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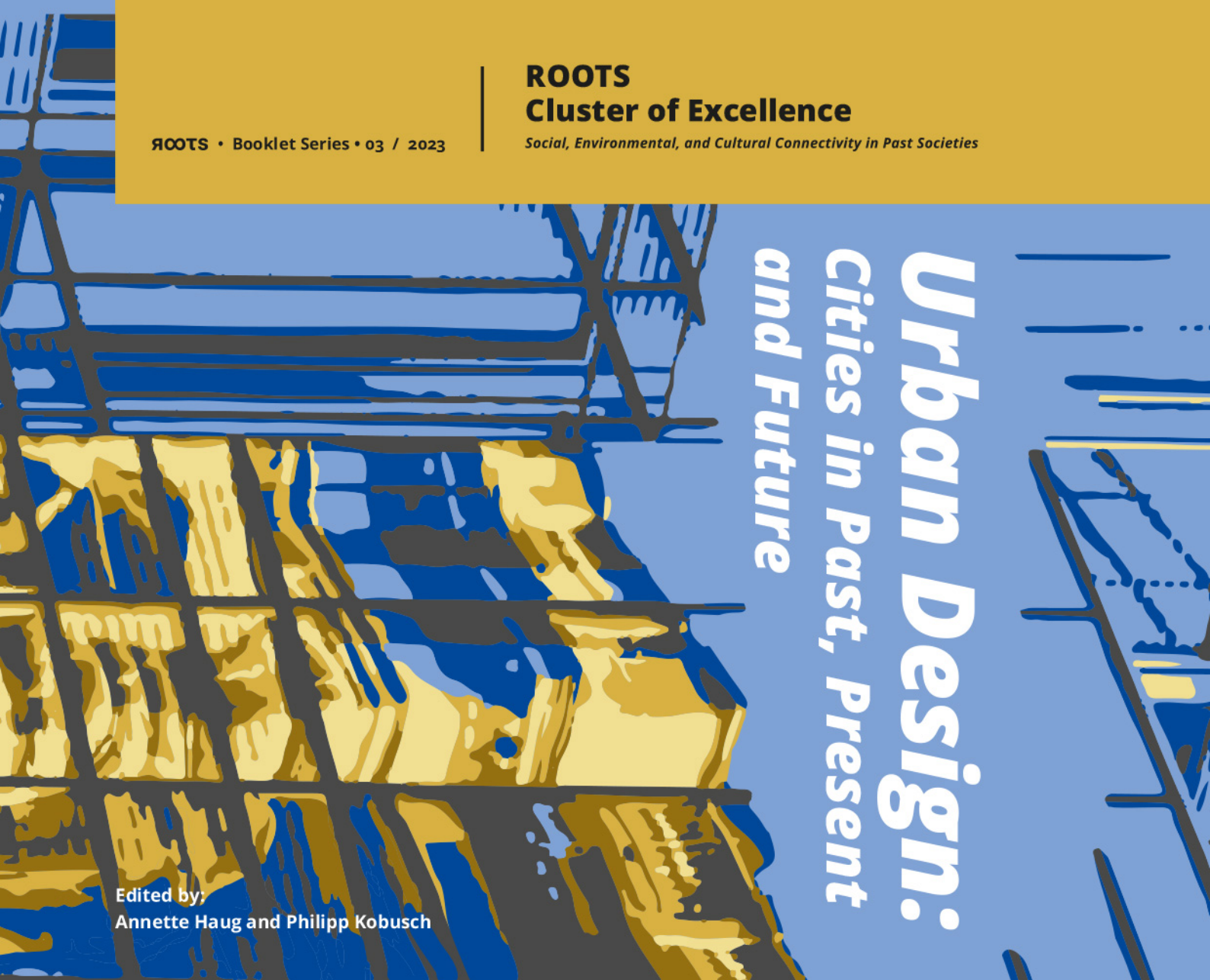
ROOTS
Cluster of Excellence
Social, Environmental, and Cultural Connectivity in Past Societies



Urban Design:
Cities in Past, Present and Future

Edited by:
Annette Haug and Philipp Kobusch

» *Urban Design: Cities in Past, Present and Future* «

Preface

In the Cluster of Excellence 'ROOTS – Social, Environmental and Cultural Connectivity in Past Societies', scholars from diverse disciplines deal with the reconstruction of past societies. Connectivities of individuals and groups, of people and the environment, of events, processes and structures are investigated from an archaeological and historical perspective. Globalisation as a worldwide process, including the associated regional effects and reactions, is of primary importance. The underlying hypothesis – the more people are connected, the lower the potential for conflict – was the starting point.

Especially in times of crises and conflicts with disrupted communication networks and transportation routes, it is even more essential to know how people reacted in changing and challenging situations in the past: not only in the recent industrial and post-industrial world but also in distant times, which provide us, so to say, with a mirror of our behaviour and our possibilities. Thus, the question is raised how hunter-gatherers, first farmers, ancient societies or early modern urban communities created their worlds.

In this respect, we decided to create a booklet series which presents information in a generally understandable way in current times of massively increasing global conflicts. With the present brochure, ROOTS continues this series, which introduces the discussions and results of our research cluster to a broader public.

This booklet is devoted to 'urban design'. The role that urban design played within different societies is one example how humans deal with the construction of their environments in self-created worlds of connectivity. This includes not only the material design of urban space through architecture and other design elements but also the development of social regulations and norms that regulated how people lived together. Beside design features and their meaning, urban landscapes are the place where, in addition to humans, also animals, plants and microbiomes, or – in a created reflection – even deities play a role. Therefore, research into 'urban design' and the underlying prerequisites, premises and concepts in the past, present and future can serve as an example for people's attempts to construct their direct environment in connected worlds and thus to help shape the basis for human action in general.

The booklet series is also conceived to stimulate discourses and commentaries on future issues from a past perspective in other media. Only those who understand the past are able to sustainably shape the present and develop lasting future perspectives. Reconstructing human behaviour in other times – and specifically in terms of the human-environment relationship – can provide a deep understanding of the past and open up opportunities for the future.

Johannes Müller
Speaker of the Cluster of Excellence ROOTS

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Annette Haug

Introduction

Urban Design between Past, Present and Future

What characterises a city? What is meant by urban design? And why is urban design so central for cities in the past, present and future? The following text responds to these questions, which form the background for all the contributions gathered in this volume.

Our world is in crisis. This (post-)apocalyptic narrative is fed in Europe by recent experiences that were thought to have been overcome since the Second World War: war, hunger and disease. Added to this are the effects of climate change in a hitherto unknown dimension. All these problems, as diverse as they are, do not only have a direct impact on cities but are also partly caused by living in cities. The crisis of the world is a crisis of cities.

From a historical perspective, however, cities also lend themselves to a different narrative. In the history of mankind – and especially in the recent past – cities have been a distinct model of success. With their specific supply, work and experience offers, they are attractive to increasingly more people. In 2050, about two thirds of the global population will live in cities. Against this backdrop, ideas are required as to which cities – and in what kind of world – we want to live in.

Architect Benedikt Hartl proposes to repurpose the materials of the 'Nordstream 2' natural gas pipeline, as the project has been abandoned for the foreseeable future. In his concept, the recycled pipes are to be turned into 'Nordstream 3': a five-storey shel-

ter at the Baltic Sea near Greifswald, consisting of 194 bunks, to function as a monumental centre for international understanding (Fig. 1, next page). As fictitious as the design is: It refers to discourses on ecology and peace, and is thus related to a concrete spatial, historical, even social context. In view of the recent political-military crisis, one might even consider whether 'Nordstream 1' would also be suitable for such a rededication. Hartl's design is unlikely to be realised. But it has received a broad echo in the press and is thus able to initiate a discourse on the limits of what is conceivable, sayable, possible and feasible. Utopias have always been an important part of urban discourse because they react to a social, political, ecological or economic setting. This is where design, in general, and urban design, in particular, come in: It is about the shape and design of cities in the past, present and future.

City means 'settling together'. Settlement densifications can take on very different forms over time and in different places. In general, however, cities can be understood as dynamic 'hubs' of dense connectivity, interaction and materiality, characterised by specific mentalities and identities. In other words, the city is understood as a built, material space, a social community and a mental concept in equal measure. Materiality, people and concepts do not stand unconnected to each other, but are closely related in urban space. The city is socially – and thus also materially and mentally – produced through communication and interaction. Conversely, materialities and mentalities have a direct influence on urban life. The city can thus be understood as a complex interplay of different interpenetrating spaces, groups of actors and fields of action: private and public, leisure and work, religious and profane, social, cultural, political, economic and ecological. All these dimensions of the urban have a material as well as an immaterial, a concrete life-world and a mental-conceptual side.

The term urban design is used, on the one hand, to analyse urban forms of design and, on the other hand, to reflect practically on possible design options. In this context, design equally refers to the shape and design of the material-physical urban space, the social relationship structures and the mental concepts of the city – on different scales. Urban design ranges from 'trivialities', such as the design of manhole covers, to monumental architecture, individual buildings, city districts and to the city as a whole. Likewise, urban design encompasses the form of partnerships and communities up to the socio-political design of urban living conditions. Last but not least, mental concepts of the city come into view, in the tension between individual ideas and collective models. The awareness of the ability to shape the city draws attention to the negotiation processes, which stand behind specific social and architectural forms.

The significance of design is thus almost all-encompassing: It provides orientation, meaning and function. This is illustrated by the example of a single building such as Kiel's town hall (Fig. 2, next page). Its architecture refers to the concrete needs of use, so that it has rooms for public use, but also state rooms. The design elements used on the façade, but

also in the interior, organise perception and direct attention. The tower signals the importance of the building in the urban space through its height, but also through its architectural language: It is reminiscent of the Campanile of San Marco in Venice. The fact that the entrance is particularly emphasised on the main façade contributes to the orientation of the users.

What applies to the design of the material urban space also applies to the social design. Here, too, it is a matter of functions, meaning and orientation – for example, in the design of social relationships, the creation of institutions and legal systems or the establishment of ethical standards. The shape and design of mental concepts also recurs to specific functions and horizons of meaning – think of the construction of urban history to legitimise political measures or urban marketing as a strategy of economic upgrading.

Particularly significant for the concept of urban design is the consideration of the temporal dimension: cities in the past, present and future. Cities have and are history. Cities worldwide are shaped by their past – in material, social and mental terms. For example, the street network of many cities in today's Italy dates back to Roman antiquity, and even more: The cityscape includes buildings from 2000 years of history (Fig. 3). Social, political, economic and ecological influences have had a similarly long impact. Roman law, for example, is a central point of reference for our current European legal system. Contemporary cities are thus always the result of a process that reacts to changing requirements and concepts.

A particularly central factor for contemporary cities is demographic development (Fig. 4). It goes hand in hand with massive urbanisation, which has led to the formation of ever new urban concepts. This applies, for example, to the post-war, car-oriented city divided into functional areas or, more recently, to the emergence of monstrous megacities and the realisation of 'compact' cities. The major urban problems of our time – social inequality, housing shortages, high traffic volumes, resource scarcity, climate change – have their roots in such demographic processes, which correlate with social, cultural and ecological changes.

This volume is the result of an interdisciplinary

↑ Figure 1. The architect Benedikt Hartl has presented a proposal for using the construction materials of the gas pipeline 'Nordstream 2' that are no longer needed. The pipes should be used for the construction of an international meeting place 'Nordstream 3' (Source: © Opposite Office, Benedikt Hartl).

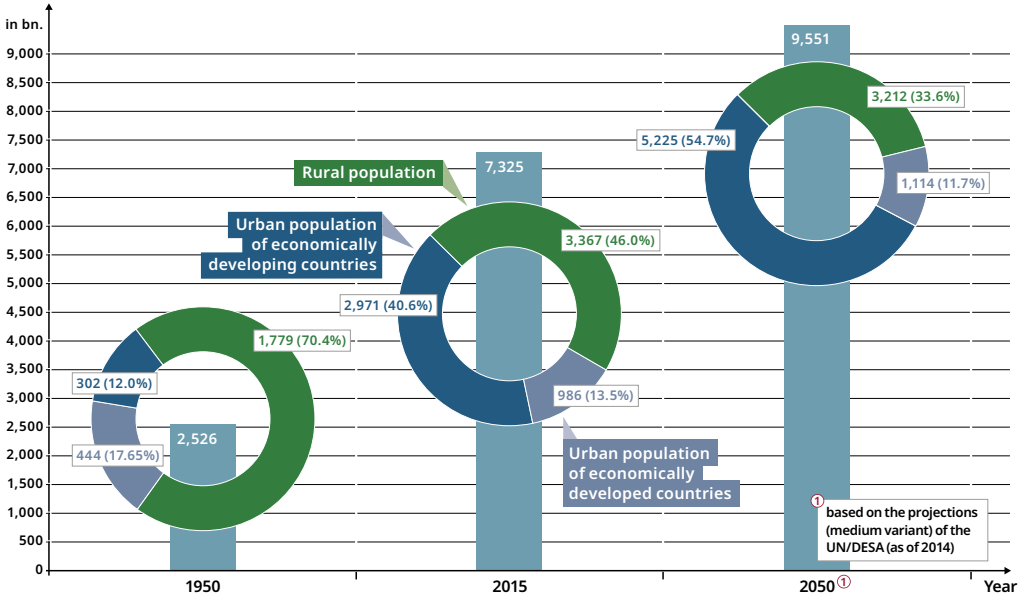
↑ Figure 2. The design of Kiel's town hall takes into account its specific function and signals this function to the outside world. It thus contributes to the creation of meaning and orientation in public space (Source: © Diego Delso: https://commons.wikimedia.org/wiki/File:Ayuntamiento,_Kiel,_Alemania,_2019-09-10,_DD_51-53_HDR.jpg).

colloquium organised in cooperation with ROOTS and the university's DenkRaum. It brought together nearly 50 positions on urban design from Kiel University, Muthesius Kunsthochschule, Kiel University of Applied Sciences, UKSH, the City of Kiel and HafenCity University in Hamburg – the following contributions represent a selection. They address the interactions of urban materiality, actors and mental concepts from different perspectives. In addition to historical-archaeological positions, more contemporary and application-oriented voices will be heard. In their diversity, the aim of the contributions is to create an awareness of the complexity of dimensions that are significant for the design of cities and to stimulate reflection on the cities of the future. ◆

↑ Figure 3. The Roman amphitheatre of Verona still shapes the modern cityscape of the Italian metropolis (Source: © Arne Müseler/ www.arne-mueseler.com, CC BY-SA 3.0 de, https://commons.wikimedia.org/w/index.php?curid=116753080).

Urbanisation

Urban and rural population in absolute numbers and in percentage of world population, 1950, 2015 and 2050



↑ Figure 4. Urbanisation chart (Source: United Nations – Department of Economic and Social Affairs, Population Division (2014): World Urbanization Prospects: The 2014 Revision. License: Creative Commons by-nc-nd/3.0/de; Bundeszentrale für politische Bildung 2017, www.bpb.de).

Ulrich Müller

Archaeological Heritage in the Historic Urban Landscape

Cities are lived, built, perceived, and historically rooted sites. In order to understand urban design as a historically layered place, archaeological features of the urban past must be both described as a historic urban landscape and its interactions also considered in the contemporary and future urban landscape. By looking at the materialities within the social domain, archaeology can record the manifold voices of the city in divergent temporal, spatial, and social contexts and emphasise the intrinsic transformability of (urban) cultural heritage in the present and the future.

Archaeology has many manifestations in our contemporary cities and generates a vivid public as well as a scientific interest. Archaeology explores the roots of urban communities. An engagement with the histories of a city is carried out in many contexts. The presentation on site with the integration of the original fabric of a city can potentially bring the research results of archaeology to life in an exciting way. The integration and presentation of archaeological finds and features in urban spaces is still a controversial topic both within the scientific community and between different urban stakeholders.

