THE POWER OF URBAN WATER

STUDIES IN PREMODERN URBANISM

Edited by Nicola Chiarenza, Annette Haug and Ulrich Müller

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Preface

This volume is the outcome of an international and interdisciplinary colloquium held in Kiel in October 2018. This colloquium marked the first stepping stone of the Excellence Cluster *ROOTS of Social, Environmental and Cultural Connectivities in Past Societies*. Within this Excellence Cluster, the subcluster *Urban ROOTS* is interested in the historical aspects of the complex urban roots of our cities today. One such phenomenon which stands at the starting point of our research activity is the role of water within cities. Many of our principal investigators within this subcluster are represented in this volume by their papers, and external colleagues bring in very fruitful contributions that allow the perspective to be widened.

As the colloquium took place even before the work in the cluster had started, it was financed by the Graduate School *Human Development in Landscapes*, while the funds for the publication come from the subcluster *Urban ROOTS*. Many have contributed to the successful finishing of this volume. We owe many thanks to the anonymous peer-reviewers, to the student assistants Katrin Göttsch and Rebecca Hannemann who have unified the format and citation styles, to the graphic designer Susanne Beyer who has improved, sometimes newly developed the figures of this book, to Douglas Fear for proofreading, and to Mirko Vonderstein and Katrin Hofmann from the publisher De Gruyter, who have accompanied the publication process with great attention.

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Annette Haug and Ulrich Müller

1 Introduction

Urban Water

Urbanity constitutes a crucial form of settlement organization. Urban agglomerations can be described as social, economic, and cultural 'hubs' within dynamic networks. Today, half of humanity lives in cities and, within two decades, nearly 60 % of the world's population will be urban dwellers.[1] However, even premodern, agricultural societies often follow a 'centralized' mode of dwelling.

The present volume takes a very specific perspective on the manifold aspects of urban agglomerations: It puts the aspect of urban water in its centre. Of the world's total water supply, over 96 % is saline (seas and oceans), whereas of total freshwater, over 68 % is locked up in ice and glaciers. Another 30 % of freshwater is in the ground. Surface freshwater (lakes and rivers) make up only 1.2 % of earth's water.[2] But water is essential to life; it is therefore hardly surprising that water is essential for the development of societies too and that a multitude of cultural practices have emerged to manage water as a resource – one could say that civilisations are built on water.[3] The importance of water and its management as a resource is underlined, for example, by the fact that, in 2019, the pre-modern water management system of the city of Augsburg was inscribed on the World Heritage List.[4]

Water thus also constitutes a central factor of urbanity. 'Water is the only universal urban resource that in this sense is a must and that can be controlled in this strict understanding of the word'.[5] Many crafts, trades and proto-industrial facilities need water: tanners or brewers, but also blacksmiths, potters, butchers or bakers. Water, however, is not only a crucial urban resource, it affects all aspects of urbanity. The hydrological conditions create a specific 'embedding' into a 'natural' environment from which arise specific health conditions, but also the availability and breeds of specific animal species and the cultivation of specific plants. These latter two aspects are key to specific urban diets. Furthermore, in many cities water is managed by specific infrastructural measures: aqueducts/pipes, fountains or cisterns for water supply, sewer canals for waste water, drainage systems. Besides such measures of water management, bridges and harbour installations (e. g. moles) are crucial for the infrastructural embedding of water into a built environment. Consequently, the presence or absence of rivers and the sea is key to urban practices and the perception and aesthetic quality of urban agglomerations. This holds true for daily routines, for specific (e. g. religious) rituals, for specific economies, but also for forms of trading (e. g. seafaring). As a consequence, not only the town itself, but also the surrounding countryside is dependent on water systems and the respective actions involved.

History of research

The history of research[6] reveals that studies on water within urban agglomerations have usually focused on specific aspects – be it the analysis of specific buildings or infrastructural measures

1 Burdett – Rode – Groth 2018, 10.

2 <https://water.usgs.gov/edu/earthhowmuch.html> (29. 09. 2018).

3 See the United Nations World Water Development Report, published on a yearly basis, available online: <https://www.unesco.de/kultur-und-natur/wasser-und-ozeane/wasser> (02. 08. 2019).

4 <https://whc.unesco.org/en/list/1580/> (29. 08. 2019).

5 Tvedt – Oestigaard 2014b, 2; see also Konold 2004; Brantz 2017.

6 The bibliography is endless – we only give examples. The bibliography on ancient water studies was partly compiled by Nicola Chiarenza. For medieval water, see these databases: Akademie der Wissenschaften und der

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connected to water (e. g. aqueducts, fountains, drainage systems, bridges, harbours, etc.),[7] urban facilities demanding water, such as baths or toilets,[8] the reconstruction of water as a medium of transport (e. g. fluvial networks or maritime networks),[9] water as a threat (e. g. floods) or medium of power,[10] the reconstruction of 'water knowledge' (e. g. the analysis of Frontinus' work)[11] and water technologies,[12] the (industrial, economic, private) uses of urban water,[13] the pollution of water,[14] water as a cultural skill,[15] the sacred, political and social semantics of water infrastructures (e. g. fountains),[16] aesthetic aspects of waterscapes and water installations,[17] or the analysis of visual and textual representations of water monuments, harbours, and harbour cities.[18] On a more general level, several studies address the role of water in different urban formations – besides the conventional towns (e. g. *civitates*, *municipia*), Punic *emporia* or the *emporia* on the North and Baltic Seas, market places, *palatia*, or inland central places related to palatines or monasteries.

Some cross-sectional studies on the subject have also been published in recent years.[19] Most recently, Terje Tvedt and Terje Oestigaard have brought together many of these in a comprehensive analysis of 'Water in History' published in nine volumes between 2006 and 2016. It provides a diachronic historical and comparative perspective on the complex relationship between water and society.[20] One volume of this series deals with the issue of 'Water and Urbanization'.[21] The study aims at understanding the relationship between water and the urban environment by differentiating three aspects: the natural waterscape, human modifications of the waterscape, and ideas and managerial concepts of water.[22] Consequently, this study follows a relatively technical understanding of the relation between water and urbanity.

Here, instead, we focus on the social and cultural production of urban spaces. One theoretical milestone for such an approach was developed by Henri Lefebvre.[23] He starts from the assump-

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Literatur Mainz <http://opac.regesta-imperii.de/lang_de/> (01. 08. 2019), Monumenta Germaniae Historica <http://www.mgh.de/bibliothek/opac/> (29. 07. 2019), International Medieval Bibliography <http://apps.brepolis.net/BrepolisPortal/default.aspx> (29. 07. 2019), International Bibliography of Humanism and the Renaissance <https://www.droz.org/fr/13-bihr> (29. 07. 2019).

7 Wikander 2000; Wawrzinek 2014; on infrastructural networks: Hodge 1991; Hodge 1992; Crouch 1993; De Kleijn 2001; Jansen 2000; Jansen 2002; Tutthas 2007; Dessales 2013; see also the volumes 'Geschichte der Wasserversorgung' published by the Frontinus-Gesellschaft; Bayerische Gesellschaft für Unterwasserarchäologie 2011; Lee 2014; Shulman 2018; Zuchowska 2012. See also the Priority Programm 'Häfen von der Römischen Kaiserzeit bis zum Mittelalter' by the German Research Council <http://www.spp-haefen.de/> (16. 08. 2019); von Carnap-Bornheim et al. 2018.

8 A bibliography on baths: Manderscheid 2004; *latrinae*, e. g.: Neudecker 1994; Kosso – Scott 2009; Jansen et al. 2011; Hoss 2018.

9 Horden – Purcell 2000; Concannon – Mazurek 2016; see the ERC project 'Portus Limen' <https://portuslimen.eu/> (02. 08. 2019); harbour studies: Blackman 2008; Rickman 2008; Feuser 2009; Salomon et al. 2016; harbour towns: Steuernagel 2004; Ladstätter et al. 2014.

10 Bartlome et al. 1999; Classen 2019; Else 2019; Ingate 2019; Kiss 2019; Nigro 2018; Rothauser 2009.

11 Abel 2017; Blackman 2001; Peachin 2004; Wiplinger – Letzner 2017; Costlow et al. 2017.

12 Wikander 2000; Wilson 2008; Mays 2010; Kreiner – Letzner 2012; Zhuang – Altaweel 2018; see especially the volumes of conference series held by the Deutsche Wasserhistorische Gesellschaft, e. g. Wellbrock 2017; Squatriti 2000.

13 Poulsen – Gundersen 2019; Wikander 2000.

14 Bradley – Stow 2012; Röber 2016.

15 Huber-Rebenich et al. 2017.

16 Dorl-Klingenschmid 2001; Dorl-Klingenschmid 2006; Schmölder-Veit 2009; Longfellow 2011; Richard 2012; Förster – Bauch 2015; Shilling – Stephenson 2016.

17 Glaser 2000a; Glaser 2000b; Grüner 2006; Grüner 2009; Dessales 2013; Staub 2013.

18 Rostowzew 1911; Kowalewski 1992; Pensa 1998.

19 Fabris et al. 2018; Holt 2018; Sulas – Pikirayi 2018.

20 <https://terjetvedt.w.uib.no/a-history-of-water/> (02. 08. 2019).

