 2011, p. 4.
42. Alison Bick Hirsch, *City Choreographer. Lawrence Halprin in Urban Renewal America*, *op. cit.*, p. 5.
43. *Ibid.*, p. 201.
44. [https://time2switch.wordpress.com/2011/08/15/score-quad/\(8/8/2018\)](https://time2switch.wordpress.com/2011/08/15/score-quad/(8/8/2018))
45. W.G.V. Balchin, Norman Pye, “A Microclimatological Investigation of Bath and the Surrounding District”, *op. cit.*, pp. 297-323.
46. Peter Smithson, “Bath: Walks within the walls: a study of Bath as a built form taken over by other uses”, *Architectural Design*, October 1969, p. 1.
47. *Ibid.*, p. 8.
48. Mark Wasiuta, Sarah Herda, “Anna Halprin, Lawrence Halprin. The Halprin Workshops Bay Area, California, USA 1966-1971”, [on line] [http://radical-pedagogies.com/search-cases/a37-anna-halprin-lawrence-halprin-workshops/\(8/10/2018\)](http://radical-pedagogies.com/search-cases/a37-anna-halprin-lawrence-halprin-workshops/(8/10/2018))
49. Alison Bick Hirsch, *City Choreographer. Lawrence Halprin in Urban Renewal America*, *op. cit.*, p. 200.
50. *Ibid.*, p. 201.
51. “Day one quotations from Halprin, *The RSVP Cycles*”, cited according to *ibid.*, p. 201 and 303.
52. “Guidelines for the Experiments in Environment Workshops”, 1968, cited according to *ibid.*, p. 201.
53. *Ibid.*, p. 7.
54. Halprin Lawrende, “Word-by-word quotation”, in Zara Muren, *Dream of the Sea Ranch*, a Documentary Film, 1994.
55. See Sanda Lenzholzer, *Weather in the City: How Design Shapes the Urban Climate*, Rotterdam, nai010, 2015.
56. Broadly, sensory walks have been applied in research on urban microclimates by French Jean-Paul Thibaud and Canadian André Potvin since the early 2000s. Potvin deployed mobile monitoring methods since his PhD. See André Potvin, “Assessing the microclimate of urban transitional spaces”, in *Proceedings of PLEA2000*, Cambridge, Routledge, 2000; André Potvin, “Intermediate environments”, in K. Steemers et Steane (dir.), *Environmental diversity in architecture*, London/New York, Spon Press, 2004; and Jean-Paul Thibaud, “La fabrique de la rue en marche : essai sur l’altération des ambiances urbaines”, *Flux*, 66/67, 2007.
57. Carolina Vasilikou, Marialena Nikolopoulou, “Degrees of Environmental Diversity for Pedestrian Thermal Comfort in the Urban Continuum. A New methodological Approach,” in *Advances in People-Environment Studies*, vol. 5, *Bridging the Boundaries. Human Experience in the Natural and Built Environment and Implications for Research, Policy, and Practice*, Hogrefe, 2014, p. 103.
58. *Ibid.*, p. 97.
59. *Ibid.*, p. 101.
60. *Ibid.*, p. 106.
61. *Ibid.*, p. 99.
62. Translation of Karl Knoch, *Problematik und Probleme der Kurortklimaforschung als Grundlage der Klimatherapie*, Mitteilungen des Deutschen Wetterdienstes, n°30, Offenbach a. M., 1962, p. 50.

ABSTRACTS

Gardens have always been appreciated as places of particular microclimatic qualities. Seen within the broader context of Enlightenment, gardens can be conceived as places of intensified thermal experience and as man-made concentrations of climate. In the first part, remarks on the aesthetics of microclimates, based on the perception of gardens, will be presented. In times when microclimates were not yet measured by scientific means, the thermal differences found in gardens have already been described as part of poetry and painting or in the treatises of gardeners and botanists. In the second part, the scientification of microclimates and its entanglement with concepts of urban green spaces shall be discussed. Over the course of the 20th century, gardens and green spaces became mitigating measures, fighting severe microclimatic conditions of cities, in particular the so-called urban heat islands. In the third part, the central role of movement in recognizing thermal differences in cities will be highlighted. Two pioneering projects, aiming at exploring the environmental “archipelagos” of cities, will be highlighted. The (garden) cities of Bath (UK) and San Francisco (USA) have been the urban territories for multi-sensorial walks of architect Peter Smithson and landscape architect Lawrence Halprin, both of which took place in 1966. The movement-oriented and body-centred approaches of Smithson and Halprin are historical forerunners of today’s interest in the exploration and cultivation of the microclimatic dynamics of cities and their social and cultural values. Even more than being geometric and spatial entities, microclimates relate directly to the body with its thermal sensations.

Les jardins ont toujours été appréciés en tant que lieux aux qualités microclimatiques particulières. Considérés dans le contexte plus large du siècle des Lumières, les jardins peuvent être conçus comme des lieux de concentration de climats créés par l’homme proposant une expérience thermique intensifiée. En premier lieu, cet article présentera des remarques sur l’esthétique des microclimats basées sur la perception des jardins. À une époque où les microclimats n’étaient pas encore mesurés scientifiquement, les variations thermiques constatées dans les jardins étaient déjà décrites en poésie et en peinture, ou encore dans les traités de jardiniers et de botanistes. En deuxième lieu, l’article abordera la scientification des microclimats et leur intrication avec des concepts du domaine des espaces verts urbains. Au cours du XX^e siècle, les jardins et les espaces verts urbains sont devenus des mesures d’atténuation des conditions microclimatiques sévères des villes, en particulier les îlots de chaleur urbains. En troisième lieu, le rôle central du mouvement dans la reconnaissance des variations thermiques dans la ville sera mis en évidence. Deux projets pionniers visant à explorer les « archipels » environnementaux des villes seront mis en lumière. Les cités-jardins de Bath (Royaume-Uni) et de San Francisco (États-Unis) ont été le terrain d’étude pour les parcours multisensoriels menés par l’architecte Peter Smithson et l’architecte-paysagiste Lawrence Halprin, tous deux en 1966. Leurs approches centrées sur le mouvement et le corps sont précurseurs de l’actuel intérêt pour l’exploration et la mise en valeur de dynamiques microclimatiques urbaines et leurs dimensions socioculturelles. En plus de leur caractère d’entité géométrique et spatiale, les microclimats sont directement liés au corps et à ses perceptions thermiques.

INDEX

Mots-clés: théorie du paysage, microclimat, îlot de chaleur urbain, perception thermique, parcours microclimatique, Alison et Peter Smithson, Lawrence et Anna Halprin.

Keywords: Theory of Garden, Microclimate, Urban Heat Island, Thermal Perception, Microclimatic Walk, Alison and Peter Smithson, Lawrence and Anna Halprin.

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