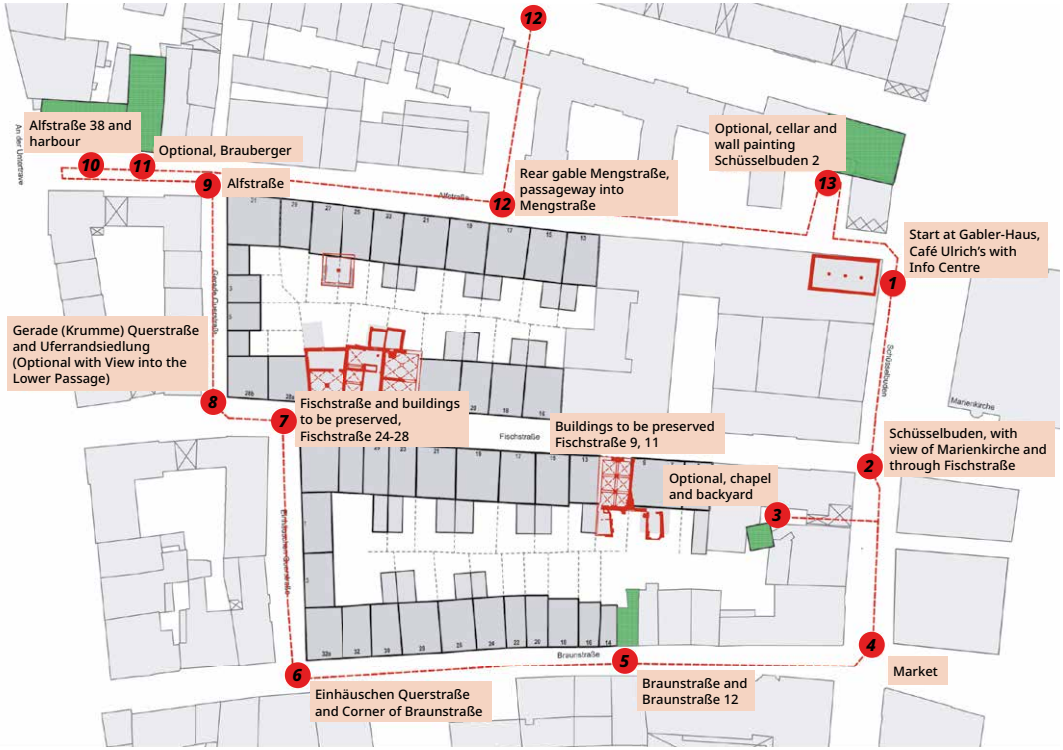
In particular, an on-site presentation focuses on urban development as a historical urban heritage. Here, the archaeological samples range from the Early Iron Age (Basel) to antiquity (Trier, Cologne), and from the Middle Ages (Lübeck [Fig. 1], Magdeburg) to modern times (Dresden, Mannheim). Urban archaeology in Central Europe was at first largely limited to the old town. It was identified with the historical centre in Central Europe since the 19th century. The temporal and thematic expansion of archaeological research in recent decades has shifted these boundaries in this respect. An archaeology of modern times and modernity must also take other urban areas into view. This encompasses not only testimonies of the city expansions of the 19th century as well as industrial facilities or infrastructures of the 20th century but also includes the 'dark heritage' – especially of the world wars, the Nazi era or the GDR period. Furthermore, a focus is also placed on urban surroundings.

Like any other archaeological investigation, archaeology in the urban environment is always research-oriented. However, it is determined by construction projects, whose scope, timing, and schedule not only impact the excavations, but also their interpretations. The options for a publicly effective presentation of the remains and the communication of results depends no less on this. In the

← **Figure 1. Lübeck, Founding Quarter. Basement Fischstraße 24-28 (Source: Bereich Archäologie und Denkmalpflege der Hansestadt Lübeck).**

» In order to make the city experienceable as a historical space, the presentation of archaeological features, such 'showcases into the past', have to be understood not only within historical contexts but also with regardto their role in present and future urban landscapes. «

↓ Figure 2. Lübeck, Founding Quarter. Archaeological-historical tour (Dark grey: new buildings after 2015. Green: preserved structure of historical buildings. Red: preserved archaeological structures under the new buildings) (Source: Schneider, M., Archäologie und Öffentlichkeit in der Hansestadt Lübeck. *In*: M. Schneider and C. Kiminius-Schneider 2021, 324 fig. 9).



case of *in-situ* presentations, the aim is to preserve more or less complex archaeological discoveries in private or public spaces, make them accessible and present them in an understandable way. In order to make the city experienceable as a historical space, the presentation of archaeological features, such 'showcases into the past', have to be understood not only within historical contexts but also with regard to their role in present and future urban landscapes.

In the following, we look at three examples of the incorporation of archaeological investigations in urban development. With the Founding Quarter *(Gründungsviertel)* in Lübeck, the development of a small-scale new district is considered, whereas the redesign of a public space is examined with the Palatinate *(Kaiserpfalz)* in Goslar. With the *Steinhauser Hütte*, we will finally take a look at a monument of modernity.

Lübeck

The town of Lübeck, founded in 1142/3, is widely viewed as the prototype of a Hanseatic town. It was nominated as a World Heritage Site in 1987 and is also a milestone for the development of urban archaeology. In 1942, the old town was largely destroyed and redesigned in the spirit of post-war modernism. However, massive interventions in the cityscape already took place in the late 19th and the early 20th century. A recent turnaround in urban planning since the 1990s, which can be summarised under the oft-cited concept of 'urban repair', led to a large-scale excavation (2009-2015) in the Founding Quarter, located to the west of St. Mary's Church. The oldest documented features from the years 1142/3 were discovered here. In the framework of the planned redesign, the partial restoration of the medieval situation of the approximately 10,000 m^2 large area was the objective. Not only the street layout, building alignments and plot layouts but also the architecture, which in the sense of a 'critical reconstruction' was realised in the historical, gabled plank houses, were intended to support mixed usage patterns, as believed to be characteristic for the pre-modern city. The participation process that was required for this was broadly conceived and participatory, even if there were differences of opinion about the architecture. What is the part played by archaeology in this process, and what cityscapes are served or (co-)produced by it?

In the course of urban planning, the intention of archaeology was to use the original substance to generate 'tangible statements' and to support the restoration of historical structures of parcels of land and public space. This is plausible in the sense that, at the latest since the third quarter of the 12th century, almost all plot boundaries remained unchanged until the 20th century. Already during the planning process, great importance was not only attached to ensuring that the private properties would be protected and thus sustainably preserved, but that public access (for a limited period of time) would also be guaranteed. Overall, the neighbourhood history is presented as a fundamental building block for the history of the town in the format of an archaeological-historical tour (Fig. 2). However, the staging represents a selection of the archaeological material: The important wooden buildings and infrastructures from the founding period could not be preserved. The archaeological cellars preserved *in situ* date from the last third of the 13th century. Breaks and dynamics of the architecture, materials, and especially the many ways of living in the urban space are thus not explored at all or only indirectly. Instead, continuities are emphasised. When the advertising brochure for house purchasers suggests that "the founding quarter [was] built almost entirely with gabled merchants' houses on narrow plots along the street", the narrative of a type of urbanism is served in which the ideal concept of the occidental city was perpetuated into the modern age. The assumption of the founding spirit and the will to shape the town on the initiative of sovereigns and merchants has had an effect over a period of more than 800 years and is meant to emphasise the present and future urban identity of the modern city.

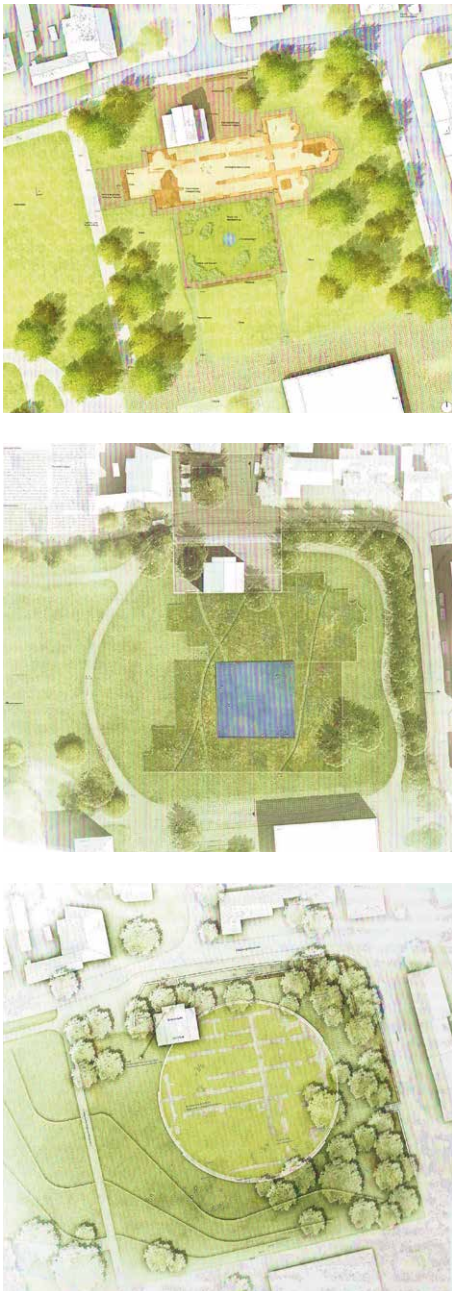
The plot layout proves continuity, but what do we know about the stories of its residents? Which people used the cellars over a period of more than

800 years? Here, the presentation of finds from the buildings could not only catch the many voices from the Middle Ages, but also give audience to those who brought vitality to the architecture from the post-medieval epoch until the destruction in 1942.

Goslar

The *Kaiserpfalzquartier* in Goslar is located in the neighbourhood of the imperial palace and close to the old town, which was designated a World Heritage Site in 1992. The palace *(Pfalz)* and the palatinate monastery of St. Simon and Judas were built in the middle of the 11th century. The imperial abbey was demolished in 1819-1822 except for the front hall which was converted into a monument of national history since 1875. The area is associated with a controversial and eventful history, which was not least dedicated to the pathos of the national historical narratives of the Salian emperors. Against the backdrop of a redevelopment of the historic town centre, the quarter also became the focus of interest. In this context, the open area used as a parking lot played an outstanding role because structures of the demolished complex can be found underneath it. The starting point for a non-destructive survey was a detailed geophysical investigation, which enabled insights into the structures of the Romanesque church with its enclosure down to a depth of 2 m. The foundations of the church with its crypt and the west front as well as the cloister and cellar were clearly identified.

Within the framework of the redevelopment, these features were to be made visible. Since kingship in the Middle Ages is often not linked in public perception with the sacral sphere and ecclesiastical institutions, a city landscape planning competition was organised in order to differentiate this traditional image, making the connections recognisable in a new design (Fig. 3). The three concepts discussed



→ **Figure 3. Goslar, Kaiserpfalzquartier. Proposals for the redesign of the site of St. Simon and Judas (Source: Geschwinde, M., Geschichte als Fragment, *In*: M. Schneider and C. Kiminius-Schneider 2021, 204-206 figs. 19-21).**

below are similar in that they did not envisage any disturbances in the archaeological substance before the redesign. However, they differ considerably in their handling of the results gained from geophysics. One proposal in the architectural contest attempts to reconstruct the time around 1200 (Fig. 2 top). The concept is based on the chronological framework of the cathedral vestibule and comes close to a historicised reconstruction of the imperial house. Another concept (Fig. 2 centre) completely dispenses with a detailed description and visualises the area in the form of a flowering meadow marked by natural stone. A quadrangular water basin represents the former cloister and is designed to provide a comfortable place to linger. The winning design (Fig. 2 below) converts the geophysics two-dimensionally. It does not take up the third dimension, although this is inherent in georadar. However, the design has the benefit that the impact on the underground is minimal. The archaeological substance is optimally protected.

In the public view, the projects were discussed critically. For example, the historical society of Goslar had positioned itself with the request for a three-dimensional presentation of the church and collegiate buildings before the demolition in 1819. However, this view can hardly be harmonised with the World Heritage status and it also contradicts the objectives of the (archaeological) preservation of monuments, for which preservation is the priority. In the spirit of Heinrich Schliemann, archaeology has the duty to validate existing concepts of history, and an excavation also becomes an event. At the same time, however, the controversial discussion demonstrates that archaeology is perceived and that a monument that is staged gains acceptance.

St. Anthony Hütte, Oberhausen and Steinhauser Hütte, Witten

For the people living in the Ruhr district, the industrial sector is – despite the meanwhile blue skies – still present not only in family histories and in collective self-contemplation but in the cityscape. However, the beginnings of the Ruhr industry, in particular, are hidden in the subsoil and can only be made tangible in their materiality through excavations. The Steinhauser Hütte ironworks in Witten was founded in 1855 and closed down in 1921. Since its founding, the ironworks were successively modernised in rapid intervals. The plant once produced malleable steel from supplied pig iron, whereby affiliated foundries and rolling mills produced end products such as rails and flat steel. An area of 17,000 m^2 was archaeologically investigated on the 4 ha wasteland in the framework of the establishment of an industrial park. It turned out that the procedural innovations of the 'steel age' were outstandingly preserved in the archaeological remains. Almost all major steps of the industrial steel production of the 19th century are present (Fig. 4, next page). The early puddling plant, for example, where the transformation of the pig iron produced in the blast furnace into wrought iron and later also into hardenable forged steel, could be traced. Since such an activity was laborious and very dangerous, the more recent Bessemer steelworks revolutionised the process. All in all, the archaeological features provide an excellent insight into the life and work of the district *(Revier)*. They are thus living testimonies to an industrial history that in many locations has given way to the staging of a 'nostology of industry' and whose historic urban landscapes are increasingly disappearing. The planning envisaged that the puddling furnaces,

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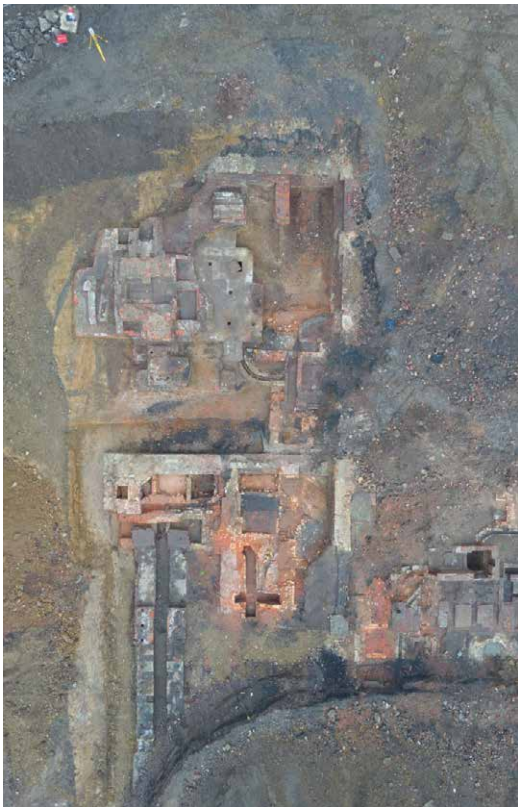
» In general, the handling of the tangible objects gives way to the question of who the cultural heritage owners are and what participation rights may be claimed. «



↑ Figure 4. Aerial photo of the northern area of the Steinhauser Hütte in the future industrial estate Drei Könige in Witten (Source: Archäologie am Hellweg eG).

which are no longer preserved as original findings anywhere else in Europe, would be presented in an archaeological time window.

This was possible at the St. Anthony ironworks, located in a suburb of Oberhausen, which is the oldest example of the Ruhr industry. Established around 1758 in what was then Osterfeld as the first ironworks in the Ruhr region, the smelter produced pig iron until 1843 and was excavated in 2008. The selected structures of the ironworks are presented *in situ* on an area of around 1,000 m^2 and are made accessible by a museum for industrial archaeology. The site is also part of the *'Route der Industriekultur'*, which is a tourist themed route that provides access to the most "important and touristically attractive" industrial monuments in the Ruhr region.

The archaeological investigation of both sites clearly demonstrates the difficulties of preserving the archaeological substance of the modern era. Industrial plants, in particular, are typically complex area monuments with a high degree of connectivity, whose preservation is not only extremely costly in terms of conservation but also financially. In addition, acceptance for the preservation of such monuments must be mediated, especially due to the pressure of infrastructure development. This is not self-evident, even in the industrial Ruhr region.

Conclusion

The urban space is lived, built, perceived, and historically layered. Urban spaces are shaped by material arrangements and mental concepts as well as the related agencies. The incorporation of the archaeological fabric into the recent cityscape and future urban development is treated on two levels.

As part of a general cultural heritage discourse, archaeology must face the question what part it wants to play in the urban development of today and tomorrow. Thus, the archaeological remains can be used to address continuities and concepts of a 'European town' and the staging of an urban *'Eigenlogik'*. On the basis of archaeological findings, however, corresponding narratives may also be critically questioned. Historical urban research, monument preservation and city planning may enter into a critical dialogue. Such discourses, which at first appear to be academic, acquire a greater significance when applied to a concrete object.

'Healing the wounds of post-war modernism' is an urban planning guiding principle concerning the preservation, the reclamation or the reconstruction of a state that is mostly sought in the pre-modern era. This can give rise to sites of an iconography of urban images and civic symbolisms in the cultural-political interpretation (cf. Lampugnani in this volume). This is particularly visible in Lübeck, but the discussion on Goslar also demonstrates that archaeology should not only be integrated into urban planning processes, but also into discourses about urban narratives. In doing so, very different approaches are taken in order to not only show the complex temporally and spatially layered and interwoven structures but also the processes associated with them. Oberhausen and Witten also stand for the question which criteria are to be applied to the archaeological substance when selecting industrial plants and processes worthy of preservation, especially in an era of dense and parallel traditions.