21 Tvedt – Oestigaard 2014a.

22 Tvedt – Oestigaard 2014b, 3.

23 Lefebvre 1974.

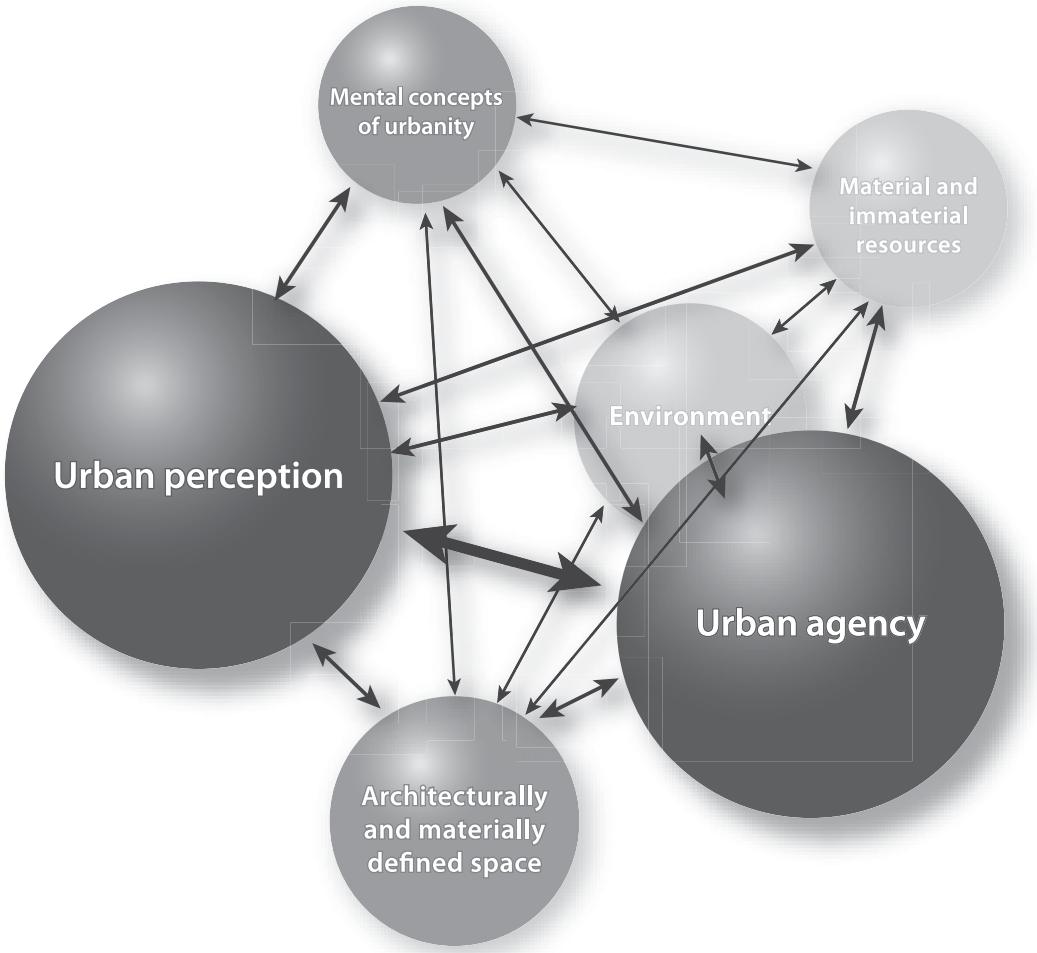

Fig. 1

tion that urban spaces are socially *produced* spaces. On this basis, he considers the experienced space (*espace vecu*), the perceived space (*espace perçu*), and the imagined space (*espace conçu*) to be mutually interdependent.[24] We refer to this concept, but we differentiate the categories more in detail and include further analytical constituents (Fig. 1): urban agency and urban perception, the architecturally and materially defined urban space, mental concepts of urbanity, material and immaterial resources, and environment. With a focus on urban water, this concept can be further specified.

1) **Practices** within urban agglomerations referring to water include a broad range of activities, including drinking and food preparation, specific forms of movement (shipping), productive activities involving water, hygiene and medical practices, leisure activities such as bathing, rituals such as baptism, and ceremonies. The following questions will be of importance: In what way does the presence or absence of water generate specific forms of urban agency? What effect does the practical (e. g. cultic, ceremonial, hygienic) relevance of water have on the architectural

24 A concise definition of Lefebvre's concepts is given in Knox – Pinch 2010, 199: '**Material spatial practices** refer to the interactions and physical flows that occur in and across space as part of fundamental processes of economic production and social reproduction. **Representations of space** include all of the signs, symbols, codifications and knowledge that allow material spatial practices to be talked about and understood. **Spaces of representation** are mental constructs such as utopian plans, imaginary landscapes, paintings and symbolic structures that imagine new meanings or possibilities for spatial practices'.

design of a city? How are specific water practices linked to mental concepts? What roles do different types of water practices (religious, political, economic, and artistic) play in the formation of urban 'identities'?

2) **Perceptions** of urban agglomerations referring to their waterscapes are particularly important for harbour cities and cities located on rivers. As specific urban architectural forms (aqueducts, fountains, nymphaea) stage and aestheticise water elements, they shape the perception of 'urban water'. The following questions will be of importance: How do 'water cities' (located on rivers, lakes or the sea) differ from other cities with respect to their 'atmospheric' qualities? What is the influence of the climate (arid/humid) on the perception of urban agglomerations? What are the sensual qualities of practices involving water?

3) A large range of **architectural forms and infrastructural measures** aim at the control, provision, removal, or staging of water. 'Water architectures' thus become prominent features of an urban setting. The following questions will be of importance: What kind of architectures result from the presence or absence of water? In what way does water and its related buildings and infrastructure have an influence on urban lifestyles (agency) and on urban design (perception)?

4) As the presence or absence of water is linked to urban practices, perceptions and architectural settings, it is thus also an important factor for the **mental conceptualisation and imagining** of cities. The following questions will be of importance: What role does water play in specific urban (religious, political, social) mind-sets? How do such concepts interfere with specific practices and perceptions? Are there conflicts and contests connected to the access to water? What significance does water have in the sense of empowerment?

5) Water as such is *the* central **resource** of any settlement. It not only quenches thirst, it also provides an aquatic infrastructure for transport (rivers, lakes, sea), for energy generation, for craft activities, etc. Water as a material resource is thus always embedded in manifold forms of knowledge and techniques (immaterial resources) that allow for its use. The following questions will be of importance: What forms of actions and perceptions does the 'resource' water enable or prevent? How is the 'resource' water instrumentalised socially and politically? What are the economic effects of water availability and scarcity?

6) Water constitutes a central **environmental factor**. The following questions will be of importance: In what way does the presence or scarcity of water have an influence on flora and fauna and thus on urban diets? In what way does the frequency or scarcity of rainwater (climate) have an influence on urban habits (agency), perceptions and the mental concepts of cities? In what way do droughts, but also floods threaten urban life? And on a more general level: How do ecological factors influence the formation of settlement networks?

Apparently, all categories (Fig. 1) – urban agency and perception, urban material design, the availability of resources, urban mindsets, and environmental settings – are mutually related.

Thematic organization of the present volume

The present volume provides case studies that start from different facets of the network mentioned above: water as an aesthetic category (perception), water in the context of rituals (agency), urban water as a mental category, water infrastructure (architecture), water as an environmental factor, and, on a more general level, water as a factor of urbanization. However, all contributors focus on the interdependency of several of the aspects mentioned. In so doing, they refer to the Mediterranean region as well as Central Europe, and cover a time span that ranges from the 6th century BC to the 18th century AD. The volume thus focuses on the 'European' town.

The perception of water as an aesthetic urban category

The relevance of water as a perceptual quality becomes particularly tangible in installations that aim at a visual 'staging' of water. **Patric-Alexander Kreuz** focuses on North Italian cities (2nd century BC to the 2nd century AD) which are characterized by the abundance of water. Consequently, the control of water via canals, piers, embankments, and bridges becomes an important task. The corresponding architectural elements had a crucial impact on the visual appearance of a city – which is exemplified for Milan, Altinum, and Aquileia. The 1st century AD entailed a new quality of aestheticization of water with the appearance of decorative water installations which were made possible by the erection of aqueducts. This holds particularly true for nymphaea – even if such features were relatively rare. Much more frequent was the use of water as an accessory element of monumental architecture – e. g. fountains connected to monumental buildings.

The second contribution by **Nicolas Lamare** focuses on fountains in a regional context which is characterized by the lack of water: North Africa. Here again, a tension between function (the provision of water) and aesthetics/semantics becomes tangible. In an arid climate, however, the visual staging of water became all the more important. Fountains and nymphaea provided a synaesthetic experience and functioned as meeting and stopping places. Consequently, during the Roman Imperial period, they were located at prominent and visible sites (e. g. crossings) and functioned as monumental proclamations of the wealth and status of their donors. They kept, indeed sometimes even enhanced their role in Late Antiquity – thus in a period, when the whole urban layout was transformed. They even became symbols of urbanity.

The two articles underline the great importance of water in the urban landscapes of very different regions. This result becomes even more significant when it is compared with the role of water within sanctuaries. Here, it is of primary ritual importance, but most often does not have a visually striking appearance.

Urban agency: the ritual uses of water

In ritual contexts, water can be regarded as one central ritual element connecting different religious groups and underlining the 'pure' status of the believers in an otherwise 'impure' environment. Nevertheless, the religious connotations and the cultic handling of water rituals differ[25] (e. g. iterated purification, water as a one-time symbol of new life). This is especially important in the horizon of cultural contacts – e. g. in Graeco-Roman,[26] Jewish, Christian and Muslim cults. The architectural and atmospheric impact of the ritual use of water in different urban cults (private or public) can be analysed and compared on a synchronic and a diachronic level.[27]

Given the primary importance of water in cultic contexts, **Nicola Chiarenza** analyses the case of the Acropolis of Selinous with its urban sanctuary during the 6th and 5th centuries BC as an example. The two wells within the sanctuary and the fountain did not receive any monumental framing and visual staging. However, the article explores the spatial relation between the water sources and the architectonic development of the sanctuary and suggests potential uses in the context of the ritual.

Chiarenza concludes that the 'sacred' wells are not architecturally staged, and this is confirmed by **Philipp Kobusch's** contribution, which is based on a large sample of sanctuaries in the Hellenistic East (4th to 2nd centuries BC in Greece, Asia Minor, and the Greek islands). This

25 Hellholm et al. 2011.

26 Especially in healing practices and healing cults, such as the Asclepius cult, see Israelowich 2015, 117–124.

27 Shilling – Stephenson 2016.

visual unimportance runs counter to the cultic relevance of water. Kobusch locates lustral practices close to the (architecturally marked) borders of a sanctuary. Such architecturally marked borders do not coincide with the placing of ritual 'rites de passages' involving water.

Christiane Zimmermann focuses on a different religious setting: water in the early Christian cult in Corinth (1st to 6th centuries AD). Here, too, water rituals marked 'liminal' situations: the initiation into Christianity (baptism), in particular. In Corinth, it was not earlier than the 6th century AD that the ritual received an architectonic framing in the shape of the baptistery of the Lechaion basilica. In the context of Christianity, water rituals received – for the first time in antiquity – their own, visually impressive building. Consequently, its architectural layout contributed to the temporal and spatial structuring of the ritual. The architectural form of the building (being related to bath plans) and its placing (outside the city, in the context of the necropolis) is thus also meaningful with regard to the underlying conceptions of the ritual. The water ritual of baptism thus negotiates traditional and new concepts of water use. Water possesses culturally specific meanings.

Urban water as a mental category: Memory, identity, symbolism and ceremonies

Water as a mental category is not limited to religious contexts. Its metaphorical meaning underlies all contexts of social, cultural, political and economic life. Consequently, the cultural self-imagination ('identity'), the construction of one's own history ('memory'), and the construction of the 'other' often involve narratives, images and actions related to water. Water becomes a highly charged symbolic good.