In general, the handling of the tangible objects gives way to the question of who the cultural heritage owners are and what participation rights may be claimed. These questions are answered very differently by the concepts of 'authorized heritage discourse' and 'inclusive heritage discourse'. Based on the approaches of a present-centred understanding, it is also necessary to discuss the responsibility for future generations and the generation of ideas about the future on different levels and for different social groups. This includes the migration society of the Ruhr area as well as the reception histories of the palatinate of Goslar or the question to what extent urban repair in Lübeck does not also stimulate gentrification. Due to its temporal depth dimension, archaeology can help to explain and demonstrate that 'the city' means the process of negotiation and discussion of urbanity in the context of interacting social, economic, political, or ecological historical and current processes. Through its findings, this research can make a significant contribution to restoring the history of the contemporary city, but it can also make the history of the 'modern' city transparent. In any case, it can highlight the many voices of the urban space in divergent temporal, spatial and social contexts and underline the fundamental mutability of (urban) cultural heritage in the present and the future. ◆

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Patric-Alexander Kreuz

Urban Models in Transition: The Roman City in the Levant Region and Its Spaces

Urban prestige buildings with the greatest possible appeal, the (de)valuing glance on other cities, but also discussions about which features make a city a 'real' city and should therefore be aspired for, are by no means only phenomena of our time. Rather, such discourses have influenced the development and design of cities at all times, not least in antiquity. Comparable local ambitions and dynamics also affected the design of ancient cities and sites of the Roman Empire, which still impress us today with their monumental buildings and cityscapes. As is currently the case, they left a lasting mark on urban spaces and thus contributed to a specific experience of cities.

In archaeological research, the urban building stock and its architectural types are considered important indicators of 'Roman influence' or even of the extent of the 'Romanisation' of a city in the Roman provinces. Such a generalised assessment, however, does little justice to the complexity of the archaeological record, nor does it really contribute to a better understanding of the cities' architectural development. More promising, in contrast, is the question of the key players who were engaged in the development of the cities, their concerns, and their courses of action. This directs attention to the design of the cities as an expression of local power relations and dominant urban models. Here, the appearance of Roman cities testifies above all to regional differences in urban lifeworlds, influenced by supra-regionally shared concepts of urban design as well as powerful local dynamics.

← **Figure 1. The ancient city centre of Gerasa (Jordan) with its public monumental architecture is the result of a monumentalisation process during the 2nd century CE (Source: © APAAME. Photo: D. Kennedy. APAAME_20081029_DLK-0059).**

Sources

The public architecture of cities, emphasised in dimensions and design, is particularly suitable as a starting point for an approach to the design of urban spaces and the architectural strategies employed in this process between the poles of aesthetics and function. It impressively demonstrates the effort taken and the primary concerns in the architectural development of a city. At the same time, such an approach can also draw on contemporaneous textual evidence, including statements by those actively involved in the architectural design of their cities. They provide insights into acting (and deciding) persons, their motivations, but also their expectations of an

up-to-date townscape. At the same time, the testimonies occasionally reveal that some building initiatives were quite controversial and that 'public' by no means had to mean 'useful' for the entire community: In Roman cities, too, actually realised building projects and priorities were always also an expression of local balances of power and interpretive predominance over urban space.

The example of Gerasa

This can also be assumed for the development and design of the cities of the Levant region, which was under Roman rule as of the 1st century BCE. The highly urbanised region had some veritable large cities, such as Apameia in Syria, which had more than 117,000 (male) citizens shortly after the turn of eras. However, the cities of the region were not newly founded by the Romans, but were often already several centuries, in some cases even millennia old. The cityscapes of Roman times, which impress us greatly, thus always presupposed massive constructional interventions and the removal of older structures. This process can often no longer be reconstructed, but it must be assumed that older building structures also provided an important framework for the Roman expansion phase.

The city of Gerasa in present-day Jordan can illustrate the extent of such efforts, which have left a lasting mark on a cityscape in over just a few generations (Fig. 1, p. 18). From the 1st century CE, a dense sequence of building initiatives fundamentally changed the face of the city. These included the so-called southern theatre, built from 90 to 92 CE, with an oval plaza at the beginning of the 2nd century (1), and in the 2nd quarter of the 2nd century the macellum (a market architecture; 2). Around the middle of the 2nd century, a large complex, interpreted as a forum, was added in the northern part of the city area (3), a bath complex (4) and, in the eastern part, an even larger bath complex (5). At about the same time, the sanctuary of Artemis (6), outstanding in its size, a new temple of Zeus, and a second theatre (7), now in the north, were erected. Still in the 2nd half of the 2nd century, a large horse/chariot racecourse followed in front of the southern gate of the city, as well as a magnificent fountain building on the main street, the nymphaeum (8). Simultaneously with these works, from the early 2nd century and into the 3rd century, the upgrading of the all-connecting main street into a monumental colonnaded street took place (9).

We encounter comparable architectural efforts in numerous cities of the region during this period. Early monumental building initiatives during the 1st century CE were followed in the 2nd century by a boom phase of architectural monumentalisation that dwindled again in the 3rd century. During this boom phase, cityscapes were comprehensively transformed at great expense and with massive interventions.

Local elites and their city

But to whom was this boom owed, which occurred only a long time after the region had been incorporated into the Roman Empire and can therefore hardly be directly connected to it? According to our evidence, it was not primarily the state, the emperor or the governor, *i.e.* representatives of the central power, who were active here, but above all the local urban elites. Thus, Dion of Prusa in Asia Minor, a member of the local elite at the turn of the 1st and 2nd centuries, confesses that he

"wanted to beautify the city and, if possible, equip it not only with porticoes and fountains, but also with fortifications, harbors and shipyards." (Dion of Prusa, Oration 45,12; translated according to the German translation by Ellinger 1967).

As wealthy citizens of their city, who were active in offices, boards and councils, the members of the local elites saw themselves in rivalry with one another, competing for prestige, public visibility and influence (cf. Bihrer in this volume). As a means in this competition, they resorted, among other things, to donations for their community, *e.g.*, of buildings – and passed this off, of course, as being for the benefit of the general public. Libanios of Antioch in Syria, for example, praised his peers, because

← Figure 2. The nymphaeum, the monumental ornamental fountain on the main street of Gerasa (Jordan), impressively displayed the city's abundance of water (Source: Commons (CC BY-SA 3.0): © Michael Gunther).

"just as the foundations of their wealth were blameless, they used it with all magnificence for the liturgies [services rendered by wealthy citizens to the community] [...] taking greater pleasure in spending for the benefit of the city than others take in amassing wealth." (Libanios, Oration 11,134; transl. by Downey 1959).

Important proof of such generosity were the inscriptions connected with the objects of the donations and honours for their donors by the city. They visibly documented their achievements to all fellow citizens and were intended to secure their reputation among the urban population. In the Syrian city of Apameia in the early 2nd century, for example, Lucius Iulius Agrippa, scion of a regional royal family, rendered many services to his city, as one such inscription emphasises:

"[...] He was priest; he was generous agoranomos [market overseer], providing six months of grain distribution [...] He had the aqueduct built, a good number of miles [...] He established the baths and the porticoes on the main street and the basilica that went with them, donating all the land he had bought at his own expense and erecting bronze statues in the baths, the group of Theseus and the Minotaur, the group of Apollo, Olympus, and Marsyas and the Scythian." (Translated according to the French translation by J. C. Balty, Guide d'Apamée (1981) 205 No. 20 after the translation of J.-P. Rey-Coquais, Annales Archeologiques Arabes Syriennes 23, 1973, 41-46 No. 2).

Last but not least, such donations were also motivated by a pronounced 'city competition' fed by local pride, prestige and striving for appropriate urbanity, which was defined, among other things, by cityscapes and their buildings. Thus, once again according to Dion, the donors wanted to

"[...] bring the city into better condition, give it more prestige at all [... because he] *saw the ambition of other cities in these things, whereby I do not only think of the cities in Asia, Syria, and Cilicia, but also of those in your immediate neighborhood, Nicomedia, Nicaea, and Caesarea [...]."* (Dion of Prusa, Orations 40,5 (first quote) and 47,13 (second quote); both translated according to the German translation by Ellinger 1967).

» The cityscapes primarily reflected the ambitions and interpretive predominance of only a small part of the urban population and their idea of architectural urbanity. «

Such statements by contemporary protagonists illustrate the power of local, yet regionally interconnected elites over 'their' urban space, who were aware of architectural developments in other cities. It was their concerns, desires and decisions that shaped the urban form – not top-down state initiatives and certainly not decisions with 'real' public participation. The cityscapes primarily reflected the ambitions and interpretive predominance of only a small part of the urban population and their idea of architectural urbanity. However, the architectural design of urban spaces was not only a general expression of urban power balances, but also an active 'power move' to affirm them: Through such initiatives, the local elite also created the magnificent places for the staging of their own official activities, such as ceremonies or festivals.

Urban design and urban spaces

In the concurrence of a shared idea of appropriate urbanity, local elite competition, and pronounced regional urban rivalry, one reason for the surprisingly consistent architectural priorities of the cities can be presumed. For here, the players reverted to the same functional building types and a 'global' portfolio of Roman architecture and decorative instruments. They wanted to show that they could not only keep up in particular cases but also partially surpass others. Thus, urban spaces were created that not only resembled each other in appearance but as places of urban acting they were also experienced and 'handled' in a similar way.

The object of such efforts, however, was not only magnificently decorated sanctuaries or other large buildings, such as theatres, which were important urban markers, or public baths, which were considered indispensable for an urban lifestyle. An enrichment of the street space with aesthetic display architecture was also popular. For example, in many cities, monumental ornamental fountains – some with multi-story façades – were now erected, the so-called nymphaea. Such fountains, prominently placed on main streets or at busy intersections, not only spectacularly staged local richness in water, but also made a distinct aesthetic contribution to the urban space.

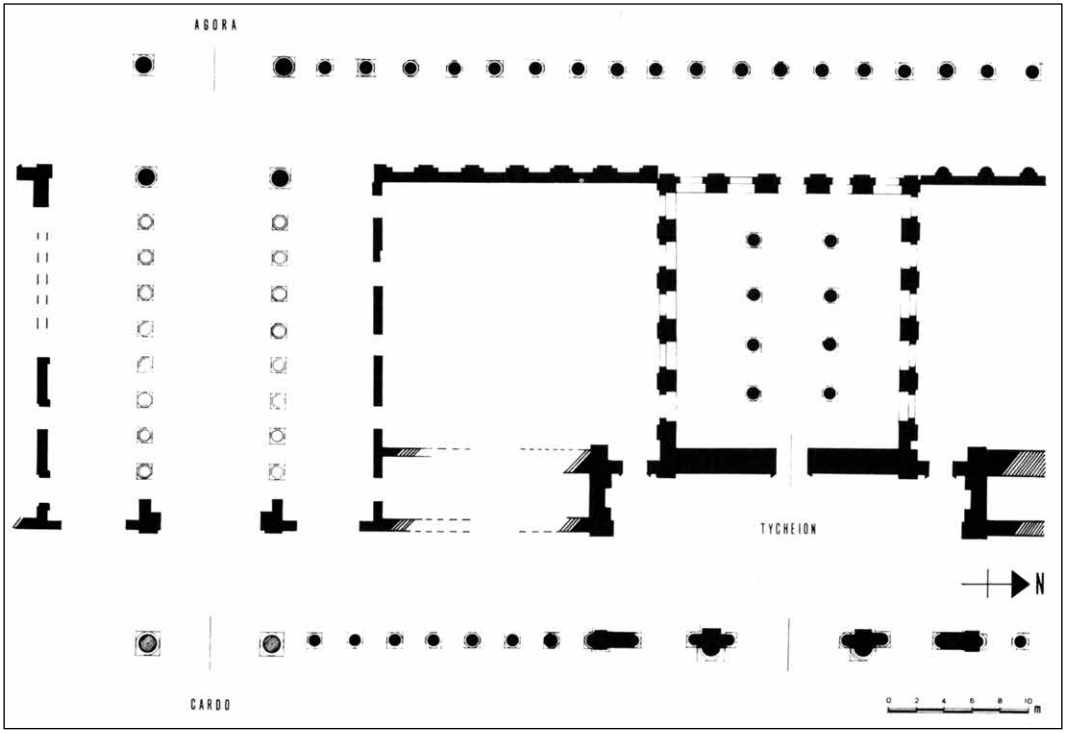
In Gerasa, the nymphaeum (Fig. 1.8; 2, previous page), built at the end of the 2nd century on the main street, was located right next to the sanctuary of Artemis, which dominated the city centre. The main street was also chosen as the site for such a monumental fountain in Apameia. In Gadara in Jordan, we even see that next to a nymphaeum at the city's central crossroads donated in the early 2nd century, a second, much larger and, above all, more magnificent nymphaeum was erected only a few decades later. This construction was also a private donation.

Like bath buildings or temples, however, nymphaea as individual buildings ultimately only remained related to their specific location in the cityscape. A clearly different level of urbanistic design and a consistent combination of aesthetics and function are, in contrast, indicated by the most ambitious urban building projects of the 2nd century in

↑ **Figure 3. Colonnaded streets, such as in Apameia (Syria), shaped urban space like hardly any other architecture and defined streets as places of urban experience (Source: Photo: Commons (CC BY 4.0): © Vyacheslav Argenberg / http://www.vascoplanet.com/).**

the region: the monumental colonnaded streets.

The transformation of the local main street into a colonnaded street was undertaken by several cities of the region since the 2nd century. The aforementioned colonnade of Gerasa or the 2 km long and 38 m wide colonnaded street in Apameia (Fig. 3) impressively demonstrate how such large-scale constructions shaped urban space with their sometimes well over 1,000 columns. They turned the main street of a city into a construction site over several generations with long-term stress on local resources – especially since they were often not the only large construction projects at this time. Such colonnaded streets, ideally extending from city gate to city gate with columns up to 10 meters high, were something different from the street-side porticoes in front of houses or larger buildings so common in the Roman world. Their endless rows of columns and multi-storey rear façade walls with entrances to houses and stores created a virtually self-contained architectural street space with its own place character. As gems of their towns, they played a decisive role in shaping the regional urban aesthetic from then on. They created perspectives like only few other architectural structures, and their columns reaching to the horizon meant an ostentatious enhancement of local



↑ Figure 4. Apamaea (Syria): Layout of the architecturally designed passage between the colonnaded main street and the forum/agora (Source: Balty, J. Ch., 1981. *Guide d'Apamée*. Brussels: Centre Belge de Recherches Archéologiques à Apamée de Syrie, fig. 64).

'column forests' as an urban experience.

In addition, the colonnaded streets offered access to immediately adjacent public building complexes of the city. Thus, they opened up new possibilities for the architectural interconnection of public (monumental) buildings, which also had an effect on the perception and 'handling' of urban spaces. In Gerasa, for example, the richly decorated gate buildings of the so-called west and east propylea (Fig. 1.10) of the great Artemis sanctuary, erected on both sides of the colonnaded main street, created an architectural arrangement across the street that guaranteed an enhanced architectural experience even when approaching from the other side of the city as well. Furthermore, in Apameia, the architecturally framed square of the forum was not directly accessible and open on the main street. Rather, it was accessible from the colonnaded street via an approximately 40-meter-deep mediating, 'integrated' passageway architecture, which was characterised by vestibules, wall openings, passages, and hall-like spaces with complex permeability (Fig. 4). It was not least such ambitious solutions for the architectural organisation of prominent spaces of action that were understood as an added value of urban design.

Urban design: regional strategies and concerns

As a result of the architectural monumentalisation of the cities, building types, such as theatres and baths, and indeed colonnaded architecture in general, became omnipresent. By following architectural types adopted from outside, they contributed to the image of a 'Roman' urban aesthetic superficially familiar to us and now also present in the Levant region. However, one might well ask whether this appropriation of building types was really accompanied by an appropriation of the forms of usage that traditionally underlie them – 'à la romaine' – such as specific bathing customs, and indeed, whether these places were at all lastingly integrated into everyday urban routines. For example, the prominence of colonnaded streets as urban spaces contrasted with the conspicuous lower importance of fora and agorai, which were actually central as well as architectonically specific and functionally diverse spaces of action in Roman cities.

The monumental architectural development of the Roman cities of the Levant region is the impressive result of primarily local efforts to create an urban form that was deemed appropriate. In this process, we witness remarkable architectural design strategies for urban spaces. They reveal a desire for a close connection between aesthetics and function as well as an architectural integration of urban spaces of action. In particular, the colonnaded streets with their potential for the architectural connection of urban subspaces had a lasting impact on the experience and 'usability' of cities. Above all, however, on the level of urbanistic design of urban space, they demonstrate the remarkable step from magnificent individual buildings to architecturally interconnected monumental subspaces as an added value of public urban space.

Last but not least, such observations can show us to what extent urban design owed much to local efforts, which then took on regional manifestations which were nevertheless oriented towards what was considered 'globally' up-to-date and appropriate. The actors actively and influentially involved in shaping their cities were – and this not only in the case of the Roman city – members of the local elites: ultimately only a small group of regionally connected peers in local competition for prestige, but with shared ideas of urbanity and urban rivalry. The specific interplay of these factors was responsible for the shaping of distinctive urban physiognomies – then as now. ◆

» The monumental architectural development of the Roman cities of the Levant region is the impressive result of primarily local efforts to create an urban form that was deemed appropriate. «

Andreas Bihrer

Sacred Design: 'Holy Cities' and 'City Saints' in the Middle Ages

Religion has been a key influence on the shape of urban spaces across different epochs and cultures. This article takes a closer look at the Christian Middle Ages and discusses two 'sacred' forms of urban design that were particularly widespread during this period. First, the article examines the attempts of medieval 'urban designers' to turn their towns into 'holy cities' by modelling their townscapes on Jerusalem and Rome. Second, it looks how certain saints became established as 'city saints' and were then utilised in a whole range of different ways to serve the interests of the various town players. Both the 'holy cities' and the 'city saints' reveal a shifting understanding of the city as a built space, on the one hand, and a community, on the other, showing that the relation between these two aspects was subject to constant renegotiation in the Middle Ages.

Communal religious worship and individual religious practices play a central role in religious societies. This worship and these practices also shape the spaces in which they are performed, particularly when special images or architectural settings are created for them, such as a demarcated place of worship, an ornate sanctuary, or a temple. Specially designed sacred spaces appear across different epochs and cultures, both in smaller communities and on the open countryside, but are found to a particularly large extent in cities, where religious rites were performed for or by large numbers of people. Religious practices, the sanctifying of persons or objects, and particularly the architecture built to frame the sacred had a significant impact on urban spaces – also during the European Middle Ages (ca. 500-1500).

In the Christian Middle Ages, the sacred manifested itself more in concrete forms than in abstract ideas. The medieval period associated sacredness with tangible objects such as relics, with visual representations such as devotional images, or with people as in the case of Christian saints. Church feast days anchored holiness in time, while sacred build-

← **Figure 1. Probably around 1260, in reference to the Church of the Holy Sepulchre in Jerusalem, another Holy Sepulchre was constructed in the Rotunda of St. Maurice that had been built by Conrad of Constance (Source: https://commons.wikimedia.org/wiki/File:Konstanz_Muenster_Heiliggrab.jpg).**

» Urban spaces thus represent an excellent field of observation to describe the manifold variety of possibilities and forms of dealing with sacredness. «

ings rooted it in space. In addition to these diverse manifestations of sacredness, over the course of the European Middle Ages, a steadily growing variety of ideas, models, and concepts of sanctity emerged. These notions were adapted to ever new historical contexts and to different individual or collective functions – we could in fact speak of multiple 'sanctities'.

The medieval city with its urban dynamics is a fruitful field of research. The city's multiplicity of actors, groups, networks, and institutions used these plural 'sanctities' as a means of pursuing their goals both within and beyond the city walls. These players' interests ranged from establishing a collective identity to using saints to instigate, regulate, and mitigate conflict, from authoritarian to economic goals. Urban spaces thus represent an excellent field of observation to describe the manifold variety of possibilities and forms of dealing with sacredness.

The following two sections present examples of such urban appropriations of sanctity. The first section examines 'holy cities' and the intentions of the 'urban designers' who shaped them. The second section looks at 'city saints', exploring the goals pursued with the establishment of these saints as key figures in the city. In the cases of the 'holy cities' and the 'city saints' alike, we shall see that the medieval mind regarded the concept of the city as a built space and the concept of the city as a community as interrelated: The idea of the 'holy city' refers both to the concrete, tangible topography of a town and to the idea of a community. The 'city saints' were meant to epitomise both the architecturally structured and designed urban space and the city's inhabitants, as well as the ideals shaping their communal life.

'Urban Designers' and 'Holy Cities'

In the European Middle Ages, a city's 'image' often emerged against a backdrop of intense competition (cf. contribution by P.-A. Kreuz in this volume). Frequently, the urban design in question was commissioned or bankrolled by the town lords, who deployed art and architecture in their political, economic, and sometimes even military struggle for dominance. 'Urban designers' took Jerusalem and Rome as their models, but their aim was not merely to imitate these cities or place their own city in their tradition, but actually to surpass them. This goal could be achieved by imitating a chosen model city and sacralising one's own city, which would thus become a sacred urban place. Urban design strategies adopted here included imitating the topography of Rome's city churches or the city walls of Jerusalem. This approximation of exemplary cities, such as Rome or Jerusalem, was propagated and disseminated in a range of media. It is evident, for instance, in phrases such as "second Rome" or "new Rome", in poetry praising the city (urban panegyric or *Städtelob*), in historiography that linked the fate of the city in question to that of Jerusalem or Rome, and

» Urban design strategies adopted here included imitating the topography of Rome's city churches or the city walls of Jerusalem. «

in visual images or architectural representations (on the literature, cf. Dahm in this volume).

Conrad, Bishop of Constance, was just one medieval personage to adopt such an imitation strategy. Between 934 and 975, he was not only the spiritual leader of the largest bishopric north of the Alps but – like his fellow medieval bishops – was also a secular lord. In this role, he was involved in imperial politics of the emperor, ruled a seigneurial territory near Lake Constance, and served as a town lord in his episcopal seat of Constance. In these secular functions, Bishop Conrad spent time at the imperial court and travelled to Rome in the emperor's entourage. However, a pilgrimage to Jerusalem that he is supposed to have undertaken was probably invented by a later biographer.

In his role as a bishop, Conrad also acted as an 'urban designer'. He reshaped the sacred topography of his episcopal city and followed a clear ideal concept in doing so. Three references in particular are significant here. First, Conrad founded a new collegiate church dedicated to St. Maurice directly next to the episcopal church, as well as modernising an older church dedicated to St. Laurence, which he endowed with relics of the saint brought from Rome itself. These two saints were not chosen at random – ever since Emperor Otto's defeat of the Hungarians in the Battle of Lechfeld in 955, Maurice and Laurence were held as the two most important imperial saints, because they were thought to have ensured Otto's victory. By dedicating his new churches to them, Conrad was thus raising his episcopal see to a quasi-imperial city. Second, Conrad had a replica of the Holy Sepulchre built in St. Maurice's Church (Fig. 1, p. 26).

He also founded a new hospital in the city, to which he gave a splinter of the Cross as a relic. After being moved by Bishop Ulrich 1 (1111-1127), it still gives the town of Kreuzlingen, adjacent to the city of Constance, its name. With these references to the death of Christ and thus to the Holy Land as well as to the city of Jerusalem, Conrad followed a 10th century trend. He upgraded the episcopal city as the 'New Jerusalem' or even the 'Heavenly Jerusalem'. Third, the bishop not only modernised the church of St. Laurence, which was located beyond the city walls, but also had two new churches built: the church of St. Paul, also outside the city walls, and – in close proximity to the episcopal church that was dedicated to Mary – a church with the double patronage of St. John like San Giovanni in Laterano in Rome. Conrad thus aligned the sacred topography of his episcopal city with imperial and papal Rome. His church foundings correspond to the Roman churches of Santa Maria Maggiore, San Giovanni in Laterano, San Paolo fuori le Mura (Saint Paul Outside the Walls), and San Lorenzo fuori le Mura (Saint Lawrence Outside the Walls).

Conrad's contemporaries recognised this sacred topography and the bishop's concept for the

» Martyrs, miracles, and the veneration of saints played a pivotal role in medieval urban life. «

city. This is borne out through a foundation by a later bishop of Constance, Gebhard II (979-995), who built a monastery a few decades later that, while dedicated to Pope Gregory the Great, even in the earliest sources was referred to as 'Petershausen'. Because, like San Pietro in Vaticano, it lay on the far side of the river and, like Old St. Peter's Basilica, it was oriented to the west. Conrad was not the only 10th century lord seeking to imitate Rome.

We can assume that his sacralisation of his episcopal city sought to surpass similar endeavours of his fellow bishop Ulrich of Augsburg (923-973) by restoring what Conrad considered the proper hierarchy of the bishoprics in the southwest of the empire, making Constance the seat of the 'Swabian archdiocese'. The Bishop of Constance also wanted to send a clear signal to the powerful Lake Constance abbeys of St. Gall and Reichenau. However, the consistency with which his urban design was implemented and the linking of the three abovementioned levels of reference – the imperial city, Jerusalem, and Rome – made Conrad of Constance's project a particularly ambitious one in the 10th century context.

'City Figures' and 'City Saints'

Saints gave additional weight and credibility to sacralisations of the city as both an architectural and a social space, for example, as the patron saints of churches, through relics, through ritual celebrations on saints' days and in processions, or through the testimony of hagiographic texts that gave an account of saints' lives and their miracles performed within the city or in connection with it. Martyrs, miracles, and the veneration of saints played a pivotal role in medieval urban life and were presented in various media using a range of narrative, visual, and performative strategies, from hagiography and historiography to visual art, architecture, liturgy, and music.

However, we should not conclude prematurely that these 'city saints' were 'city patrons', figures who served to integrate all the town's inhabitants over a longer period of time. Rather, a closer look at the conditions in the Middle Ages reveals that in cities, sanctity could only be produced situationally, that a host of contradictory ideas were associated with saints, and that competing groups in the city used the saints to promote different interests. The large number of urban players and the plurality of 'sanctities' described at the beginning of this article should caution us against overly static notions of 'city patrons'. Rather, the manifold and sometimes conflict-ridden ways in which these 'city figures' were put to use need to be considered. We need to ask which facets of a saint were chosen by the competing players within a city to pursue their particular goals.

Once again, Conrad, Bishop of Constance, may serve as an example. Conrad started to be venerated as a saint soon after his death. His successor, Bishop Ulrich I (1111-1127), took up a range of the abovementioned strategies in an endeavour to have Conrad officially canonised. The struggle for supremacy between the emperor and the pope in the Investiture Controversy (ca. 1070-1122) made Ulrich's position precarious and he was only able to cement his rule from 1118 onwards. His efforts to elevate his predecessor Conrad of Constance to an 'official'

➜ Figure 2. In the middle of the 13th century, a fire-gilded copper disc depicting Conrad of Constance was mounted on the cathedral's east gable: the saint is visible from afar (Source: https://commons.wikimedia.org/wiki/File:Konstanz_M%C3%BCnster_Krypta_Konrad-Goldscheibe_01.jpg).

➜ Figure 3. Above the left doorway of the west portal of Constance Cathedral is a half-length relief of Conrad of Constance carved from walnut in 1470: every visitor to the church passes by this depiction of the saint (Source: https://commons.wikimedia.org/wiki/File:Konstanz_M%C3%BCnster_Westportal_Konrad_01.jpg).

↑ Figure 4. To mark the 800th anniversary of the canonisation of Conrad of Constance, the city council issued an emergency banknote depicting the saint with his attribute (a chalice with a spider) and a silhouette of the city dominated by church towers (Source: https://commons.wikimedia.org/wiki/File:D-BW-KN-Konstanz_-_Notgeld_-_1923_-_100_Milliarden_Mark_-_R.jpg).

saint by commissioning a vita and a compilation of miracles need to be read within this context. In 1123, Pope Callixtus II canonised Conrad at the First Lateran Council, and in the same year the bones of the holy bishop of Constance were raised in a grand celebration. Ulrich I undoubtedly wanted to demonstrate the unity of bishop, cathedral chapter, clergy, citizens of the episcopal city and all the faithful of the diocese, a unity he himself had restored as the sainted bishop's successor following the conflicts of the Investiture Controversy. It is striking that both in the vita commissioned by Ulrich and in the context of the celebration itself, the new saint was related to – one might even say restricted to – the topographical area of the episcopal city. Moreover, the miracle reports linked Conrad's life and veneration very strongly to the inhabitants of the city of Constance. The new bishop Ulrich I, who still needed to stabilise his position and authority, pursued a double aim. With this new 'city saint', he wanted to win over the urban population and at the same time demonstrate his role as a lord of the town, promising an era in which the city of Constance would flourish, united under his episcopal leadership.

In contrast to the 'holy city concept' of the 'urban designer' Conrad, there is no evidence that Bishop Ulrich I's 'city concept' survived beyond the death of its 'inventor' in 1127 – it appears to have been swept away by the 'urban dynamic'. However, the 'city figure' Conrad was firmly anchored in the city of Constance by the saint's tomb in the episcopal church, and was now used by new groups in the city to further their own respective interests. There is space only for a brief overview of these interests here, but this should suffice to demonstrate the many different ways the saint was deployed: By 1192 at the latest, the cathedral chapter had accepted Conrad as co-patron of the episcopal church. One party at the bishop's court, known as the Klingenberg party, redesigned the central places of worship – St. Conrad's Chapel and the Rotunda of St. Maurice with the holy grave – in the Gothic style around 1300. This is likely the same period when the *Konradsscheibe* (Conrad disk) was created, which was positioned at the gable end of the episcopal church so that everyone arriving from the lake would see the saint's face (Fig. 2, p. 31). Painted and sculpted representations of St. Conrad were placed both in other locations in the episcopal church and in the city's other churches over the course of the late Middle Ages and the modern era (Fig. 3, p. 31). In 1966, a church bell was dedicated to St. Conrad, its chimes ringing across the city as yet another reminder of the saint.

However, the 'city saint' Conrad also appeared in other locations besides the city's churches. For example, from the 15th century onwards at the latest, he featured in an image on the city's most important gate, the Rhine Gate. Constance also had a *Konradstor* (Conrad Gate), a *Konradsbrücke* (Conrad Bridge), and from the 19th century onwards, a *Conradigasse* (Conrad's Lane). Until the Reformation, on the Monday after Corpus Christi, all the groups in the city took part in the St. Conrad Procession across the city to Kreuzlingen, and the saint's feast day was always celebrated on November 26. In the 17th century, the city's cannons displayed Conrad's image. Statues, reliefs, banners, and glass panels depicting the saint could be seen throughout the city. In the 17th and 18th centuries, Conrad coins were minted, and his image was even printed on emergency banknotes in 1923 (Fig. 4).

Today, the cities of the Christian world are still characterised by sacred buildings, figures and images of saints. Even in secularised societies, buildings, such as churches, and statues of saints remain in central urban locations, defining cityscapes to this day. Churches continue to play an important social role in urban life at special points in time, for example, on holidays, or in special situations, such as commemorating the victims of acts of violence, natural disasters, or catastrophes. Moreover, the sacred topography of modern Western cities is once again becoming more diverse thanks to the (re)construction of synagogues, mosques, and the places of worship of other faiths, showing that the differences between the urban design of secularised and religious societies should not be overestimated. ◆


Alſo flore
Gegen babilon
Alſo flore mit ſinen dienern vff paß vnd wolt ritten
Gegen babilonie do blanſchaflur was

Margit Dahm

Mental Conceptions of Cities in Literary Texts of the Middle Ages

Literary texts are media from which not necessarily the historical conditions, but very likely the cultural ideas of their time of origin can be deduced. This also applies for literary descriptions of cities: The images of cities presented in epic poetry of the Middle Ages only refer to a small degree to historical appearances of urbanisation in this period. Instead, they mirror cultural imaginations connected to the city and an urban way of life. Thereby, religious paradigms are of particular significance, since they belong to the central mental conceptions of the city with an almost transtemporal importance.

The 12th and 13th centuries represent the period of the so-called courtly literature of the Middle Ages. This term subsumes literary texts of several genres clearly aligned with the living environments and the interests of the nobility. During this time often seen as the 'flowering period' of medieval poetry, central literary works, such as *Parzival* by Wolfram von Eschenbach, *Tristan* by Gottfried von Straßburg, the anonymous *Nibelungenlied*, and several novels on King Arthur and his knights, were written. They belong to the most well-known texts of the medieval literary period.

Taking a closer look at the configuration of space in these texts, one can figure out very soon that cities are usually not of particular importance within the narrated worlds; the primary place of action is in most cases the noble court. Cities are mentioned several times, but they appear mostly in the form of short descriptions with only few individual

← **Figure 1.** ***Flore and Blanscheflur*** **by Konrad Fleck in an illustrated manuscript from 1442/44. The depiction shows the approaching Flore against the stylised backdrop of the city of Babylon (Source: Universitätsbibliothek Heidelberg, Cpg 362, fol. 94v).**

» These literary descriptions of cities are not oriented to the urban living environment of the authors, but are based on transtemporal patterns and traditions which are much older than the medieval epics. «

characteristics or differentiated descriptions of the urban space.

But there are some texts that differ from this pattern by presenting extensive descriptions of large and remarkably splendid cities. These literary descriptions of cities are not oriented to the urban living environment of the authors, but are based on transtemporal patterns and traditions which are much older than the medieval epics. Among the most important sources for such supra-temporal mental conceptions of cities are biblical narratives as well as subjects from ancient mythology.

Babylon as a Christian paradigm of the city

Ranking among the most important constants in the cultural knowledge of the city is the paradigmatic city-pair Babylon and Jerusalem. Shaped in the Old Testament, it epitomises controversial attributions of the city as a cultural and living space. While Jerusalem stands out as a place with a particular presence of God and end-time promise, Babylon is the epitome of the city as a place that promotes a sinful and decadent way of life.