The article by **Dylan Rogers** leads us to the centre of Roman power and identity: the Forum Romanum in Rome, originally a swamp before the Cloaca maxima was built. He shows how, during the Republic, manifold narratives referring to Roman myth and history (e. g. naval victories) involved rituals and ceremonies related to water and referring to the 'aquascape' of the place. Water rituals and their spatial anchoring thus contributed to the stabilisation of memory and identity. The age of Augustus marked a drastic change. Most of the buildings of the Forum Romanum were transformed architecturally, but above all, the emperors started to build new Imperial fora. Instead of connecting memory to 'dead' water, the new fora were equipped with fountains staging 'living' water. Water thus gains a new aesthetic quality.

Adam Rogers considers water to be part of the urban materiality in military forts, towns, but also in pre-existing *oppida* of Roman Britain – a region characterised by the over-abundance of water. With the arrival of the Roman army, the 'traditional' land- and waterscapes changed considerably. Roman territorial development built prominently on the 'functional' domination of land- and waterscapes (by building harbours, ports, canals, etc.). At the same time, it aimed at the appropriation of 'symbolic' water sites that were restructured and occupied by settlements. The domination of water and the creation of new waterscapes thus became a means of power.

In medieval literature, water was used as a complex metaphor for a wide range of purposes. **Dahm-Kruse** examines their multiplicity on the basis of the 13th century novels 'Herzog Ernst' and Konrad Fleck's 'Flore and Blanscheflur'. The authors refer to the broad symbolic and especially religious implications given to the element of water. In both epics, the well elaborated descriptions of waterworks are of great importance for the image of the city. They are central parts of various urban structures and architectural forms. On the one hand, it is obvious that these portraits of water systems refer to biblical images and thus become a medium of specific spiritual concepts. The descriptions of the garden of Eden or Heavenly Jerusalem have, at the same time, aesthetic and representative functions. The visual depictions, on the other hand, also allow an insight into the material infrastructure connected with the water systems.

Water infrastructure, water politics, water economies

Water is a prerequisite for livelihood, health, food security, and general economic growth. Water systems are part of the development of urban infrastructure, both tangible and intangible. They encompass the supply of drinking and industrial water, as well as ports, bridges, flood protection, and irrigation. Access to and availability of water could be limited and could function or be used as a trigger for conflicts and struggles, both within the city and also at a higher geopolitical level. The urban economy can be related almost exclusively to water as a transport system (e. g. port cities). At the same time, water is a resource for commerce and crafts, not only in the city, but also in the urban hinterland. The control of rivers for trade, but also access to sources and lakes for urban water supplies illustrates how water systems became integrated into urban development.

Sophie Bouffier analyses several of the aqueducts of Syracuse. The building techniques of three of them (Tremilia, Ninfeo, Paradiso) show well developed technological knowledge, while, at the same time, they demanded an immense investment of working time and labour. The infrastructural measures can possibly be related to the dynasty of the Deinomenids (Gelon) in the 5th century BC, when Syracuse experienced a phase of important urban growth. The Galermi aqueduct can possibly be linked to Hieron II (before BC 213/12). In the case of the water supply of the city of Syracuse, one could thus speak of a real water policy.

Betty Arndt's contribution addresses private and public water management in the Late Medieval and Post-Medieval town of Göttingen. She starts with a discussion of the commercial use of water. In addition to private uses, inner-city crafts and small businesses (especially tanners) needed complex water infrastructure (e. g. sewers or pipe systems). Like windmills, watermills were an important factor in urban economy. However, there were numerous conflicts, e. g. for fishermen. With the installation of public wells and water arts, water management not only attained a new administrative relevance; water also became a new component in the perception of urban space. Last but not least, the author also examines the treatment of liquid and semi-liquid waste that could contaminate the groundwater. The basic need for water on a physiological basis is the root cause for water becoming a resource, and the abundance or scarcity of water then provides the cause (or not) of conflict. **Elisabeth Gruber's** article investigates the influence water had on urban communities in the Middle Ages by using the example of the towns of Krems and Stein on the Danube, from Late Medieval up to Early Modern times. She discusses the role of water for late medieval towns and their inhabitants. Access to water is always associated with questions of use and regulation. This interaction can be organised at an individual level, in communities or between different groups of actors. Whether with regard to fishing rights, tolls, marketplaces or even bridges, water is not only a contested or connecting resource, but also a potentially dangerous element of life and the economy.

Environmental hazards: floods and other dangers

As densely populated settlement systems, cities are highly exposed to environmental impacts. Environmental issues are not an invention of the recent past and were particularly well perceived in pre-modern times. Extreme natural events, such as unexpected droughts or 'floods of the century', threatened the urban landscapes. Continuously recurring natural events such as floods forced urban residents to develop prevention strategies and to minimize risks. Last but not least, the contamination of drinking water or water scarcity due to industrial activities forced inner-city discussions and demanded coping strategies.

In his contribution, **Christian Rohr** discusses these aspects from a long-term perspective, from the Middle Ages to Early Modern times. The differentiation between natural hazards and (natural) disasters is of crucial significance for the understanding of pre-modern natural phe-

nomena. Floods and ice jams are such phenomena, for which pre-modern societies were scarcely equipped. Ice jams and subsequent floods can threaten the whole city, but they can also have a tremendous impact on urban subspaces and on the relationship between the city and the surrounding countryside. In his article, he points out how people tried to minimise these risks. This included not only construction works, but also administrative interventions and neighbourhood cooperation.

While Rohr explicitly focuses on a wide-ranging perspective, water also has a significant role as a 'risk factor' for **Rainer Schreg**. He shows how medieval urban infrastructure used water networks as a resource. The establishment of a town on a river or lake had a huge impact on ecology. The author describes the 'projected' influence of urban water management on the hinterland and rural landscapes, but also the unintended effects of urbanisation on hydrology and landscapes. Here, not only the direct relations between city and rural surroundings are of importance. In the sense of a 'big history', Schreg associates economic, social and ecological consequences with the late medieval 'crisis' and its processes of transformation. Both contributions thus illustrate the role water played in urban development. In addition, they show that urban water systems are also mutually related to the 'waterscapes' of the surrounding countryside. Against this background, water proves to be an integral feature of urbanization.

Urban water and the process of urbanization

Water is one of the basic factors for urban development. The significance of water for urbanization processes has to be investigated in its multidimensionality. Water and the urban environment form a dynamic and multifunctional network. For urban development, the physical, natural water landscape is initially a starting point. This can have a determinant effect, but human intervention was targeted at changing water systems. These find their expression in a multitude of cultural, institutional and conceptual practices and frameworks. Legal and administrative regulations, but also everyday practices are expressions of these relationships. Two contributions deal with these topics.

With a focus on the Middle and Upper Rhine Valley and against the background of late medieval written sources, **Gabriel Zeilinger** describes not only environmental aspects, but also political constellations. Water was not least a part of the conflicts in the complex relationships between the various social and political actors in the cities. Water was thus not only a natural element and an economic factor, but also a negotiated and sometimes contested resource. Water shaped the city's own logic and thus stands for specific historical constellations. However, the treatment of water in urban development can also be an expression of similar prerequisites or behaviours. In this sense, ports, for example, as interfaces between the city and 'the outside world' are an expression of physical conditions, but also of historical and path-dependent patterns. **Ulrich Müller** studies these relationships on the basis of three port towns in Northern Europe. By conceptualizing harbourscapes, he describes the multidimensionality of ports as an urban area from Early to High Medieval times. The theoretical approach of the '-scapes' (ethnoscapes, technoscapes, financescapes, ideoscapes, mediascapes) is used to study the urban subspace of the 'port' as a place of globalization in pre-modern times. Harbourscapes connect water and land, but the port as a place of encounter neither begins nor ends with the quays. Harbourscapes serve as an area for social, cultural and political interactions, processes of transformation, which manifest themselves in concrete urban locations. Finally, both contributions make evident that research into urbanization and water systems can only be carried out within a transdisciplinary framework.

Outlook

The present volume touches on diverse water issues that are at the heart of urbanity. To date, there are only a very few systematic water studies that comprise several of the constituting elements of urbanity (Fig. 1). Most often, comprehensive studies cover large regions, so that they cannot look at the interrelationships of different factors.[28] The present volume cannot fill this gap either. However, it is intended to stimulate future studies on single cities or small-scale, regional water networks. It is obvious that this can only be done through multidisciplinary and transdisciplinary approaches. Archaeology, geology, botany, zoology, but also ancient and medieval history, philology, art history or even religious science are essential disciplines for investigating the fluid relationships between society and the environment, between urbanization and water in pre-modern times.

However, we are well aware of the fact that the cultures of antiquity and of the following periods (the so-called 'Middle Ages') never existed in isolation, but developed via transcultural contacts: the ancient Mediterranean in exchange with Africa, the Near and Far East, and Northern Europe, the Middle Ages with North Africa, the Middle East and Central Asia. In such a global perspective, traditional periodisations such as 'Antiquity' and 'Middle Ages' – the latter with a specifically Christian connotation – have to be questioned.[29] The widening of the perspective is of primary importance, too, for the topic of urbanization and water, because water has manifold material and immaterial manifestations, especially in Islamic culture, which change or expand the Latin European perspective of *usus aquarorum*. This is not to deny lines of tradition from antiquity, but to widen the perspective for future research on the topic.[30]

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Patric-Alexander Kreuz

2 From Nature to Topography

Water in the Cities of Roman Northern Italy

Abstract: The Po and its numerous tributaries were a dominant feature of Roman northern Italy. Ancient authors emphasize the region's richness in water – and indicate how this challenge was met by cities and settlements. In addition, archaeological research in the region has brought to light numerous remains of water infrastructure in the cities, dating from the 3rd/2nd century BC to the 2nd century AD. This comprises harbours, canals and bridges, as well as manifold installations and architectures as part of the local topographies. The omnipresence of water must clearly have contributed to the regional urban experience. Yet water was not only understood as an infrastructural and technical challenge by the urban communities. It was increasingly embedded in urban spaces and architectural complexes, where its display enriched local cityscapes. The paper seeks to outline this tendency towards an increasingly prominent aesthetic role of water in the regional cityscapes. Drawing on a limited number of examples, it addresses three aspects of water and its role in urban settings: the presence of (natural) water in urban contexts, the decorative use of water to enrich architectural constellations, and the role of water as a locale in urban topographies.