These stereotypes were incorporated into cultural knowledge and they have continued meaning that can still be seen in current media presentations such as the series *Babylon Berlin*. Here, Babylon is used as a cipher for the metropolis as a place of a decadent way of life and a sphere of criminality, prostitution and social decay.

This image of Babylon established in theological discourse is shaped via miscellaneous biblical texts. Among these is the well-known narrative of the Tower of Babel found in Genesis/ first book of Moses, when humans start to build a tower whose spire is to reach heaven (Gen. 11:1-9). The Babylonian tower embodies human hubris because humans want to bring something into being that comes close to divine creation. The central text for the biblical image of Babylon is the Revelation of St. John, describing the apocalyptic inferno of the divine Last Judgement at the end of time. It contains several efficacious images like the book with seven seals and the apocalyptic horseman which became a firm component of cultural memory. Among these images is that of Babel as the "mother of harlots" (Rev. 17:5). This female personification is attributed with luxury and a particular preciousness of her attire: she is surrounded by purple and scarlet, covered with gold, pearls and with precious stones (Rev. 17:4).

This applies not only to Babylon as the female personification of the harlot but also to Babylon the city, which is described with the same attributes of luxury and material splendour: the city is decorated with purple, scarlet, gold, precious stones and pearls. These material features signalise luxury, decadence and worldly lavishness – qualities with extremely negative connotations in biblical contexts. Furthermore, the Revelation of St. John presents an efficacious image of Babel as an epitome of worldly power and material wealth, but in a negative conno-

tation because these attributes are connected to sin in opposition to God. This image of Babylon did not only shape the theological discourse in the Middle Ages, but was also made productive in the context of literary depictions of cities.

This can be seen through the example of Konrad Fleck's *Flore und Blanscheflur*, a love novel from the first third of the 13th century. *Flore und Blanscheflur* (Fig. 1, p. 34) presents the narration of the unprecedented love of Flore, son of the Moorish king of Spain, and Blanscheflur, daughter of a Christian slave. Born on the same day and at the same hour, both children are bound together in a divinely conditioned love. The protagonists' outstanding love is honoured with a particular significance in the history of salvation, since their daughter is destined to become – as is foretold in the prologue – the mother of Charlemagne. In this way, Flore and Blanscheflur are the origin of the renewal of the Holy Roman Empire. But before this outstanding happy ending, their love has to prevail against much resistance because Flore's royal parents do not approve of their son's love for a Christian slave, perceiving it as a misalliance, and try to divide the lovers. They sell Blanscheflur to Babylonian merchants and thus she arrives at the court of the Babylonian Emperor, the Amiral, an extremely powerful and cruel despot to whom 70 kingdoms are subjected. The Amiral wants to marry Blanscheflur, but this can be prevented, since Flore is relentless in his search for his beloved and finally wins her back.

The city of Babylon as the central place of action in this novel is almost exclusively depicted by one central building. It is the Babylonian tower, a monumental construction which serves as the Amiral's seat of power and where Blanscheflur is imprisoned (Fig. 2, p. 39). The analogy to the biblical tower becomes apparent from the outset when it is told that the Amiral keeps Blanscheflur

"in eime turme veste
und âne zwîvel der beste
der in allen rîchen stât.
den turn er erziuget hât
ûz so grôzen steinen
daz man vil kûme ir einen
mit drîen winden ûf gezôch.
er ist hundert klâftern hôch
und ist ahtzic klâftern wît."
(V. 4166-4175)

"in an enormous tower,
without doubt the best
that one can find in all empires.
He has built the tower
from such huge stones,
that one could hardly move one of them
with three winches.
It is 100 fathoms high
and 80 fathoms wide."

Already in its sheer dimensions, the Babylonian tower exceeds everything previously experienced; the extraordinary strong construction mirrors the absolute power of the Amiral. Not only its size, but also the interior of the tower is exceptional. Besides a highly impressive great hall, it houses 70 bowers of immeasurable splendour. The floor pavements, walls and ceilings of all chambers are over-abundantly decorated with gold and precious stones:

"In den gewelben über al
stânt sibenzic kemenâten.
[...]
Daz himelze und diu mûre
sint von golde und von lasûre
unde von kristallen
in den kemenâten allen
gezieret âne missewende."
(V. 4182-4191)

"Within the entire vaults
there are 70 bowers.
[...]
The ceilings and the walls
in all of the bowers
are covered with gold and lapislazuli
and perfectly decorated with crystals
without any flaw."

The exquisite interior design with gold and gemstones is mentioned several times, and due to this overwhelming beauty, the tower is compared with the earthly paradise. At the same time, the description of the tower depicts the Amiral's immense wealth and lavishness building an analogy to the biblical image of Babylon. Furthermore, each of the 70 bowers in the tower is inhabited by three times as many women, signifying the Amiral's sexual intemperance, a characteristic that applies to the Babylonian harlot as well. Thus, the negative biblical patterns associated with the name Babylon are used for the production of meaning in this literary text. This gives the opposition between the protagonist couple and the Amiral a special salvation-historical scope. The Christian couple is threatened by the Babylonian emperor who is attributed with absolute worldly power and incredible richness, but also with hubris, because with his earthly power and economic potency, he is trying to build something similar to paradise and therefore to divine creation.

Troy as a pagan supercity

Another important repertoire for the literary description of cities are the topics of Greek and Roman mythology. In medieval times, the educational traditions from antiquity were continued and ancient topics belonged to the first subjects presented in the worldly, thus non-religious literature of the Middle Ages. Of particular significance was the history of Troy and the Trojan war, which were part of general education and were the subject of numerous texts. The Trojan war and the fall of Troy were regarded as historical facts in the Middle Ages. Troy was also an important part of the Christian history of salvation: Troy's doom was the absolute precondition for the founding of Rome through the descendants of the Trojan refugee Aeneas, who had fled from Troy as it fell. And the Roman Empire, as the last of four biblical world empires, was connected to the medieval Empire through the concept of *translatio imperii* by which the German Emperors considered themselves as the legitimate successors of the Roman Empire.

The status of Troy as significant common cultural knowledge manifests itself in a widespread literary tradition on the topic. The presumably most popular and definitely most extensive text on the Trojan war is the *Trojanerkrieg* written by Konrad von Würzburg in the late 13th century. This novel, comprised of more than 40,000 verses, contains a description of the newly built city of Troy which ranks among the most comprehensive city-descriptions in all of medieval epic poetry. Troy is characterised by an almost fantastic materiality – the walls are made of marble in different colours, the countless towers have golden roofs, and from the entire city an almost celestial shine radiates. The inside of the city is on par with its beautiful exterior, everything inside

the walls is made of marble and gold and covered with gems. Due to this outstanding materiality, the city appears to be an earthly paradise:

> *"reht als ein irdisch paradîs*
> *diu stat erwünschet dûhte,*
> *wan si gar schône lûhte*
> *von rîchen dingen manger slaht."*
> *(V. 17444-17447)*

> *"The desirable city*
> *appeared just like an earthly paradise,*
> *for she glowed beautifully*
> *from several precious objects."*

Troy's exceptional beauty is repeatedly highlighted in certain passages of the text, but at the same time, a highly problematic momentum is attributed to the city: In the course of the description it becomes apparent that its beauty and splendour are based, at least in part, on black magic – with this, the city is problematic to the core and stands in fundamental opposition to Christian salvation.

This religiously loaded image of Troy with its inherent ambivalence becomes understandable against the background of the reception of antiquity in the Middle Ages. The modes of this reception shifted between identifying acquisition and purposeful dissociation: On the one hand, the pagan and therefore pre-Christian past had a high cultural value, on the other hand, it had to be overcome and outpaced by the Christian present. Therefore, Troy's initially positive attributions of almost ethereal beauty and outstanding culture become undermined through the implied opposition between Christian and pagan religiosity. This already becomes manifest in the fact that Troy has to perish so that that the city of Rome with its particular Christian significance can be founded by the descendants of the Trojan refugee Aeneas.

These two examples should demonstrate that city descriptions in medieval epics do not intend to depict historical forms of cities and urbanity. This might have to do in part with the fact that the city

↑ Figure 2. The depiction shows Blanscheflur in the Babylonian Tower (Source: Universitätsbibliothek Heidelberg, Cpg 362, fol. 114r).

» These two examples should demonstrate that city descriptions in medieval epics do not intend to depict historical forms of cities and urbanity. «

» Rather, the literary texts have to be regarded as media from which cultural ideas of the city and urbanity can be revealed. Of particular relevance are religious paradigms which rank among the central and transtemporal mental conceptions of the city. «

was not a crucial factor within the world of experience of medieval authors. Unlike medieval Italy that was shaped by a dense net of ancient cities and thus knew an entirely different form of urbanisation, the degree of urbanisation in the German-speaking area has to be described as low – at least until the beginning of the 12th century. During the 12th and 13th centuries, this changed increasingly when a 'peak phase' of city foundations as well as the expansion and densification of existing urban structures started. Therefore, for the authors of the 13th century, a certain familiarity with urban settlements can be well assumed. Konrad von Würzburg, for example, the author of the *Trojanerkrieg*, ranks as an urban author (Fig. 3). He lived and worked in Basel and his texts were commissioned by several important personalities of Basel's elite. Nevertheless, the description of the city in the *Trojanerkrieg* is not a presentation of a concrete urban structure. It is an artistic object not aiming at the imagination of a 'realistic' cityscape, be it that of a typical medieval town or that of an ancient polis, but at the evocation of a fantastic superlative of a city full of religious allusions. We do not know anything about Konrad Fleck's life and production context, but his city description as well allows no reference to concrete cities of his historical period.

The examples show that the images of cities within medieval epics have little to do with factual urban structures at the time of origin of the individual texts. Rather, the literary texts have to be regarded as media from which cultural ideas of the city and urbanity can be revealed. Of particular relevance are religious paradigms which rank among the central and transtemporal mental conceptions of the city. Well-known biblical or mythological cities, such as Babylon and Troy, which are central points of reference within the cultural memory of premodern societies, are used as components for the creation of meaning within the literary text, they shape the literary image of the city. These conceptions are in no way restricted to premodern times – in modern medial conceptualisations of the city, precisely these traditions are often pursued. The series *Babylon Berlin* mentioned above invokes the image of the Babylonian harlot as a leitmotif and as a personification of the vicious city. This example shows that in the 21st century, a similar repertoire of mental conceptions and religiously influenced city stereotypes still exists that we already know from ancient times. ◆

← Figure 3. Konrad von Würzburg's *Trojanerkrieg* in an illustrated manuscript from 1444/45. The depiction shows the landing of the Greeks in front of Troy, which is depicted as a city abbreviature with walls and towers (Source: Berlin, Staatsbibliothek, mgf 1, fol. 263v).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Annika Hanert

City, Memory and Orientation: Design Features of an Age-friendly City

The ability to orient oneself in the environment and to move purposefully is an essential part of our everyday life. In addition to the normal aging process, a constant loss of the ability to orient oneself is a relevant feature of cognitive deficits in people suffering from dementia. The loss of the ability to orient oneself in the immediate environment leads to passivity and behaviour of social withdrawal in those affected. Similarly, the dynamic transformation of urban spaces in modern times makes it more difficult for people to navigate. In order to enable people with orientation difficulties to live independently for as long as possible, design principles should be applied in public spaces, so that navigation in urban space is supported (Fig. 1). Can we enable better spatial orientation on the basis of cognitive science results and by integrating architecture and urban planning to promote a transformation to an age-appropriate city?

Our ability to navigate is a constant companion of our actions: whether it is finding our way to the kitchen in the morning, exploring a foreign city, or traveling to a foreign country for the first time, we use a variety of different cognitive processes. These include, for example, recognising landmarks, tracking a specific target position, and calculating the shortest path to the destination. Numerous studies have examined this behaviour on cognitive and neurobiological levels, as well as in the context of perceptual geography considerations. A deeper understanding of the brain processes underlying the formation of new memory content may provide clues for the development of effective orientation

← **Figure 1. Making a city more legible for the elderly and cognitively impaired requires distinctiveness, accessibility, and clear wayfinding. An abundance of signs can lead to confusion and increase disorientation (Source: https://unsplash.com/photos/AU07BMLW1NA).**

» A deeper understanding of the brain processes underlying the formation of new memory content may provide clues for the development of effective orientation strategies in complex environments. «

↑ Figure 2. For autonomous living of elderly people in urban spaces, good orientation abilities are essential, which can be supported by design principles (Source: https://pixabay.com/de/photos/senior-alten-menschen-paar-3336451/).

strategies in complex environments. In addition, design features that help peoples' orientation in urban space and the generation of distinctive memories in specific places are also of direct relevance to the design of buildings, neighbourhoods, and the entire urban space.

While most people in their younger years find it easy to orient themselves, even in urban areas that are not well-structured and constantly growing, this ability declines in old age. Currently, demographic change is contributing to an aging society, which is accompanied by an increase in the prevalence of people with dementia. According to an estimation by Alzheimer Europe, the number of people who are over 85 years old in Europe will have more than doubled by 2050 (compared to 2018). Here, 1.73% of the population had dementia in 2018. In Germany, already 1.9% of the population suffered from dementia. Given the expected increase in the number of people with dementia, the support of the aging population in the community represents a major urban planning and design challenge (Fig. 2). Although there is considerable research on planning and designing dementia care facilities and nursing homes

that flow into the planning and design of these facilities, there are comparatively few studies on the impact of the built environments on the health and well-being of people with dementia in neighbourhoods with open environments.

In the following, the interrelationships of neurobiological principles and perceptual geography as well as urban architectural perspectives will be illustrated. Considering this background, the relation of dementia and design principles of urban space as well as solutions for age-appropriate urban design will be discussed.

The Image of the City

One of the most influential theories in the field of spatial cognition and social geography is Kevin Lynch's study *The Image of the City* published in 1960, which contains both theoretical concepts and empirical research on orientation in urban space. As a basis of the analysis, Lynch used maps drawn from memory by residents of Los Angeles, Boston and Jersey City. From his findings, Lynch concluded that individual mental representations condense into a communal 'cognitive map' whose typical elements could be defined as paths, edges, districts, nodes, and landmarks. These not only interacted with each other and with the perceiving person but are also guiding for spatial orientation. Navigation based on the cognitive map would be supported especially by the elements of edges and landmarks, since their three-dimensionality would have a higher geometric order for the observer and thus convey a sense of distance and direction. Additionally, due to their topological character, the two-dimensional main elements of the cognitive map (paths, districts and nodes) would serve as anchors and support orientation.

Another essential characteristic defined by Lynch is the legibility of the city. It enables an understanding of urban space in such a way that it can be recognised and organised in a coherent pattern. Thus, according to his theory, the legibility of a city is the simplicity with which a route can be understood and identified. Parallel to the concept of legibility, Lynch defined that of imaginability as a property of space that determines how easily the object can be mentally mapped and recalled from memory. Lynch's theory, which analyses the interactions between perceptible objects in urban space and their viewers, consequently interprets navigation as dependent on the quality of the mental image of urban space. Accordingly, Lynch's design elements can be used to derive guidelines that are essential for age-friendly urban design and the consideration of orientation difficulties that people with dementia are faced with.

» Neurobiological literature, analogous to Lynch, defines the landmark as a spatially and temporally fixed object that supports navigation and emphasises that it is an essential basic visual element. «

» Aging processes of the brain show up on a cognitive level especially by volume reduction in the medial temporal lobe including the hippocampus, which is why we can observe deterioration of memory and spatial orientation with age. «

Landmark-based navigation

In cognitive psychology, spatial navigation is described as the ability to navigate and move purposefully in familiar as well as unfamiliar environments. This is a complex and multicomponent cognitive performance because it involves the processing of different types of information. For example, sensorimotor information about one's position and movement as well as spatial memory, perceptual and attentional processes are dynamically integrated. With respect to the perceptual geography feature of legibility, empirical studies show that visual stimuli play a seminal role in human navigation. Visual stimuli would be used more than sensory internal stimuli of one's movement, such as vestibular or proprioceptive feedback. Visual stimuli, in particular, provided direct information about spatial properties of the environment, central objects of the current environment, and their positional relationship to each other.

Neurobiological literature, analogous to Lynch, defines the landmark as a spatially and temporally fixed object that supports navigation and emphasises that it is an essential basic visual element. Landmarks (Fig. 3) can appear in different forms: as single objects (*e.g.* as buildings or statues) or extended topographic features (*e.g.* the arrangement of buildings at an intersection). The more unique and informative the features of an object, the more likely it is to be used as a landmark. This primarily requires a contrast with its surroundings (*e.g.* architectural distinction), either in terms of its characteristics (colour, texture, size, shape, *etc.*) or because of its spatial location in relation to other objects in the nearby environment. Humans, as well as animals, use landmarks in route finding to determine their position and course. This strategy, known as landmark-based control, contrasts with path integration strategies, which use cues of self-motion to determine movement relative to a known starting position. Landmark-based control and path integration can be intertwined in navigation, where path integration is used to maintain one's position and course, and landmark-based control is used to recover (or recalibrate) these quantities in a famil-

➜ Figure 3. Characteristic sample of a landmark in urban space (Source: https://pixabay.com/de/photos/germany-architecture-city-travel-2693087/).

iar environment. Orienting oneself to landmarks and salient waypoints and assigning directional decisions to them (*e.g.* "At this church, I go left.") is an orientation strategy that is more promising for older people than the strategy of identifying one's own position relative to a plurality of other external objects.