With the following remarks, I seek to focus on changing approaches to water in the Roman cities of northern Italy and on different ways it became manifest as 'urban water', i. e. an amenity contributing to or accentuating a specific, prominently aesthetic, quality of architectural and urban spaces. An aspect of regional cityscapes is thus addressed that not only influenced the experience and perception of urban spaces or the cities as a whole, but also played an important role in defining the urban ambience as a stage for and expression of urban lifestyles, hence relating to wider contemporary concepts of adequate urbanity.

The period chosen comprises the centuries from the 2nd century BC to the 2nd century AD, i. e. the first centuries after the establishment of Roman rule in northern Italy – and here above all the 1st centuries BC/AD. It is this period in which we can trace the introduction of new concepts of urbanity in the region and the development of a flourishing urban landscape (Fig. 1). In the context of the following remarks, I understand, possibly too superficially, 'nature' to be influenced by human intervention, i. e. environment managed by man in a reactive way. 'Topography', on the other hand, designates the elements of former natural constellations that have been appropriated architecturally and inscribed in the cityscape as 'places' or 'locales'.

Note: My thanks go to the organisers of the Urban Water colloquium, Nicola Chiarenza and Annette Haug, for the opportunity to contribute to the colloquium with a paper on water in the cityscapes of Roman northern Italy. It addresses some phenomena elaborated in my habilitation thesis on the changing aesthetic of the Roman cities in northern Italy (in preparation for publication).

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Fig. 1: Roman northern Italy and its cities.

Water in the Cities: Written sources

The omnipresence and wealth of water in northern Italy was emphasized already in antiquity. Water was regarded as a characteristic feature of the region's environment. Rivers, streams, swamps and lagoons were an immediate, everyday challenge for the settlements. In his *De Architectura*, written during the late 1st century BC, the architect Vitruvius highlighted water as a dominant environmental factor in the region.[1] In his paragraph on cities in swampy coastal areas, the northern Italian cities of Altinum, Aquileia and Ravenna find prominent mention.[2] Only a short time later, the Greek geographer Strabo (or his source) describes the region as characterised by watercourses, swamps and lagoons:[3] Ravenna and Altinum, for example, lie like islands in the water, others are partially surrounded by it. We also learn that Ravenna was crossed by canals and could be navigated by ferries. Water must have played a defining role for early Verona, too. According to the late republican poet Catullus, his hometown was characterised by low-lying, swampy areas with standing water along the Adige river and an old wooden bridge leading over it.[4] In this low lying, partly swampy area, crossed only by the via Postumia and featuring only isolated buildings,[5] we can identify the plain in the Adige river bend, an area which was fully developed only for the layout of a new, relocated city from 49 BC on.[6] The Verona which dates back to a Celtic settlement was originally located on the left bank of

1 See Corso 1983 for references.
2 Vitr. De arch. 1, 4. 11.
3 Str. 5, 1. 5–8.
4 Catull. 17; Corso 1986, 583 f. 586. Corso's assumption that this bridge was only a temporary solution is contradicted by Catullus emphasising its age.
5 Cavalieri Manasse 2008, 74 f.
6 Corso 1986, 584.

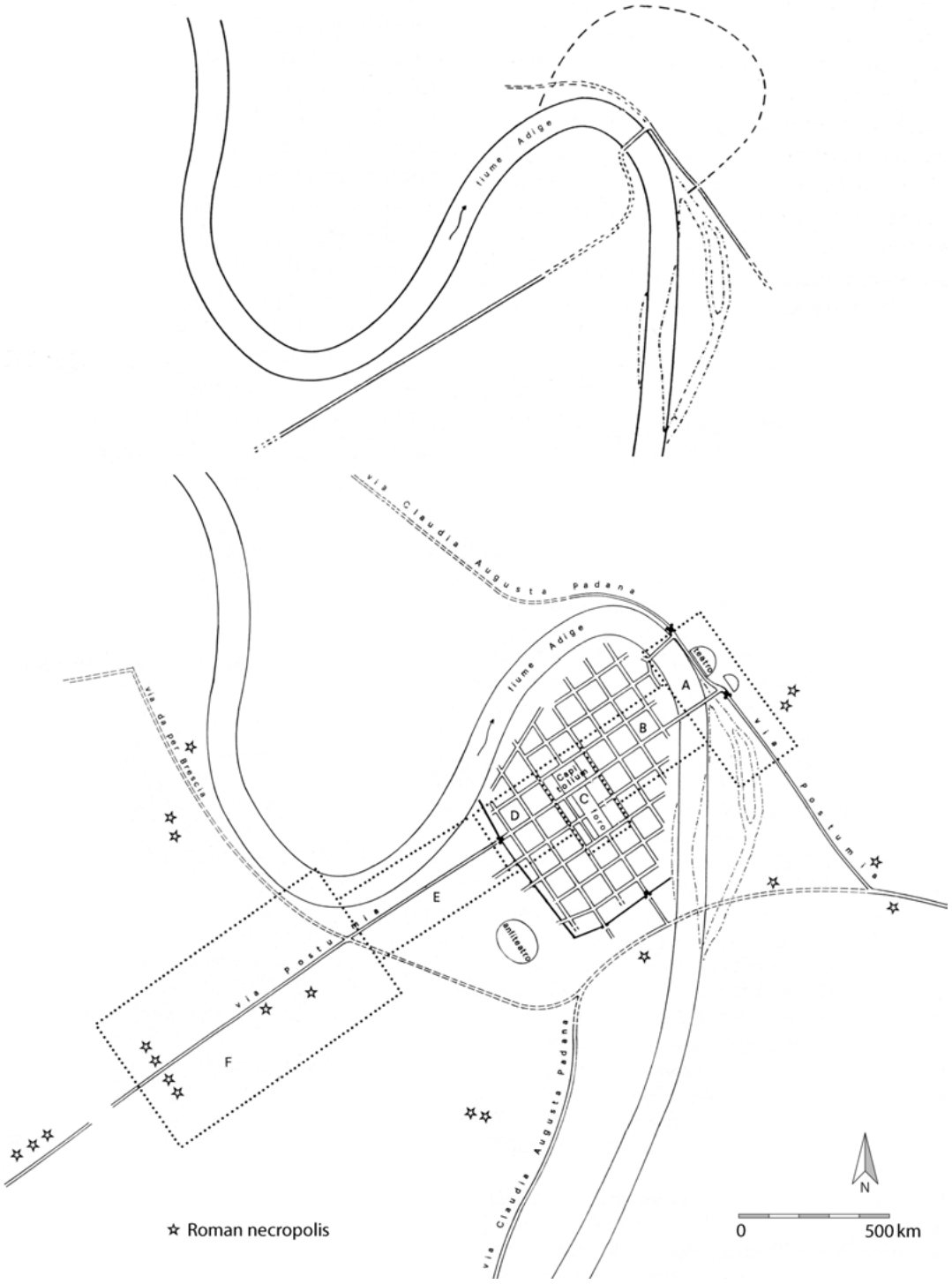


Fig. 2: Verona, area of the original settlement (above) and new city layout (below), with via Postumia.

the Adige on the flank of the Colle San Pietro hill (Fig. 2). Since Catullus died before the middle of the 1st century BC, his reference can only relate to the old, pre-municipal Verona, i. e. the settlement on the hill(-side). Catullus' Verona offered a remarkably different urban ambience compared to the later city with its street grid and 'up to date' urban appearance in the plain.

Canals and waterways: Controlling water in the cities

Shaped even more by the local hydrology was the urban layout of Milan, like Verona a major Celtic settlement. Bridges over watercourses and canals within and immediately outside the city walls are mentioned in publications, but are often insufficiently known.[7] The resulting, rather incomplete picture allows no topographical connections to be explored or even a reconstruction of the local network of canals.[8] Yet e. g. the lack of an orthogonal layout of the city (and, accordingly, the experience of the local urban tissue and its streets) has been explained by the local hydrological situation and the earlier settlement development already determined by it.[9] In addition, structures like canals, piers, embankments, bridges and related infrastructure of potential high visibility in the city area proper, as well as in the *suburbium*, must have been perceived as a common element of the local topography and daily urban experience. They prove Milan to be a 'città d'acqua'[10] – even if we are not able to specify the concrete consequences for the local topography and its localized urban spaces.

This, in turn, has been accomplished recently for the city of Altinum, where the topography has been revealed city-wide by a combined analysis of aerial photographs and infrared images[11] (Fig. 3). Here, in a settlement area characterised by fluvial and lagoon processes, canals surrounded and delimited the city area, while two wide inner-city canals of rather irregular course formed the backbone of the city: an East-West canal of about 26 m width and a canal running from north to south of lesser width. Identifiable as dominant elements, the two canals were lined by streets and, at least for some stretches, bordered by stone embankments.[12] They subdivided the city area of approx. 1400 × 700 m into three areas. In addition, the layout of the streets, the location of several public buildings, bridges, moorings and piers with porticoes can be identified. Distinguishable – and explained by the city's development, determined in turn by the local hydrological situation – are e. g. different orientations as well as *insula* sizes of the street system in the city area: the north quarter with its public buildings of the city centre, the south quarter, and the east quarter as a later expansion of the city area.[13] With its canals and their urbanistic impact, Altinum offers remarkable insights into the urban reality of the aforementioned statements by Vitruvius or Strabo, reminding us also of cities of later epochs in the region, such as Chioggia or, of course, Venice, where controlled water played and plays a major role for the urban space, its development and experience.

The important role of canals and waterways for the cities on the *caput Adriae* can also be underlined for Aquileia, the major urban centre of the region. Geophysical investigations carried out by the Austrian Archaeological Institute from 2011 on allowed for the documentation and analysis of river courses and canals in the urban areas outside the city walls.[14] Canals originally running along the old fortification walls show that the city was, comparable to Milan and Altinum, surrounded by waterways: the river Natiso along the eastern and southern side of the city, the *Canale Nord* which connects into the Natiso from the north, and the *Canale Anfora*, which, taking up the orientation of the street grid of the city's layout, led towards the city at about the height of the decumanus running to the western side of the forum. The *canale* then turned north

7 Haug 2003, 67. 414 no. 2.3.: bridge of the 1st century AD crossing an open canal running from north to south within the city area.

8 Sacchi 2012, 13 f.

9 Ceresa Mori 2004, 305; Sacchi 2012, 13 f.

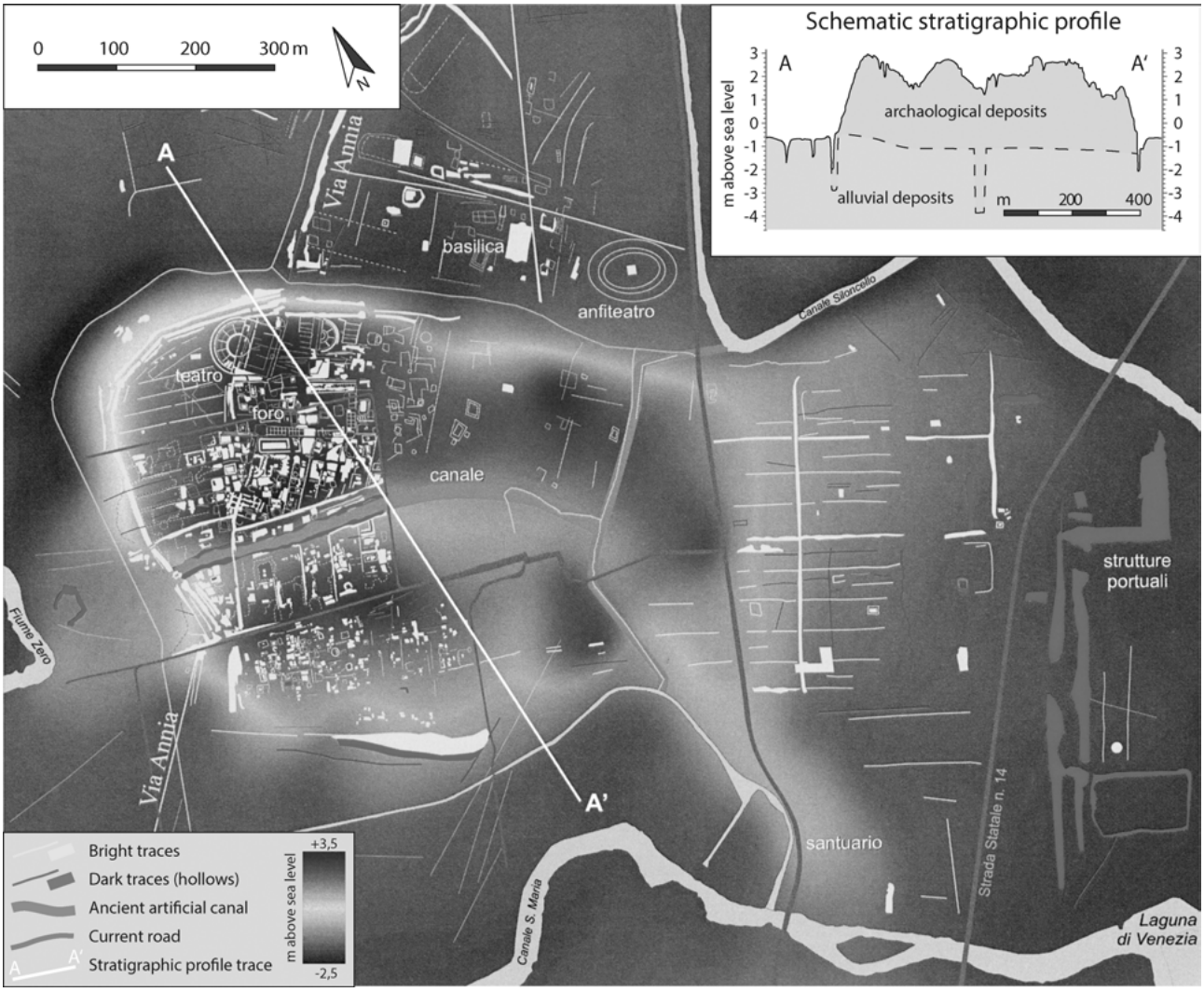
10 Sacchi 2012, 14.

11 Ninfo et al. 2009; Mozzi et al. 2011; Tirelli 2011.

12 The construction of the bank of the main channel is largely unknown. An excavation near the local museum, however, uncovered a part of the western border of the canal. It featured – at this place – a more than 4 m deep ramp-like section with steps dating back to the 2nd half of the 1st century BC: Vigoni 2013, 100 fig. 67.

13 On these differences in the urban area of Altinum, see Tirelli 2011, 61–66.

14 Groh 2011, 156 figs. 3. 10; Groh – Schimmer 2013, fig. 4.



along the city wall in order to enter the *Fossa Ausset*, which was in turn connected to the *Canale Nord*. Aquileia's waterways show an urban area defined by water in a much more immediate way than is evident today – or visible in most of our plans of the ancient city. Until the 3rd century, the wide *Canale Anfora* leading from the west towards the city area was probably one of the city's main harbour areas, connecting Aquileia with the sea: geophysical and survey results show here a densely built area with extensive harbour structures, such as quays, piers and huge storage buildings, but also a street running along the canal towards the city centre.[15] These harbour structures reached up to the city wall and thus were only a short distance away from the city centre with its forum.

Milan, Altinum, and Aquileia can exemplify how controlled water and its infrastructure, such as canals passing through urban space, embankments as places of numerous activities, and bridges connecting separated areas, contributed to the local topographies of a great number of cities in the region. Water and related infrastructure were part of the everyday life in 'their' local urban or suburban spaces and added to their experience and perception alike.

Fig. 3: Altinum, the city area and its reconstructed topography.

15 Groh 2011, 156 figs. 3–5; Groh – Schimmer 2013, 61 figs. 4. 7.

Staging water: fountain architectures and installations

Beginning with the 1st century AD, we witness a new phenomenon in dealing with water beyond the management of 'natural' water: the enriching of urban spaces or architecture with decorative water installations, leading to new ways to encounter water in the regional cityscapes. This local desire to enrich the local cityscape clearly benefitted from the construction of large overland aqueducts establishing a continuous freshwater supply for the cities of the region from the end of the 1st century BC. The new, continuous water supply allowed for various new forms to embed water in the urban space besides the omnipresent, yet unspectacular (and here left out) street-side fountains of utilitarian purpose. Among these new forms, we find monumental and elaborate fountain architectures that may be described as ostentatious stagings of water in urbanistic contexts, as well as smaller decorative installations embedded as an aesthetic contribution to architectural settings.

Especially the often so-called nymphaea, i. e. monumental and richly decorated fountain architecture, which became increasingly popular in the architecture of the Imperial period, are often considered iconic water installations of Roman urbanity.[16] Bordering squares or streets, the aesthetic impact of these monuments on their built environment cannot be underestimated. In addition, they attracted attention and contributed to the micro-climate and acoustic background of their location, thus shaping urban space by adding specific surplus value. However, compared to the abundance of such monuments known from the cities of e. g. Asia Minor or the Levant, the evidence for comparable architecture from the cities of northern Italy is rather sparse. Only thanks to a fragmentary inscription dated to the late 1st century AD with monumental lettering do we know e. g. of the existence of a nymphaeum in Roman Como.[17] Archaeologically known, yet uncommon and remarkable, is a constellation in Milan, where along a street about 150 m west of the forum two decorative fountains were located opposite each other:[18] according to the excavators, the first one consisted of an 8 m wide rectangular basin, a rear second basin and a final apse. Traces of wall painting, mosaics and marble veneer are mentioned as evidence of a former lavish design. Less well known is the second, unexcavated building, which lay on the same axis as the first. Other nymphaea contributing to urban spaces in the cities of the region may be inferred hypothetically – if at all – from groups of dislocated decorated marble elements that must have belonged to the decorative orders of monumental architectural designs, yet of unknown function.[19]

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16 On such monumental fountain architecture, their not unproblematic terminology – and its shifting meaning since the Hellenistic period – as well as the manifold architectural and aesthetic solutions applied during the Roman imperial period and their urban impact, see Letzner 1990, 24–59; Gros 1996, 418–444.

17 Pais 1884, no. 747; Goffin 2002, 93.

18 Letzner 1990, 143. 194. 391 f. no. 242 pl. 89, 1 (first nymphaeum); Neuerburg 1965, 257 f. no. 227; Letzner 1990, 392 (second installation).

19 Prominent are the groups of such marble elements from Milan and Parma. In Milan, F. Sacchi was able to define two such groups, both of 2nd century AD date ('gruppo II' and 'gruppo III'; Sacchi 2012, 91 f. 161–186 nos. 71–94 pls. 44, 4–64, 2 ('gruppo II'); Sacchi 2012, 92. 187–194 fig. 60 nos. 95–99 pls. 64, 3–68, 2 ('gruppo III')). The numerically larger group II comprises decorated elements of at least five to six Corinthian orders of different coloured marble varieties (cipollino, portasanta, bigio antico, africano, proconnesian). Group III, on the other hand, consists of elements of a composite order, including again different coloured marble varieties. In terms of material of a different character (only proconnesian marble of white-greyish colour), three groups from Parma studied by M. P. Rossignani also date to the 2nd century AD (Rossignani 1975, 43–65). Group B, with its elements of triangular and segmental arches, as well as a peopled acanthus scroll of a richly decorated architecture, is of particular interest here. The former architectural context of the groups both from Milan and Parma is not known. We can imagine them as former elements of ornamental façades of theatre stages, thermal baths or nymphaea. Yet these richly decorated monumental façades made of imported marble are conspicuous exceptions in northern Italy. Considering their limited number, the obvious ambition and the quality of their craftsmanship, they belong to the top range of architectural monuments erected in the region and must have prominently enriched their urban spaces.

Ultimately only one monumental decorative fountain from northern Italy is better known in its design and urban context, if not in dating. The installation was documented in Rimini during excavations in the area of the cardo maximus leading to the city's forum square.[20] It consists of a raised three-quarter circular basin seven meters wide with an – again elevated – apse (with the water inlet), and, in front of the large basin and on a lower level, a rectangular basin of only three meters width and therefore of considerably smaller size. With its overall size, the fountain was a prominent later addition to the urban centre of Rimini and its monumental topography. Remains of a marble revetment (Cipollino) of the larger basin and of white marble for the smaller one bear witness to an – at least in the regional context – ambitious initiative. However, the setting of this monumental fountain is in a striking way unusual, indeed almost counterproductive, considering its potential to contribute to this area of the urban space bordering the forum: it was not placed as an ornamental installation at a prominent location for a wider area, e. g. the forum square proper, but set back considerably from the square into the cardo. There, the nymphaeum appears to be squeezed into the cardo maximus, and even to have largely blocked it: the passage left between the installation and the west wall of the forum basilica was now only 1.7 m wide.