Neural correlates of spatial orientation and cognitive map

Animal studies in the 1970s led by neuroscientist John O'Keefe were the first to show that place cells in the hippocampus are active when memorising events as well as their specific locations. Cells in this region of the temporal lobe responded to an animal's past experiences at a specific location and spatial orientation. In addition, Moser and colleagues discovered that memory of space also activates a hexagonal network of grid cells in the nearby entorhinal cortex in response to landmarks and self-motion. This creates a neural system that links memories of places and events. Although much of this research is based on electrophysiological studies in rodents, recent studies using functional magnetic resonance imaging have pointed to similar mechanisms in humans. The multitude of results across different species also solidified the cognitive map theory at the neurobiological level that animals store a map-like representation of their environment. Thus, cognitive maps can be viewed as spatial schemas composed of many individual experiences: The cognitive map of an environment is reactivated as soon as the same environment is re-entered. It is also updated by new experiences that are made in that place. Aging processes of the brain show up on a cognitive level especially by volume reduction in the medial temporal lobe including the hippocampus, which is why we can observe deterioration of memory and spatial orientation with age. This brain region is particularly affected in the most common form of dementia, Alzheimer's disease. The deposition of specific proteins (beta-amyloid and tau fibrils) in the structures of the temporal lobe leads to a degeneration of brain tissue in this brain area. This results in a constant loss of short- and long-term memories as well as of the temporal and especially spatial orientation ability. The loss of this ability leads to a feeling of not being able to find one's way around and to the fear of getting lost, so that everyday activities are avoided. This passivity and social withdrawal pose a major problem for the further course of the disease with enormous implications for family caregivers. Both older people with orientation difficulties and those affected by the onset of dementia gradually withdraw from urban development activities, so that they are pushed back from urban space and from helping to shape it. Social responsibility towards the older generation therefore demands that we intervene in this self-perpetuating process and develop a sustainable cityscape that can be used by young and old alike.

Dementia-friendly urban design

In light of Lynch's theory as well as neurobiological evidence for cognitive maps in the temporal lobe, it is clear that spatial orientation can be

» If parallels are drawn between the previously identified indoor design solutions and the external environment, distinctiveness, accessibility, and clear wayfinding are of great importance for dementia-friendly urban design. «

influenced by design features. Thus, difficulties in orientation in urban space may occur due to the neglect of Lynch's criteria in the built environment. In the case of spatial design for people with declining orientation abilities, empirical studies have already shown principles that facilitated navigation in interior spaces, such as nursing homes. These included simple floor plans, good visual accessibility of destinations, low uniformity, a clear guidance system, and the presence of landmarks. To enable people to live independently for as long as possible in old age, design principles should also be considered within urban architectural issues. An urban design that takes up Lynch's criteria of legibility and imaginability in relation to the needs of elderly and cognitively impaired people can contribute to a higher participation in urban, community life and have a protective effect on withdrawal behaviour. If parallels are drawn between the previously identified indoor design solutions and the external environment, distinctiveness, accessibility, and clear wayfinding are of great importance for dementia-friendly urban design. A varied design, salient landmarks, and small blocks of streets with direct, connected paths with clear cues through signage could lead to a better understanding of public space. Particularly in relation to landmark-based navigation, which is helpful for the elderly and cognitively impaired, this means for the design of cities that landmarks should be created that are highly visible through colour schemes and contrasts, distinct from each other, and located in places relevant to navigation.

The connections between neurobiological mechanisms of aging as well as dementia-related developments and urban design were made clear above. In order to plan urban architectural and design solutions that maintain independent living for the aging population for a long time, it is a priority to raise society's awareness of the limitations in daily life in the city caused by cognitive impairments. Subsequently, it is important to create a basis for transdisciplinary cooperation between experts from neuropsychology, neurobiology, urban designers, as well as those affected and their relatives. ◆

Thomas C. G. Bosch

Urban Living and the Rise of Lifestyle Diseases: Lessons from Microbiome Research

Numerous multicellular organisms are permanently associated with specific communities of microorganisms and form a functional unit with them, termed 'metaorganism' or 'holobiont'. There is increasing evidence that this metaorganism not only determines health and disease, but also influences animal and human behaviour. As the hitherto hidden role of microorganisms becomes visible, it becomes clear that we need to rethink many long-established and familiar relationships. Moreover, it is also time to use the findings of microbiome research for a paradigm shift in urban and building planning (Fig. 1).

The discovery of the metaorganism and the recognition that many organisms are an evolutionary community of visible host cells and a large number of mostly invisible microbes (Fig. 2, next page) have attracted attention in the life sciences, evolutionary biology and also medicine. Today, we know that all our body surfaces are colonised by bacteria and that the vast majority of microbes colonising us are not pathogens, but that we need them for our development and also for protection against possible infectious agents. It is known that organisms are always multi-organismic and there are no individuals in the strict sense that can exist on their own. We exist only as an ecosystem in an evolutionary partnership with microbes.

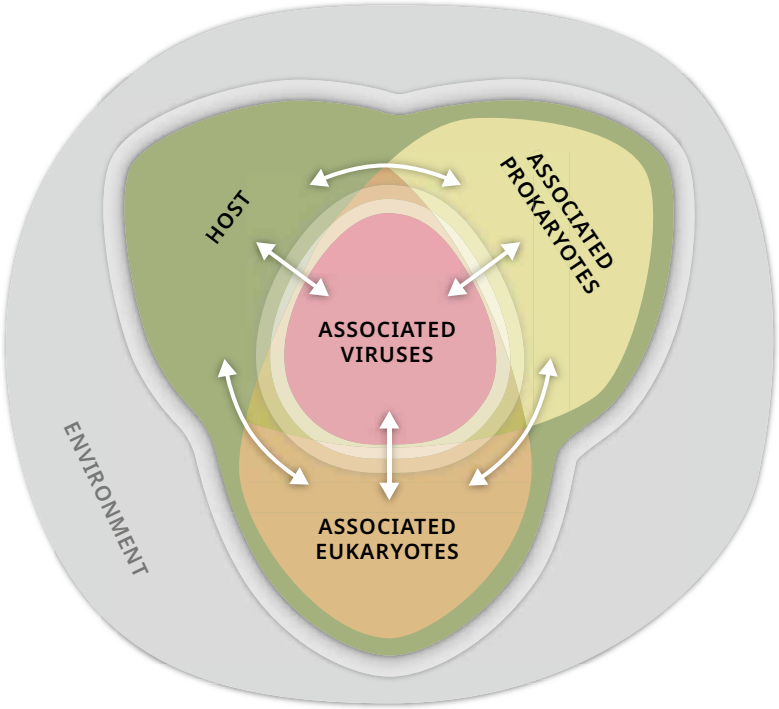
← **Figure 1. The so-called Bosco Verticale in Milan (Italy) integrates dense greenery with trees into the façade of modern tower buildings (Photo: Angelo Stara, Unsplash: https://unsplash.com/photos/Uj8NUWvDnes).**

This progress is due in large part to the application of 'metagenomic' methods, which enable us to determine the composition of a microbial community by sequencing its genetic material without having to culture its members. This has made it possible to show that a host-specific microbiome provides plants, animals, and humans with important functions related to metabolism, immunity, development, and also adaptation to an ever-changing environment. Microbes contribute to developmental transitions and life history traits such as developmental tempo and longevity. In recent years, microbiome research has also revealed that the interactions between microbes and their hosts are ecologically and evolutionarily significant across the entire phylogenetic tree of life. Animals, plants, and fungi have evolved in a microbial world and depend on their associated microbes to function. Symbiosis and cooperation with microbes thus emerge as a fundamental principle in evolution.

» Symbiosis and cooperation with microbes thus emerge as a fundamental principle in evolution. «

The urban habitat

Urban habitats are unique ecosystems and very different environments than those in which our ancestors lived. In 2018, 55% of the world's population lived in urban environments, or cities, according to the United Nations. By 2050, that number is expected to reach 68%. In Africa, urbanisation is expected to increase by 300% over the next 40 years. This shift from living in rural areas to living in the city means that there has been a massive change in our environment and the way we interact with nature in our daily lives. With urbanisation comes densification and increasing time spent indoors. While there is some kind of nature in urban areas, this nature is very different from the nature we see outside of cities and towns in rural areas. The number of animal and plant species, i.e. biological diversity, is generally much lower in urban habitats than in natural environments.



→ Figure 2. Organisms are metaorganisms, composed of a macroscopic host and synergistically interdependent bacteria, archaea, viruses, and numerous other microbial and eukaryotic species including fungi and algae (Diagram: Thomas C. G. Bosch).

Loss of microbial diversity and the emergence of lifestyle diseases

The genetic diversity of the microbiome of animals and humans has been significantly reduced in recent years and demonstrably during the transition from rural to urban life. Hunter-gatherer societies in the Amazon regions have about twice as many microbial species in their guts as residents of Western countries. Lifestyle diseases, such as inflammatory bowel disease and obesity, are rarely found there. Interestingly, however, the diversity in the microbiome of these people also dwindles as soon as the younger generation, in particular, becomes mobile and moves out of the villages into larger cities. With these field studies, a gradient can clearly be measured: the further one moves away from living in a small village in the countryside to larger and very large cities, the lower the diversity in the gut microbiome and the more frequent the occurrence of chronic inflammatory lifestyle diseases. These include chronic immune diseases, for example, Crohn's disease, asthma, or multiple sclerosis, which have reached unprecedented incidences in Europe and North America since the mid-20th century. Other lifestyle diseases include obesity, asthma, food allergies, neurodermitis, cardiovascular disease, chronic bowel inflammation, and esophageal reflux. An important cause of the health problems occurring today is the mismatch between the new environmental conditions and the adaptation that occurred during human evolution, including the resulting traits that are embedded in the human genome. These 'mismatch diseases' thus represent, in effect, the trade-off between the body we inherited and the new environment we created. Now that we know that individuals are metaorganisms and that the evolutionary success of a species is also based on the formation and maintenance of a diverse microbiome, a loss of microbial diversity also affects the ability to adapt quickly enough to changing environments. If it turns out to be true that high species or gene diversity in the microbiome is of great importance for health, this also means that these missing microbes provide the key to preventing or correcting dysbiosis. Thus, this may be an effective means of treating and curing civilisation-related diseases such as diabetes, Crohn's disease or chronic inflammatory diseases in the future. This opens up an important new field of action for modern urban and building planning.

Urban and building planning in the age of the metaorganism

Buildings are ecosystems that are part of larger urban ecosystems. Each space is a unique ecosystem. Currently, our understanding of the composition and distribution of microbial communities in buildings is limited. In addition, largely unclear is the nature and relevance of the space on and in which all of the aforementioned interactions take place in the multi-organism entity that is the metaorganism. How can buildings be designed for better health and constructed so that a complex and diverse microbiome can survive there? Most often without realis-

» An important cause of the health problems occurring today is the mismatch between the new environmental conditions and the adaptation that occurred during human evolution, including the resulting traits that are embedded in the human genome. «

ing it, urban planners and architects also design the habitats for microbes in buildings and interiors, and thus determine the growth and proliferation of microbial communities. 'Microbiology of the built environment' (MoBE) is the name of a new discipline that studies cities and buildings, including schools, university dormitories, hospitals, offices, and even the International Space Station, and characterises the microbiome in each particular interior setting. At the core of the new science of building is a multidisciplinary approach linking architecture, design, engineering, microbiology, and anthropology. Looking through the lens of microbiome research promises important insights into the impact of building design, planning, material selection, ventilation systems, and engineering infrastructure on the microbiomes present in buildings. This may allow for better detection of infection spread and the prevention of disease in the built environment. The 'Hospital Microbiome Project' at the University of Chicago, for example, was designed to analyse microbial samples from surfaces, air, staff, and patients from a new hospital pavilion in order to better understand the factors that influence bacterial population development in healthcare environments. Human microbiome research has shown that the use of antibiotics can disrupt the normal array of microbes that live in and on our bodies. The constant attempts at sterilisation in hospitals might function on a similar level. It might take out some of the harmful pathogens but at the same time it also drastically reduces the many beneficial microorganisms. This results in a loss of colonisation resistance, making hospitals potentially rather very unhealthy buildings. Given the new findings of metaorganism research, it seems urgent to rethink the character of indoor public spaces, as well as high-traffic places and frequently used routes between buildings. Rethinking sterile environments seems much needed. Rather than designing houses as shelters and defences against any microbial threat, cities, public buildings, and homes should be included in an interconnected, metaorganismic way of thinking. Architects and designers, such as Beatriz Colomina of Princeton and Mark Wigley of Columbia University, join biologists and anthropologists in thinking about a "microbiome-friendly home" and wonder if human-centred design might not be better focused on microbes (Fig. 2).

Let them eat dirt

With this book title (Windmill Books, 2017), Canadian microbiologists warn against letting children grow up only in a very hygienic environment in everyday life. When we think about how our cities are built, we must also consider how children use and move through these spaces. If children hardly come into contact with real nature and their environment is kept sterile wherever possible, they will come into contact with very different and, above all, considerably fewer microbes than children who grow up on the countryside. It has long been known that allergies and autoimmune diseases occur much less frequently in rural areas than in cities. If we facilitate children's access to (micro-) biodiverse spac-

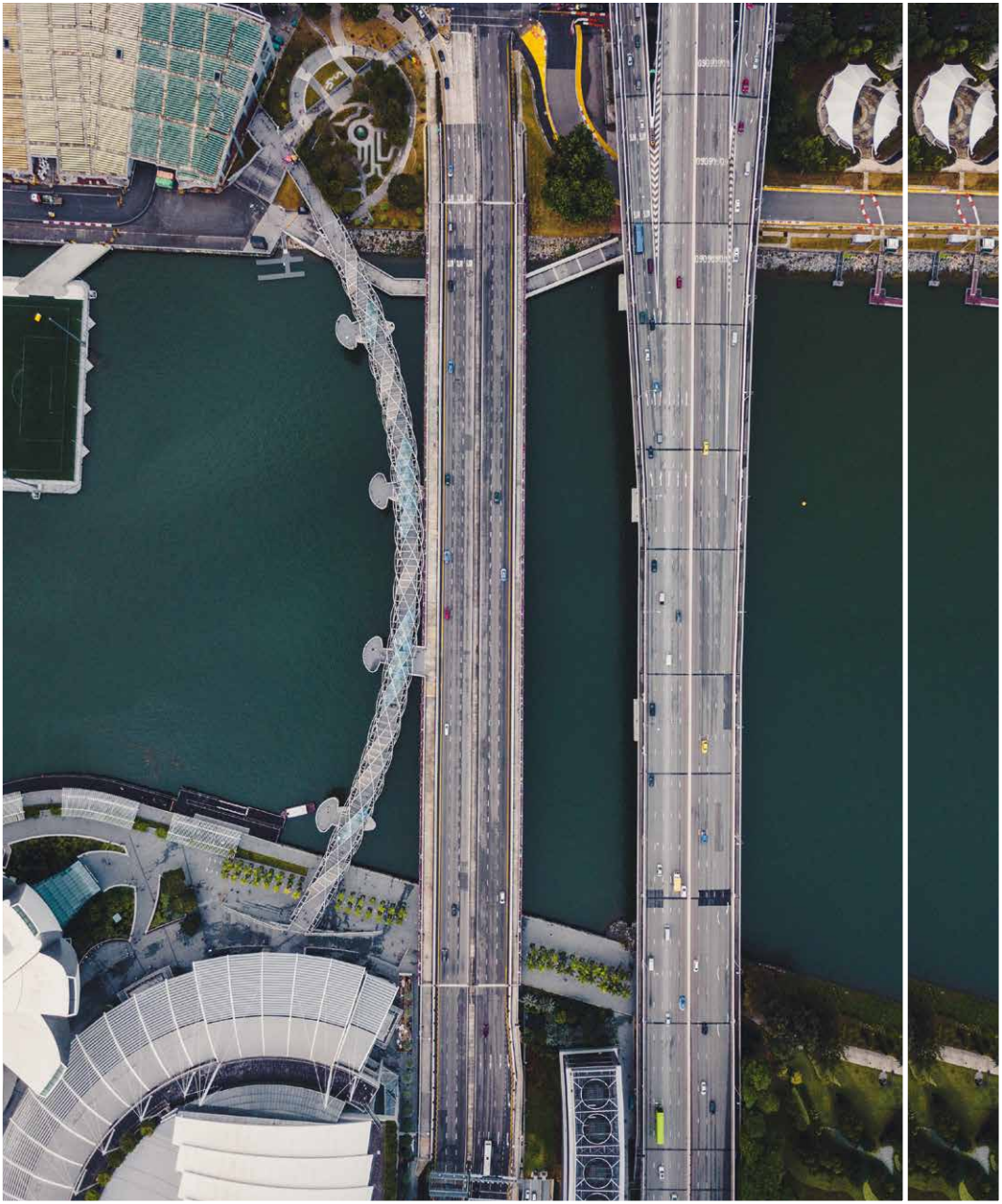
» Most often without realising it, urban planners and architects also design the habitats for microbes in buildings and interiors, and thus determine the growth and proliferation of microbial communities. «

» The thoroughly revolutionary view of living organisms and microbes as a functional unit will also extend the boundaries of biomedicine and urban planning in the future. «

es (Fig. 3), we could encourage them to use them and prevent allergies and autoimmune diseases from developing.