Reviewing the epigraphical and archaeological evidence, it is obvious that monumental fountain architecture like the richly decorated nymphaea known as prominent 'urban furniture', e. g. from the Roman East, were rather exceptional in the cities of Roman northern Italy. They were never as omnipresent as e. g. in the cities of Asia Minor and the Levant, and they never played a comparable role as decorative architecture enriching prominent spaces of local cityscapes aesthetically.[21] Yet the existence of monumental decorative fountains in at least some of the cities of northern Italy, and their architectural designs, attest their appeal as an adorning 'urban motif' for the regional cities, too.

More common, *and* in the variety of installations more diverse, was, in contrast, the integration of water as an accessory element of monumental architecture or built spaces by means of subordinate decorative fountains. Two dislocated inscriptions from Verona point to a valorisation and enrichment of a distinct urban space by establishing such fountains – as the result of a testamentary donation, i. e. a private initiative.[22] The initiative included, among others, an unknown number of fountains (*salientes*[23]), that were possibly located in the surroundings of the city's most dominant suburban building, the famous amphitheatre. Unfortunately, these decorative fountains are attested only by the inscriptions. Although they let us assume the amphitheatre and its immediate surroundings, i. e. a periodically frequented location, to be upgraded as an urban space by decorative settings of water, their exact location, design and especially impact on this distinct (sub-)urban space remain unknown to us.

A better understanding of water embedded in a monumental architectural setting by means of decorative fountains can again be provided only by a limited number of archaeologically known contexts. Thus, in the Flavian-period Capitolium in Brescia, the major local sanctuary towering above the forum of the city, the remains of a pedestal on the left side of the wide staircase leading from the already elevated forecourt to the temple proper and its main cella

20 Ortalli 2011, 139 f. figs. 2. 7. 11.

21 On monumental fountains in the cities of the Roman East, see e. g. Richard 2012. The reasons for the only limited impact of this type of urban monumental architecture not only in northern Italy, but in the western provinces in general (with the exception of north Africa) are difficult to assess. Probably decisive factors might have been a differently rooted elite culture of urban engagement, aiming also at contributing to the splendour of a city, as well as the well-documented rivalry among cities that encouraged also the striving for an aesthetic enhancement of local cityscapes.

22 CIL V, 3222; Ricci 1893, 12 no. 26; Alföldy 1985, 217; Letzner 1990, 78.

23 On the Latin term *salientes*, defining a category of decorative fountains embedded in architectural contexts, see Letzner 1990, 75–82.

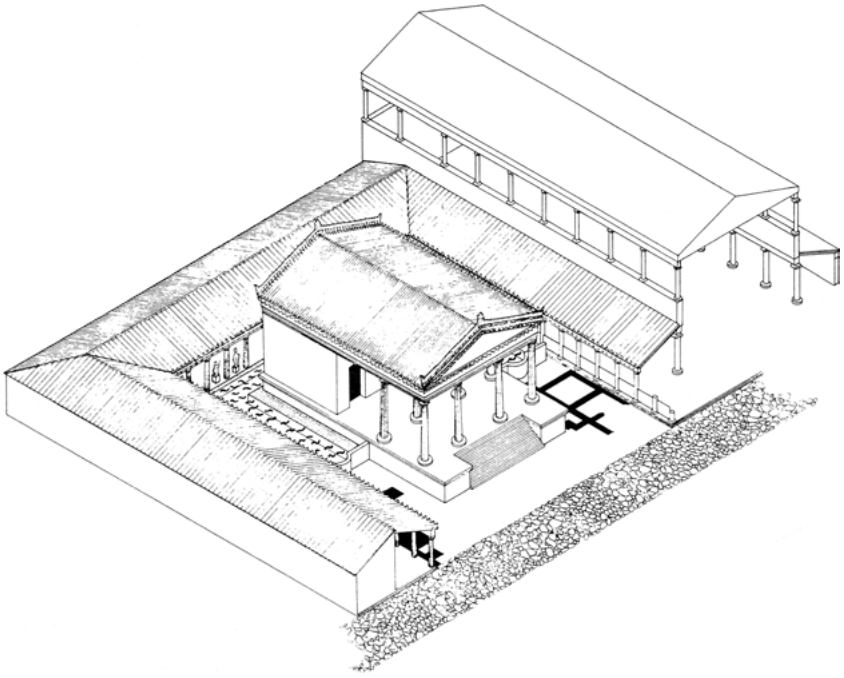

Fig. 4: Luni, reconstruction of Capitolium, Porticus and water basin.

shows an opening for water runoff.[24] A *pendant* can be assumed for the right side of the staircase. The stairs must have been flanked by small fountains enriching the architecture with their decorative quality, but also accentuating the final access to the temple.

In a similar way, the experience of several architectural complexes in the city centre of the colony of Luni was enhanced by small fountains or embedded water installations during the early Imperial period. The space between the old temple of the Capitolium and its surrounding three-winged portico, for example, was transformed in the middle of the 1st century to a wide – and elevated – marble-clad water basin.[25] As a built structure, the basin connected the temple podium and the podium of the portico. But by isolating the temple from the surrounding architecture by means of water, the capitolium was also singled out and emphasized as major monument of the community (Fig. 4). In the sanctuary immediately to the east of the forum (the so-called sanctuary of Diana), erected at about the same time, we find instead water installations comparable to those in Brescia. Here too, the staircase leading to the small temple building was flanked by ornamental fountains accentuating the temple and the stairs leading to it as a focal point at the end of the colonnaded courtyard of the sanctuary.[26] Again, such fountains adorned the steep flight of stairs leading to the temple of Luna in the spacious sanctuary with its emphasized alignment, located in the northern part of the city.[27] At the local forum, a marble-rich small open air enclosure of unknown function at the southern end of the square, the so-called *area con fontane*, comprised six small fountains surrounding a large marble-clad pedestal and an altar. The decorative fountains must have contributed substantially to the atmosphere and specific experience of this small enclosure located at the public centre of the colony.[28] These

24 Dell'Acqua 2014, 322 f. fig. 1.

25 D'Andria 1973, 644; Lavizzari Pedrazzini 1977, 354–356 pl. 4; Rossi 1998. A similar function as water basins enriching temple areas can be hypothesized for the remains of a large basin in the sanctuary at the via Postumia immediately outside Verona's Porta Borsari (maybe a sanctuary of Iuppiter) and in Bologna for a marble basin of 4 × 11 m in the area north of the two forum temples: Cavalieri Manasse 1998, 121 f. (Verona); Bergonzoni et al. 1976, 89 f. no. 72. 2. A. 2 (Bologna).

26 Durante – Landi 2001, 30. 33–35.

27 Bonghi Jovino 1973, 657 f. pls. 186, 5. 187, 2.

28 Rossignani 1973, 137–141.

examples of a valorisation of architectural spaces e. g. by small fountains illustrate the contribution of embedding water installations to the specific experience of a monumental built space. Imperial period Luni demonstrates water to be a clearly omnipresent element of the local sacred topography and as a significant contribution to the specific atmosphere of its locations.

The potential variety of installations for a decorative display of water in monumental architecture can finally be exemplified by a lost inscription from Parma which points to a more unusual integration of water into an architectural context.[29] The text of the inscription documents the costly transformation of a city gate into a lavishly decorated monument by the citizen Q. Munatius Apsyrtus during the 1st century AD. Apsyrtus had, from his own funds, the street from the forum to the city gate paved and the gate decorated with marble, sculptures and decorative fountains: *marmoribus statuis fistuleis et salientibus ornavit*. It is not possible to connect this gate and its decorative fountains with a gate architecture known archaeologically. The appearance and design of the gate before and after the initiative of Apsyrtus must therefore remain unknown, as must the specific contribution of the *salientes* to the architecture. Yet the reported find spot of the long-lost inscription suggests that the initiative might refer to the eastern city gate, i. e. the entrance of the Via Aemilia, the main overland route of the region passing through the city.[30] The decorative accentuation of one of the most important points of access to the city and, in the same way, focal point of the local main street was achieved also by embedded *salientes*.

The outlined forms of the embedding of water in architectural settings show the aspirations of local communities and individuals to enrich their urban spaces and to create additional value to their ambience. In this (as well as in the solutions applied), the cities of northern Italy seem to follow more general trends in dealing with urban space during the Roman Empire. But the conspicuous lack of monumental fountain architecture, for example, as urban furniture comparable to the prominent nymphaea in the Roman East is an obvious indicator and reminder of the importance of a regional focus when dealing with urban phenomena. Yet besides their limited number, our restricted knowledge of the local topographical context and built environment of the small number of known monuments also prohibits a concrete assessment of their impact on 'their' urban space. A far more precise picture emerges, in contrast, from the smaller decorative fountains as an embedded element of monumental architecture. The number of installations known with contexts, sometimes several in one city, allows for a better understanding of their local impact, but also of the aesthetic strategies and surplus underlying their installation. Where known, most of them enriched the ambience of – at least partially closed – architectural spaces, prominently sanctuaries. Here, the decorative fountains were always placed according to the overall architectural layout of the architectural complex, i. e. as part of an overall aesthetic concept, not as self-contained installations. Within these spaces, they highlighted built units, such as temple buildings within sanctuaries, by attracting the gaze of the viewer, adding a playful element to a static monumental setting. Finally, their placement (or the placement of their architecture) shows several of them accentuating situations of transition, like gates and flights of stairs, or emphasizing hierarchies within an architectural context. Monumental topographies gained a new aesthetic dimension, urban spaces offered an increased, richer experience.

Natural water in regional cityscapes

Compared to such decorative installations enriching architectural situations, the architectural transformation of (natural) water into a topographical locale of urban space meant a completely

29 CIL XI, 1062; De Maria 1988, 248 f. no. 30 fig. 27.
30 Vera 2009, 245. 249.

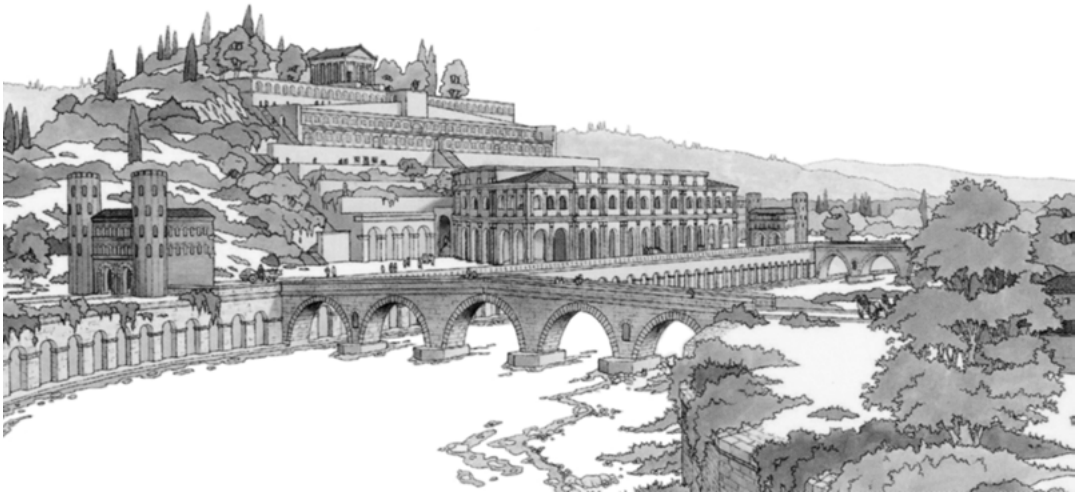

Fig. 5: Verona, hillside with theatre and terraces.

different level of appropriating water in an urban setting. An initiative that must have stressed the resources of the city for years or even decades can be found in Verona. Only a few years after Catullus' description of his hometown, the local community took the decision to relocate the settlement to the area in the bend of the Adige river, where a new city, now with an up-to-date orthogonal layout, was established.[31] As a result, the area of the former settlement on the hillside on the now opposite side of the river was available for a new development: only a few decades later, it was thoroughly and monumentally reshaped. The most prominent building here now was the large theatre, which rose only 10 m behind the Adige's embankment, immediately above the street along the bankside.[32] The approximately 105 m wide cavea of the building was embedded in the slope of the hill, while the rear wall of its 71 m wide stage building with the bulky *parasceniae* formed a multi-storey façade towards the city on the other side of the river. And this theatre was no solitary monumental building: it was visually and structurally embedded into an ambitious architectural reshaping of the entire slope, starting from the theater's cavea. This reshaping included a gallery crowning the cavea and, above all, a sequence of three built terraces and ramps climbing up to the summit of the hill that was crowned by a sanctuary and its temple[33] (Fig. 5). The over 120 m wide walls of these terraces were each structured by different decorative arrangements of niches, half columns and entablatures: the plain rear wall of the lower, about 10 m deep terrace featured a fountain at its western edge, while a corresponding installation might be assumed for the eastern edge today occupied by a monastery building. The wall of the only 1.5 m narrow middle terrace exhibits in symmetrical arrangement a rectangular central and two semi-circular niches, framed by a sequence of blind windows. Doric half-columns and entablature decorate the whole width of the wall. Finally, the 7 m deep upper terrace, situated already 41 m above the level of the theatre's orchestra, was decorated with a central niche and an arrangement of semi-columns with entablature. As a result, the slope of the hill was, from the embankment of the river up to the sanctuary on the hilltop, completely 'architecturized'. Distanced by the separating river, but at the same time connected to it, a highly articulated monumental prospect incorporating hillside as well as river opened up to viewers from the city. River and embankment, theatre façade, the sequence of terraces, and the crowning temple must have exhibited a specific scenographic quality,[34] making the river an element of the built local cityscape.

31 Cavalieri Manasse 1998, 111–113 fig. 1.

32 Cavalieri Manasse 1987, 17–22; Tosi 2003, 537–540 pl. 12. 100–120.

33 Cavalieri Manasse 1987, 20 f.; Tosi 2003, figs. 102. 103. 109–112.

34 Cavalieri Manasse 1987, 20 f.

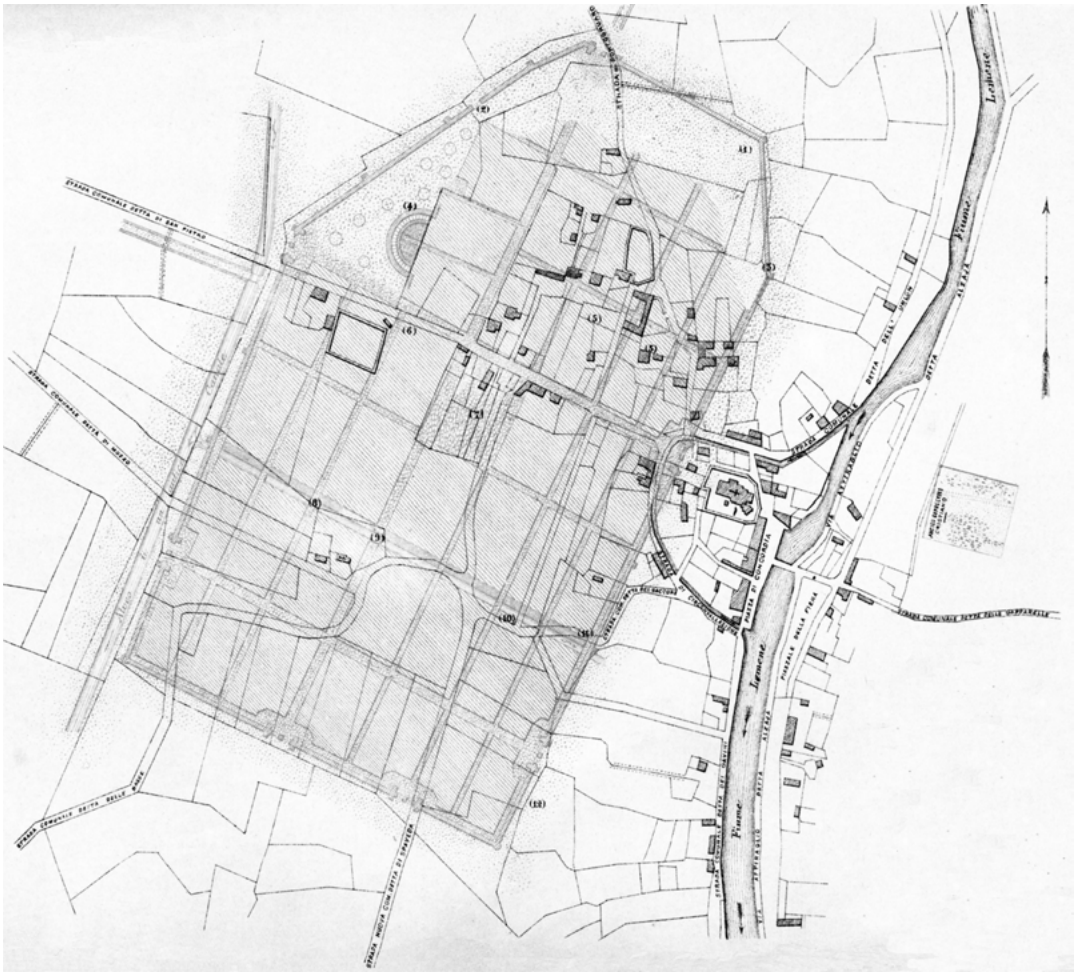

Fig. 6: Concordia, urban layout with canal separating second and third row of *insulae*, from south.

A slightly different, yet more immediate role for the urban topography can be discerned in the colony of Iulia Concordia. Here, as in nearby Altinum or Milan, watercourses played an important role in shaping the local character of the settlement established between two small rivers that received its almost uncompromising orthogonal layout during the later 1st century BC. A 9 m wide canal dividing the city area is, however, a local feature that distinguishes Iulia Concordia clearly from both cities mentioned. Connecting the two small waterways surrounding the city, the canal was, in a remarkably consistent way, embedded into the urban layout: it was adjusted to the street grid and accompanied one of its decumani as an inner-city east-west waterway. Known only from late 19th century excavations, its prominent role for the local urban space can only be specified by consulting old plans and descriptions[35] (Figs. 6–7). While the south side of the canal was formed by only a simple wall, its north side received a more elaborate – and spacious – architectural definition: here six wide stone steps connected the canal with the accompanying decumanus. Although the exact depth and height of these steps are not known, the 19th century drawings and descriptions indicate an approximate total depth of 9 m and a height of altogether 1.8 m.[36] With a length of over 750 m and interrupted only by the bridges of the *cardines* crossing the canal, these downright monumental steps were one of the most striking architectural features within the city walls.

35 Bertolini 1880; Vigoni 2006; Vigoni 2013.

36 Vigoni 2006, 459 f. fig. 5; Vigoni 2013, 97. Should the steps indicated in the plan given by Bertolini 1880, pl. 14 be true to scale, the six steps would correspond approximately to the width of the accompanying decumanus.

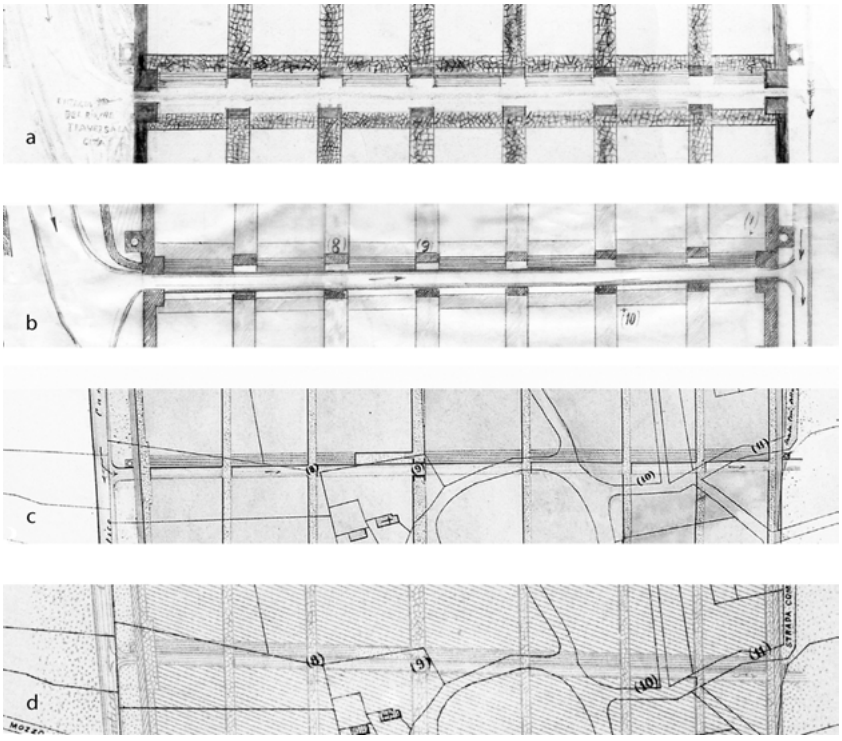

Fig. 7: Concordia, detail of the canal according to old plans.