Our urban way of life ignores the fact that, over the millennia, the body has come to terms with its environment and its microbes in the best possible way – and that it is only fit and healthy as a whole. We will only come to a deep understanding of health, and thus to an understanding of common diseases, if we decide to accept this multi-organismic complexity. The thoroughly revolutionary view of living organisms and microbes as a functional unit will also extend the boundaries of biomedicine and urban planning in the future. ◆

↑ Figure 3. Community Garden Bostanie in Skopje (North Macedonia) (Source: https://commons.wikimedia.org/wiki/File:Collective_gardening.jpg).



Dirk Nowotka

CAPTN Future: Clean Autonomous Public Transport

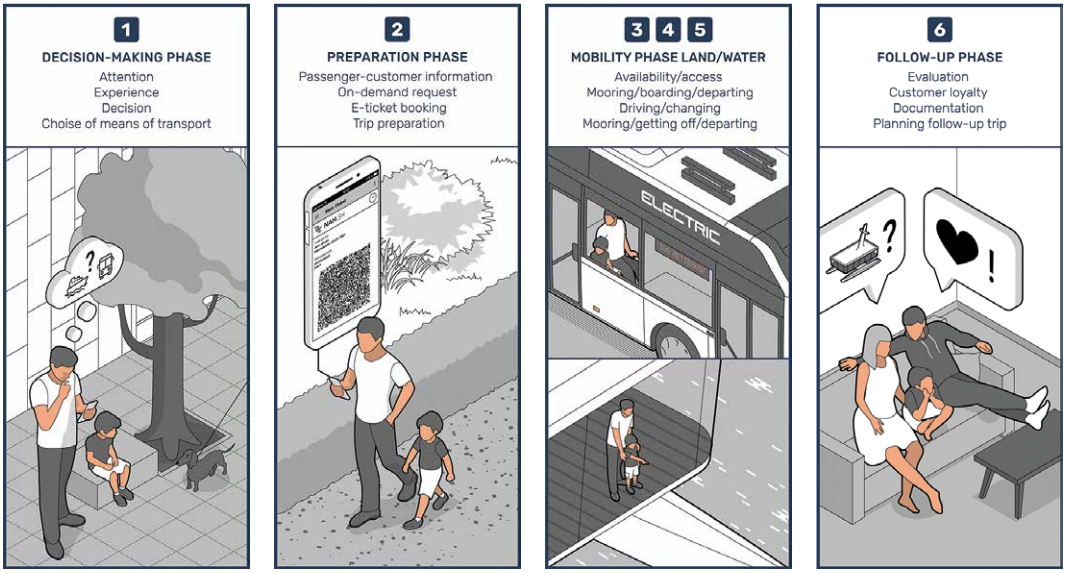
The transportation problem in urban areas poses an environmental and health challenge for its population. The factors that influence these problems are highly complex and tightly interwoven. The best solution to the transportation problem in highly populated areas appears to follow a holistic approach. We outline the future development of urban public transport from a point of view which combines autonomous and clean technologies, safety/security, attractiveness, integrated mobility chains and innovation processes.

Massive urbanisation, which has been steadily increasing since 1950 and which will continue to increase in the future, is leading to more and ever larger cities. In 2018, there were 33 cities in the world with a population of 10 million or more. According to UN forecasts, by 2030 there will probably be 43 so-called megacities.

With the increasing concentration of habitats, the importance of urban transport (Fig. 1) increases. The growing problems of urban transport are obvious: noise, congestion, smog, conflicts over land use and increasing costs of public transport with growing demand. Individual transport is becoming increasingly expensive and public transport is an unattractive alternative for many. The CAPTN Initiative (Clean Autonomous Public Transport), a consortium of economic, academic and municipal partners, is dedicated to this problem. Through the use of end-to-end digitisation, clean drives, autonomous transport solutions and a greater integration of different modes of transport, more attractive, cheaper and

← **Figure 1. Traffic is one of the great challenges of modern cities. The required infrastructure often shapes entire cityscapes, such as the Helix Bridge in Singapore (Photo: Fahrul Azmi, Unsplash: https://unsplash.com/photos/qJOPjqrPEKU).**

» Through the use of end-to-end digitisation, clean drives, autonomous transport solutions and a greater integration of different modes of transport, more attractive, cheaper and pollution-free transport options are to be created in urban areas. «



↑ Figure 2. Mobility chain phases (Diagram: Vincent Steinhart-Besser, CAPTN).

↑ **Figure 3. The integrated inner-city autonomous mobility chain (Chart: Vincent Steinhart-Besser, CAPTN).**

» In the CAPTN vision, networked, inter- and multimodal mobility means no longer thinking, organising and offering mobility in terms of different modes of transport, but along integrated mobility chains. «

pollution-free transport options are to be created in urban areas. The CAPTN vision is an urban mobility system that is increasingly characterised by autonomous solutions that are safe, pollution-free and climate-friendly, which significantly reduces individual traffic and connects the various modes of transport on land and water in a user-friendly and intelligent way. In 2020, the CAPTN initiative developed a comprehensive concept (Kiel BMBF Future Cluster application CAPTN Future) for the realisation of this version as part of the final round of the BMBF's Clusters4Future program. Central parts of this concept are presented below and are intended to serve as an example of the complexity of the task of developing a sustainable, largely autonomous transport system for urban areas and its possible mastery.

In the CAPTN vision, networked, inter- and multimodal mobility means no longer thinking, organising and offering mobility in terms of different modes of transport, but along integrated mobility chains. The concept of the integrated mobility chain is based on the idea of networking publicly accessible means of transport on an equal footing and making them accessible to the end consumer.

The mobility chain (Fig. 2) includes local public transport services, such as ferries, buses, and possibly trams, that are able to move large numbers of people. Sustainable forms of individual transport, such as pedestrian mobility, bicycles or scooters, but also sharing and mobility-on-demand offers, in particular bike, car and ride sharing, are given equal priority. In this way, CAPTN is developing attractive alternatives to classic motorised individual transport with one's own car.

Overall, the CAPTN Future mobility chain consists of six phases (Fig. 3): a decision phase (1) and a preparation phase (2) in the run-up of an actual journey, in which the passengers deal with the specific requirements regarding the preparation of a mobility section (journey), followed by three mobility phases (3-5) to carry out the trips that are to be considered independently of one another, but which are mutually dependent if different means of transport are used in combination, as well as phase (6) to follow up the trip with the option of planning the next trip as a transition to the next phase (1) of a mobility chain.

Each phase of the mobility chain includes vari-

↑ Figure 4. Target properties of the integrated mobility chain (Diagram: Vincent Steinhart-Besser, CAPTN).

ous elements and aspects that can each be assigned to one of five fields of competence (technology, business, operational design, ethics & acceptance and law). The chain and the interfaces between the sub-aspects illustrate the need to develop inter- and transdisciplinary answers to many questions.

For the future cluster program from 2021 to 2030, a SWOT analysis identified central aspects that determine the realisation of the CAPTN vision. The following questions arise: What are the technological key elements for the realisation of autonomous and clean sea and landside traffic as well as an inter- and multimodal mobility chain? How must technical innovations be designed so that they are safe and legally permissible and offer attractive added value for people and their mobility? How do we reach new target groups and bring about change that considers the current demands and needs of users? What properties must the products and services have so that they make business sense, are globally marketable and sustainably secure the future? Which framework conditions need to be promoted or expanded in order to create an effective innovation ecosystem, build up sustainable cluster structures, establish and secure collaborative R&D as well as regional value creation and skilled workers? On this basis and in dialogue with the relevant stakeholders, the CAPTN Future concept team has defined the following target properties for the integrated mobility chain (Fig. 4): 'autonomous', 'clean', 'safe and secure', 'integrated', 'attractive', and 'innovative'.

These target properties relate to the overall system of integrated mobility and to the products and services of urban mobility on water and on land, embedded there as part of an integrated inner-city mobility chain.

The topic 'autonomous' deals with the development of technological solutions for environmentally friendly, highly automated and autonomous passenger transport on water in coastal urban areas and its integration into inter- and multimodal transport concepts. The autonomous technology and its interactions are to be optimised for a floating test vehicle whose functionality and robustness are to be proven under real conditions. We see the following key challenges: Autonomous navigation in busy coastal areas with cooperating and non-cooperative participants from swimmers to seagoing vessels; au-

tomated collision avoidance rules (colregs), including compliant evasive manoeuvres and autonomous berthing and casting off manoeuvres for autonomous ferries; near-field sensor development and its combination with methods of object detection and object classification; approval of autonomous maritime concepts; integration of broadband communication in navigation and situational awareness; development of multi-modal autonomous transport systems with maritime and landside passenger transport.

The focus of the 'clean' topic area is the development of technical solutions for environmentally friendly public transport on the water and their integration into holistic traffic concepts. In a comprehensive further development of the urban traffic area, all transport systems are to be examined to ensure that they are pollution-free. This concept focuses on the exemplary development of clean water transport. In particular, components for maritime electric mobility are to be further developed, considering the specific driving behaviour of small urban ferries and the requirements of highly automated or autonomous control systems. Above all, solutions for safe and dynamic energy supply must be found for such emission-free and long-term CO_2-neutral passenger ferries. For this purpose, accumulator/fuel cell hybrid systems are being developed, including the associated power electronics and the necessary infrastructure (charging technology, refuelling). At the same time, energy efficiency can be increased through lightweight construction and improvements in drive technology.

The topic 'safe' deals with questions of road safety, data security and legal certainty. New technological solutions, such as an autonomous ferry, can only be approved as a commercial product in passenger transport if essential safety questions are answered in detail. A high level of data and legal security form the basis for the acceptance of innovations.

The topic 'integrated' deals with the networking of the individual modes of transport (especially ferry, bus, car, bicycle) and the development of a data platform for mobility control based on AI methods. The goal is to improve the prediction and control of mobility with interfaces to other sectors, *e.g.* green energy supply or logistics. This should optimise the design and control of attractive mobility chains that cover the largest possible areas of a metropolis, not just those close to water, and provide mobility offers for broad sections of the population.

The topic 'attractive' focuses on activating the involvement of the actors who, with their knowledge and perspectives, promote the development of innovative mobility practices, use the new technologies and thus implement the potential of climate-friendly and well-connected offers. On the one hand, this topic is about working out which logics and mobility practices underlie the creation, application and use of integrated mobility chains in order to ensure acceptance and implementation by the acting and decisive actors. On the other hand, it is about the creative definition, concretisation and communication of the aesthetic, performative and interactive qualities of the integrated mobility chain, with special consideration of the design potential of the shared goods air, space and atmosphere. In this

» The challenges of the CAPTN (and other) innovation ecosystems lie in the high complexity and interdisciplinary nature of the innovation field. «

way, a creative strength of the elements of the new mobility chain can be generated. The CAPTN vision provokes resistance without appropriate communication of the mission statement. In addition, the communication activates broad stakeholder groups and is thus the basis for their active involvement in the innovation process.

The topic 'innovative' creates the methodological foundations that are necessary for the establishment and management of an innovation ecosystem. The aim is to define the framework for continuous innovation processes, to back them up with instruments, and to evaluate and improve them. At the same time, this creates a scientific basis for the innovation-supporting measures. The challenges of the CAPTN (and other) innovation ecosystems lie in the high complexity and interdisciplinary nature of the innovation field. Convergence processes occur here, which result in different areas of knowledge and technology, as well as fields of innovation and industries growing together. These processes are opposed to organisational path dependencies and the limited motivation and ability of the actors. The central dilemma is that an increasing diversity of cooperation partners serves the development of radically new approaches, but, at the same time, uncertainty, cooperation problems and conflicts arise due to increasing diversity.

Unfortunately, the implementation of the CAPTN Future concept was not funded in the Clusters4Future program of the Federal Ministry of Education. Nevertheless, this concept is being implemented in a network of individually funded projects. The developed concept serves as an indispensable guide.

The CAPTN vision will thus contribute to a transformation process of urban space in the coming years, because mobility is one of the central factors that shape city life in the past, present and future. ◆

Sabine Schlüter

Zero Waste Architecture

Resource scarcity, energy crisis and climate emergency are currently placing a particular burden on urban building. At the same time, cities are growing worldwide and require a massive expansion of residential development in dense urban areas. Against this backdrop, the development of concepts that enable energy- and resource-efficient construction and housing is one of the central challenges for urban planning and urban design in the coming years. With the Zero Waste Space housing unit, which was planned in Kiel and implemented in a model project, a possible solution approach is presented below.

Building currently devours enormous resources (40% of energy and 16% of water resources) and causes 60% of waste products. Against the backdrop of an ever-increasing demand for residential and commercial buildings, new ideas for resource-efficient, sustainable construction are needed. As early as 1713, the Saxon chief miner Hans Carl von Carlowitz formulated the main features of the sustainability concept in his work *Sylvicultura Oeconomica*: he demanded that only as much wood should be felled as can grow back through planned reforestation.

In the current debate on building, too, there is widespread agreement that avoiding and reducing the use of building materials, whose resources only grow back very slowly or hardly at all, is imperative if the resulting environmental problems, such as the destruction of habitats of all kinds and the high CO_2 emissions caused by the building industry, are to be averted. Many already established concepts are therefore based on the use of renewable raw materials, which enable CO_2 reduction through natural CO_2 storage and at the same time require less grey energy during the manufacturing process. Buildings made of renewable building materials are also much easier to deconstruct and thus produce less waste in the long-term than buildings made of conventional materials. This contrasts with fired building materials, such as concrete and clinker. They require resources, such as sand, which can neither be actively cultivated nor contribute to a reduction of the CO_2 content in the atmosphere. Moreover, when such architectures are deconstructed, enormous amounts of waste are produced, since these building materials cannot be returned to their original material situation. However, it is precisely the reuse of materials that has increasingly come into focus in recent years. The German process engineer and chemist Michael Braungart and the American architect William McDonough, for example, have formulated a principle with 'Cradle to Cradle', which

← **Figure 1. Zero Waste Space in Kiel is a prototype that is intended to demonstrate the possibilities and opportunities of a 'new building'. From the construction process to its use, it follows the principle of strict waste avoidance and thus saving resources (Photo: Tanja Lücker).**

↑ Figure 2. The interior of Zero Waste Space is designed as a fully equipped, autonomous working and living unit. In the kitchen area, a degradable kitchen system consisting of a wooden construction with straw hemp panels was tested (Photo: Tanja Lücker).

assumes that 'intelligent waste' is unproblematic for the environment as long as the material cycle remains closed. Accordingly, a product should be completely returned to the material cycle without loss of value.

The research project 'Zero Waste Space' at the Muthesius University of Fine Arts and Design in Kiel, Germany was conceived and carried out by Sabine Schlüter to develop concrete architectural solution strategies that can demonstrate the potential and opportunities of 'New Building'. The project was funded by the Muthesius University of Fine Arts and Design, the German Council for Sustainable Development, the Gesellschaft für Energie und Klimaschutz Schleswig-Holstein GmbH (EKSH) and Kiel Sailing City.

The focus of the project was placed on the interface between design, architecture and technology. As a result, an approximately 16 m² work and living unit (= Zero Waste Space) was developed and realised on the grounds of the Kiel Science Park (Fraunhoferstraße 6, Kiel) (Fig. 1, p. 64). It has all the basic functions and interior design of an inhabitable building (Fig. 2) and is scalable for a building construction.

Compared to the concepts already outlined, the 'Zero Waste Space' project goes a decisive step further. The basic idea of Zero Waste is based on

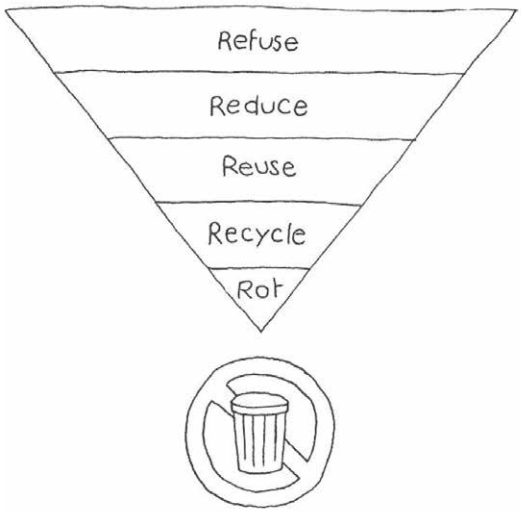
» The basic idea of Zero Waste is based on not creating any waste at all, which directly saves resources and energy. The best waste is the waste that is not generated in the first place! «

not creating any waste at all, which directly saves resources and energy. The best waste is the waste that is not generated in the first place! The guiding principles of the design were summarised by the association Zero Waste Kiel e.V., following Bea Johnson, in a simple scheme with five central requirements (Fig. 3):

'Refuse': reject what we do not need.
'Reduce': reduce what we need but cannot refuse.
'Reuse': reuse what we consume but cannot refuse or reduce.
'Recycle': what we cannot refuse, reduce or reuse.
'Rot': compost the rest.

Reduction to the essentials and the renunciation of consumption-related excess are thus in the foreground here. These are principles that were coined by Bea Johnson as a new life style and are now reflected in many initiatives and activities: From unpacked shops on a local level to certification as a Zero Waste City on a national level.

Accordingly, the focus of the 'Zero Waste Space' research project presented here was placed on how the resources required for construction, their distribution, energy consumption for their manufacture,



↑ **Figure 3. Guiding design principles (Source: Johnson, B., 2016. *Zero Waste Home – Glücklich leben ohne Müll!* Kiel: Verlag Ludwig, fig. p. 23).**

recyclability and also the disposal effort are related. The use of the architecture should also consume as little energy and produce as little waste as possible.

The basic construction of the Zero Waste Space in Kiel consists of a wooden frame structure insulated with straw and a flax fleece with clay and clay plaster. The residential unit meets the passive house standard and due to the clay plaster the building components achieve certified fire protection. Thus, the project can basically be used for conventional buildings. By choosing this technique, the energy required for the construction of the Zero Waste Space was reduced by a factor of 10 compared to a passive house building made of non-renewable building materials. Heating pipes were built into the 4 cm thick clay layers of the walls and ceilings so that the building can be heated in winter and cooled in summer with the help of a switchable heat pump. In combination with the clay plaster, this gives the building an additional component activation. Due to their mass, building components made of clay enable ideal storage of heat/cold, so that the energy can be used extremely efficiently (Fig. 4).

The water concept envisages using mainly rainwater collected from the roof. Before the water from the rainwater tank enters the water circuit of the Zero Waste Space, it is treated in the technical room (Fig. 5) by a sediment filter and a UV lamp so that the rainwater is of drinking water quality. The built-in, dry separation toilet separates the urine from the faeces and thus enables potential further use – human urine is already being tested as fertiliser in fields in Switzerland. The specially developed toilet is also designed to be usable in high-rise construction and is scalable to multi-storey buildings.

In terms of efficient and energy-saving ventilation, a simple mechanical ventilation system with heat recovery was installed. The PV electricity during the day drives the heat pump and is used for the power supply in the building. The entire energy concept is documented by monitoring to ensure a final evaluation. A battery system was dispensed with

← Figure 4. The walls of the Zero Waste Space are made of sustainable building materials with good climatic qualities, including: wood, straw, flax fleece and clay. No additional plastic sheeting was used in the wall construction (Photo: Roland Meingast).

↑ Figure 5. The heart of the facility is its own technical unit, which controls the water, electricity and heat supply (Photo: Tanja Lücker).

in favour of a water buffer storage tank. Currently, the environmental impact in production, resource depletion and disposal is relatively high due to the short life span of the batteries and does not correspond to the applied Zero Waste concept for buildings.

With the implementation of the Zero Waste Space (Fig. 6), it can be demonstrated that the underlying principle of maximum waste reduction can indeed be applied and, without loss of quality of life, has the potential to reform modern building and decisively reduce the high consumption of resources. Against the background of current developments, we believe that such a transformation process, which radically subjects urban design and urban development to the issue of sustainability, is crucial in order to prevent the destruction of all of our living space. ◆

↑ Figure 6. The Zero Waste Space has been realised in the Science Park (Fraunhofer-Str. 6) in Kiel (Photo: Torben Tombarge).

Vittorio Magnago Lampugnani

Programme, Authorship, Openness: Thoughts on Contemporary Urban Design

How should our cities be designed? What tasks must their planning be based on? And what role should planners and architects play? The following text is a plea for a spatially clearly defined, robust city that leaves room for the unexpected.

Across Europe, urban design is in crisis. Our historic city centres are repeatedly disfigured by inadequate structural interventions and maltreated by negligence or planning mistakes, while the new peripheries into which our cities are sprawling at an increasing rate are proving for the most part to be as bleak as they are uninhabitable. Under pressure of expansion for which they were conceptually unprepared, the urban planning projects of recent decades have repeatedly failed in their task to create places for people to live together well and productively. Against this background, it does not seem out of place to think anew, or at least in an unbiased way, about designing and building cities.

No city becomes good if the task it has to fulfil is not clearly and wisely formulated, in other words, if its programme is not appropriate. A programme that provides only or predominantly for housing creates dormitory ghettos that are almost always desolate during the day. A programme that prescribes only or predominantly offices produces working cities that die out after hours. Emblematic of the first genre is Sarcelles north of Paris, the largest of the 200 *grands ensembles* that sprang up in France in the 1950s and 1960s and gave its name to 'Sarcellite', a social disease that can be described as a mixture of alienation, depression and neglect. The second genre, the pure working city, is represented in Paris by La Défense with its supercooled urban environment of glass office buildings.

The tasks of the city must be formulated and quantified in the programme: Living and working in a balanced relationship, subdivided according to demands, lifestyles, and places of production. In addition, educational and supply functions, culture, entertainment, recreation, and mobility should be considered. In other words, a city must consist of housing for different income and social classes, differentiated workplaces, offices, workshops and factories, day-care centres, kindergartens, schools, universities, clinics, hospitals, libraries, museums, cinemas, theatres and opera houses. It must accommodate gymnasiums, sports stadiums, gardens and parks, railway stations, ports and airports.

The programme is given to the urban designer by the client, whether public or private. But the urban designer must examine the programme, question it, add to it if necessary and correct it. Furthermore, the designer must distribute the functions that the city has to fulfil in such a way that they do not appear isolated and side by side, but as a coherent mixture. A separation may be advocated between living and working, but the two should not be far apart. Residential follow-up facilities can and must be mixed with living and working. This is the only way to achieve short distances, synergies, productive tensions and, in general, what we call urbanity. This means: before a piece of the city is invented, its programme must be invented. This process requires just as much creativity as the urban design, and ultimately just as much poetry. Of course, a programme consists of numbers and areas, which are based on analyses and needs assessments; but these analyses, assessments, areas and numbers have to be creatively interpreted, compiled, jumbled up and recombined.

The programme must be translated into a plan before it becomes a city. This must first and foremost determine the public spaces. In the urban planning of the last decades, such spaces have increasingly taken a back seat and were what remained after the determination of the private parcels and their development areas. In quarters characterised by single-standing buildings, they become rest-spaces, which had to be embellished afterwards. Exactly the opposite must happen, and the opposite was the

← **Figure 1. Konradhof. Main street façade. Richti Quartier, Wallisellen, 2009-2016. Baukontor Architekten, Zurich (Vittorio Magnago Lampugnani, Jens Bohm) (Photo: Maximilian Meisse).**

» No city becomes good if the task it has to fulfil is not clearly and wisely formulated, in other words, if its programme is not appropriate. «

case in every historical urban project worthy of the name. In the ancient city, the open spaces were laid out first, the *plateias*, *stenopoi* and *agora* in the Greek city, the *viae*, *ambiti* and *forum* in the Roman. They were levelled and paved, furnished with public and profane buildings and with temples, and decorated with works of art. The private plots were what remained, and their layout had to submit to the overarching urban drawing as much as the individual to the community.

↓ **Figure 2. Richti Quartier, Wallisellen. Masterplan by Studio di Architettura, Milan (Vittorio Magnago Lampugnani). Architects involved: Baukontor Architekten, Zurich; SAM Architekten, Zurich; Wiel Arets Architekten, Amsterdam and Zurich; Max Dudler Architekten, Berlin and Zurich; Diener & Diener Architekten, Basel; Joos & Mathys Architekten, Zurich.**

Functional and well-designed public spaces do not only make a city aesthetically attractive. They encourage people to move around more by foot or bicycle, which uses less energy and causes less pollution as well as less noise, so that urban living becomes more pleasant. If people increasingly practise mobility under their own steam, not only will the city become healthier, but so will its inhabitants. Moreover, if people walk, run and cycle more, if the streets and squares are attractive and enable and stimulate activities, they will become livelier and thus safer: without omnipresent video cameras and security services. In this way, the city ultimately also becomes more economical – and in general a place with a higher and more sustainable quality of life.

But public space is more than what is needed to accommodate the access and mobility functions of the city, more than a pretty ingredient for fine-minded loungers. It is also more than a clever engine of the city's self-regulating system, more than a clever incentive to consume more vigorously, work better and produce more imaginatively. This 'more' was described by David Hume in 1752 in his essay *Of Refinement in the Arts*:

"The more these refined arts advance, the more sociable men become [...]. They flock into cities; love to receive and communicate knowledge; to show their wit or their breeding; their taste in conversation or living, in clothes or furniture. [...] Both sexes meet in an easy and sociable manner; and the tempers of men, as well as their behaviour, refine apace."

Entirely in the spirit of the European Enlightenment, of which he is one of the most exposed protagonists, Hume evokes the city as a dispositif for the betterment of humans; and the impetus of this dispositif is the inclination, indeed the passion, to "receive and communicate knowledge". To redeem this claim, public spaces must not only be left over, but also designed.

There are no recipes for this design, but there are examples. They can be found in the history of the city. The great streets, squares and parks that were created in the past and that we still enjoy today are lessons in the successful relationship between built spaces and social processes that have survived and stood the test of time. We cannot imitate them, but we can learn from them. The history of urban architecture is a memory of strategies that can and must be interrogated for current demands.

One of the most devastating misconceptions plaguing contemporary urbanism is that of invention at all costs. All architects who set out to design and plan a piece of the city think that they can invoke a vested right to creation, to abandon everything that came before and to set themselves apart from everything that is around. Even more: They think that they absolutely have to be different and new, because otherwise they run the risk of being ignored or even ridiculed as backward-looking bores.

This was not always the case; it was even different for millennia. As much as the public spaces and the public buildings, both sacred and secular, were to be given a special face, the city's residential

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↑ Figure 3. Arcade street, view from the station. Richti Quartier, Wallisellen (Photo: Maximilian Meisse).

buildings, i.e., its main architectural substance, were not to stand out. They were optimised and standardised and had to deviate as little as possible from the norm that was established or that resulted from the conditions of origin and life. At the beginning of the 17th century, Pierre Le Muet, a French architect who created a seminal urban building manual titled *Manière de bastir pour touttes sortes de personnes*, still advised that every new house in a street should be adapted as far as possible to what was already there; and faithfully recommended those who did not have a really good architectural idea to choose a nice urban building in the neighbourhood and simply copy it. This was in fact done in many places, more or less exactly, and so most of the cities we admiringly love turn out to be harmonious modulations of what is always the same or at least similar, merely carefully and sometimes virtuously varied.

A new city or a new city quarter must have several designers involved, for all its unagitatedness, otherwise it remains as thin as a magnified model. But one of these designers must invent, draw and be responsible for the overall plan: a city needs an author.

Contemporary urban planning projects, both large and small, seem to be condemned to anonymity. Generally, not one but several plans are commissioned, they are overlaid, mixed, diluted, talked over and slurred, and at the end of disproportionately elaborate and astonishingly boring processes, something emerges that none of the countless participants wants to be responsible for, and indeed does not have to be responsible for. The consideration of different interests and the mixing of oppos-

↑ **Figure 4. Central square with fountain. Richti Quartier, Wallisellen (Photo: Maximilian Meisse).**

ing design ideas give birth to a mediocrity that satisfies no one and with which no one identifies.

It is indisputable that the programme for an urban project can only be formulated politically, and this requires a multi-voiced, even controversial debate. But something beautiful only comes into being when you let someone you have confidence in and trust to do it. The bon mot of the camel, which is said to have been the result of the efforts of a committee that wanted to fabricate a horse, also applies to urban planning. Granted: Every larger city is a superimposition of different plans and an addition, sometimes even a collage of different districts. But every plan, every city quarter is only worth talking about if it was drawn by a city builder – drawn alone and with great freedom. This applies to the ancient Miletus of Hippodamos as to the Rome of Sixtus V and Domenico Fontana, to the southern Friedrichstadt of Berlin by Philipp Gerlach (with the personal collaboration of King Frederick William I) as well as to the newly built Lisbon of Eugénio dos Santos, to the Paris of Napoleon III and Georges-Eugène Haussmann and to the Barcelona of Ildefonso Cerdà. This is also the case for Hendrik Petrus Berlage's Amsterdam South and for Le Havre of Auguste Perret and his studio.

Admittedly, these examples are from the past, and much is different today. In urban planning, there is no omnipotent subject, the means are insufficient, the actors are at odds because they represent conflicting interests and are only able to agree on a vanishingly small common denominator. The awareness of inadequate knowledge about the city, its complexity and its laws of development has a paralysing effect, the constant change it is undergoing

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makes it seem incomprehensible. But precisely for this reason, it is necessary for someone to look at all this with courage, perhaps also with high spirits and a dose of recklessness, to reflect on it and then to disregard some of it in order to give the city a form.

This is less audacious than it might seem at first. Cities and neighbourhoods, when robustly designed, do much more than what they were originally intended for. Kreuzberg in Berlin was created in the late 19th century as a place for the middle classes

↓ Figure 5. Konradhof. Garden courtyard. Richti Quartier, Wallisellen (Photo: Maximilian Meisse).

to live. After the Second World War and the building of the Berlin Wall, the houses fell into disrepair and served as cheap housing for less well-off immigrants, mainly Turks. In the sixties, students and squatters arrived and the neighbourhood became the centre of a young alternative scene that coexisted harmoniously and almost synergistically with the immigrants. In the 1980s, as part of the International Building Exhibition Berlin (IBA), numerous houses were carefully renovated, making them attractive to white-collar workers. After the fall of the Wall, a wave of gentrification rolled over the neighbourhood, which experienced a renaissance as the preferred place to live for the young, the affluent and especially the creative. The same urban plan, the same development met the needs of completely different classes, cultures and social groups in just over a hundred years.

In fact, any architecture, any city, is not a straitjacket for life, but allows some leeway. Different things can take place in the same spaces, including the unexpected. The planners' misinterpretations are usually not as fatal as Heinrich Zille implied when he declared that one could kill a man with a flat just as easily as with an axe. However, planners must ensure that freedoms are maintained in their spaces: by not tailoring made-to-measure suits, but wide, comfortable garments. This requires not only craftsmanship, but also modesty and composure.

Even the most beautiful cities were conceived differently than they present themselves to us today. Contemporary Barcelona is a city with high density and mostly completely built-over blocks. Cerdà had conceived it as an urban garden city, with only two-sided plots and gardens that were to take up more than half of the floor space. Thus, it turned out quite differently than he thought and wished, but his plan was at the same time strong and open enough that it was able to take the speculation that rolled over him with some equanimity.

The city, any city, is so complex that it cannot really be planned. Every programme we base a city on becomes obsolete sooner or later and is replaced by other needs. In order for the city not to be replaced as well, it must be strong and flexible enough to accommodate forms of life that we did not foresee and perhaps could not foresee at all. It must be open enough to accommodate the unthought and the unplannable. ◆

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The planning and design of cities greatly influence the way many people live together. Here, diverse life models meet with their very own interests and needs. In addition, there are global developments that also demand a response from urban designers – such as climate change or advancing digitalisation.

This booklet combines contributions by authors from Kiel University with its Cluster of Excellence ROOTS, the University Hospital Schleswig-Holstein (UKSH) and the Muthesius University of Fine Arts and Design. They describe phenomena of urban design from their own, very different specialist perspectives and thus reflect their diversity. They address the social conditionality of design processes from antiquity onwards; they emphasise the importance of historical, but also purely imagined cityscapes and show how these can also be present in today's cityscape; they define the requirements of urban design in relation to the health of the inhabitants and they provide and discuss concrete approaches to solving individual central problems, such as traffic planning or resource-saving construction. Alongside contributions that address such questions from a historical perspective, there are those that refer to current challenges, including a view to Roman Jordan, medieval Constance and not least to our present-day handling of cultural heritage. It becomes clear that urban design is always linked to power and influence as well as to (ideological) ideas of a 'good' city – and that the sovereignty of interpretation and action in urban space must be negotiated, also and especially today, in a democratic context.

This booklet is intended as a plea to develop solution strategies for current problems that, together with well-informed historical perspectives, merge current needs and the most modern scientific findings.

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