Two inscriptions of the late 1st/early 2nd century AD are usually connected to this initiative.[37] Both inscriptions, formerly free-standing, approx. 1.1 m high stelae, were found in the area of the canal and must have been erected in its context. They document for the public that two prominent inhabitants of Concordia, both *liberti* of the same person and both *seviri*, took over the costs for steps (*crepidines*) of two sections of the canal, itself not explicitly mentioned (*inter murum et pontem*, and *inter duos pontes*; these specifications only make sense for the canal as the object of the initiative, as well as the context of the inscriptions). This large-scale improvement of the local infrastructure was therefore a private donation and euergetic contribution to the local topography. Moreover, since the city's layout with canal – and street grid – had existed already for some time, it was a subsequent initiative that must have had some impact.

But how could this initiative be understood in its urban context? With the inner-city canal, water was already a formative component of the initial layout and urban space of Concordia. Yet in its embedding, a conspicuous local approach is evident. From the beginning integrated in a remarkably consistent way into the layout of the city, the canal, being a part of it, was subsequently the object of architectural articulation as a monumental locale. This, however, did not result in a sophisticated or even grandiose architectonic design, such as a promenade. Finds from the area indicate an ongoing commercial use of at least parts of the canal,[38] although the actual harbour with its corresponding infrastructure was located outside the city.[39] Yet the area of the canal was also sought for official monuments. An honorary inscription for a high-ranking imperial official of the Late Antonine period found in the eastern section of the canal steps points to a certain publicity in this area:[40] the inscription with its size of 150 × 80 cm must have formed part of an impressive honorary monument erected somewhere along the canal.

37 CIL V, 1886 and 1887; Bertolini 1880, 414 no. 10 pl. 14 (findspot); Vigoni 2006, 464 fig. 6 f.; Vigoni 2013, 104 figs. 73. 74. Against a connection of both inscriptions with the steps proper and for a different assessment of the urban role of the canal, see Laird 2015, 254–261.

38 Vigoni 2013, 125–154.

39 Vigoni 2013, 109–111 fig. 78 pl. 2. 5.

40 CIL V, 1874; Bertolini 1880, 415 no. 11 pl. 14; Vigoni 2013, 105 fig. 75.

Therefore, although a commercial use of the canal for the inner-city handling of goods is likely, the wide area of the steps contiguous to the street grid, their monumental design, the presentation of freestanding inscriptions and, later, of a massive honorary monument, both of which presuppose and imply a certain publicity, may argue against its use as a purely commercial infrastructure. It is a hypothetical, but nevertheless appealing assumption to imagine this urban area along the northern side of the canal as a more high-profile location, possibly even with a sought-after public character. The case of Concordia thus indicates a more coherent, 'total' appropriation of water than the one in neighbouring Altinum or in Verona mentioned at the beginning. In its subordination to the local street grid and its complete architecturalization, it is conceived here as a topographical place, as a locale for the public, for localised interaction and even monumental communication – apart from the forum.

With their ambitious architectural initiatives, Verona and Iulia Concordia confront us with two different approaches to including or even embracing water, i. e. local watercourses, on a large scale in their topography. In Verona, the river was one element of a monumental reshaping of a complete hillside, including river embankment, theatre, terraces, and a sanctuary. The result was a veduta-like arrangement, with the river serving as a visual starting point, yet also distancing the viewer. In Iulia Concordia, on the other hand, we find a local watercourse completely subordinated to the city layout with its orthogonal system of streets and insulae, and, thanks to the subsequent donation of the steps, upgraded as a locale. Yet despite these different approaches, both in Verona and Iulia Concordia water was embedded in a remarkably coherent, prominent way as an element of an overall urban arrangement. Nature became topography.

Local water and local identity: the case of Padua

The many-layered local 'treatment' of water within urban space in northern Italy finds a rare and unusual facet in the case of Padua, pointing to the potential meaning of water in a local cityscape beyond the infrastructural or aesthetic aspects outlined above. Already during the late Republican period, the old Venetic and later Roman city was praised for its prosperity. According to Strabo, Padua was the best of all the cities in the region. The geographer Pomponius Mela characterises the city in his *De Chorographia* as *urbs opulentissima*.[41] City and territory were, according to Livy, himself a Paduan, characterised by watercourses, canals and a lagoon landscape.

An important urban factor was the river Metuacus, which surrounded the core area of the ancient city. Several areas and infrastructures of the Roman 'riverscape' of Padua are known from archaeological excavations. Bridges, piers, and warehouses along the river formed an important part of the Metuacus' waterside. Yet one of the structures, excavated in today's *Via Battisti* 1, is of particular interest: a wide, probably semicircular architectural setting built from large trachyte blocks and dated to the middle of the 1st century BC.[42] The known remains of the only partially excavated architecture allow for a reconstruction as a kind of wide, stepped exedra with at least seven 29 cm high steps, opening towards the river and descending to it. Due to its unusual layout, the structure can hardly be interpreted exclusively as a pier for the handling of goods. Rather, it has features of a monumental architectural setting that instead indicate a specific character as a place for a special purpose. The river would thus be a topographical space for a discrete location with a specific monumental quality.[43]

41 Mela 1, 60.

42 Ruta Serafini 2002, 57 f.; Vigoni 2013, 99 f. fig. 66; Zara 2018, 132 fig. 92; 447 no. 114.

43 Yet the concrete appearance of this construction beyond the architectural layout or even its valorisation as an installation remain unclear. The use of the very durable material trachyte as well as no mention of a white limestone or any decorative elements point to a rather utilitarian design. Considering this, it is hypothetical – yet has a certain charm – to connect this construction with a regularly staged naval battle to celebrate a historic victory

However, Padua is noteworthy above all because our written sources on the city (and river) give us exceptional insights into a local collective tradition connected to, shaped by and regularly affirmed by local water – the river as a locale of collective identity. Our source is the Roman historian Livy, himself a native of Padua. In his account of the Venetic naval victory over the Spartan Kleonymos during his expedition to the North Adriatic in 302 BC, Livy mentions that the enemy's ships' beaks captured on this occasion were kept in the old temple of Iuno in the city.[44] In this context he also mentions that, in remembrance of this significant victory each year on its anniversary, a *certamen navalis*, a naval battle, was held on the river flowing through the city (*in flumine oppidi medio exercetur*).[45] His account underlines that this event related to a historical episode from a time long before Roman control of the region played a major role as a component of local Paduan identity. It could be experienced in different media (spolia, performative staging) and topographical locations (temple, river) and was kept up at least until the time of Livy. In particular, the naval battle, taking place as a spectacle on the river as a central locale of the city, must have been staged in the presence of large parts of the regional population. With all these aspects, the Metuacus passing through Padua connected in an immediate way collective tradition and facets of a well-established local identity with the topographical location 'river'.

Urban water in northern Italy: A summary

The Po plain, rich in tributaries, streams and meadows, has always required melioration, drainage and canalisation. Water was therefore not only a constitutive component of the regional environment, but it has always been a challenge for the regional urban communities. In consequence, canals and watercourses were a significant factor in the development of the regional cityscapes, not only in the obvious examples of the delta of the Po or the cities situated at the *caput Adriae*, but also e. g. in Milan or in Verona.

However, a closer look reveals a far wider range of ways of handling local water as well as of embedding it in the cityscapes. Beyond the above-mentioned infrastructural level with its canals, watercourses and related constructions and their consequences for urban and suburban topographies, we find water since the 1st century AD increasingly embedded in urban architecture. Installations like fountains enriched, whether as monumental architectures or as subordinate installations, built environments in manifold ways and accentuated their specific setting. In their diverse types they contributed, as can be seen at Luni, in a prominent way to the perception and aesthetic experience of 'their' urban (sub-)spaces and their ambiences. Yet the embedding of water was also possible on a far larger scale. In Verona and Iulia Concordia, a local watercourse was transformed into a prominent locale (or constitutive element of it) of the built topography. Finally, our sources on Padua remind us that the importance of local water for an urban community may not be restricted to infrastructure or installations, but may also include a role as a link to and as a place of local identities.

As a general tendency and beginning with the early Imperial period, the regional water became more and more 'urbanised'. Beyond water supply and disposal, it was increasingly the object and focus of architectural initiatives and ambition. The archaeological record reveals a remarkable range of initiatives and solutions to embed water not only as a topographical feature of the cityscapes, but also as a decorative contribution to urban spaces in order to enhance their

(see below) and to interpret it as an installation to accommodate spectators in the manner of a VIP stand (Vigoni 2013, 100).

44 Liv. 10, 2. 14.

45 Liv. 10, 2. 15.

aesthetic quality and to enrich their experience. Yet our lack of knowledge of the appearance of most installations and monuments, as well as of their concrete architectural and spatial settings, prohibits a more concrete analysis of their specific contribution to local urban spaces. But considering that the 'cities in the water' or 'city islands' of Vitruvius or Strabo are sketched by them primarily from the viewpoint of technical control of water and its presence as a natural element within settlement contexts,[46] archaeology can add important observations and especially introduce a wider perspective, namely one of the manifold forms of architectural initiatives and ambition to upgrade water to an urban feature, as well as on the enrichment of urban spaces by means of water installations as a major aesthetic contribution to local cityscapes. We can trace a changing approach to water in urban settings, indicating the emergence of a new facet of regional urbanity.

Illustration Credits

Fig. 1: Haug 2003, pl. 1.
Fig. 2: Cavalieri Manasse 1998, fig. 1.
Fig. 3: Ninfo et al. 2009, fig. 82.
Fig. 4: Rossignani 1995, fig. 9.
Fig. 5: Cavalieri Manasse 2012, p. 252.
Fig. 6: Pettenó – Vigoni 2013, pl. 4 = Bertolini 1880, pl. 1.
Fig. 7: Vigoni 2013, fig. 63.

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46 Vitruvius does not mention nymphaea or monumental decorative fountains: Letzner 1990, 30.

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Nicolas Lamare

3 Fountains and the Ancient City

Social Interactions, Practical Uses, and Pleasant Sights

Abstract: Fountains were remarkable buildings in ancient cities. First, their functional aspect as water suppliers made them essential to daily life. Then, under the Roman Empire, they gradually acquired a role as ornamentation of the space and as a manifestation of the political discourse that modified their architecture and appearance. Because of these dual characteristics, both functional and decorative, fountains, especially monumental fountains, are very appropriate buildings for conducting an analysis of urban space and its perception. Where were the fountains located in the city? How did they fit into the architectural framework? Who frequented them on a daily basis? How did they evolve over time? This article argues that fountains were buildings in their own right, whose practical and decorative functions must be considered in an equivalent way. Focusing on North Africa provinces, it looks at the perception of fountains in the city, as monumental buildings and constructions decorated with water, which is their raison d'être.

The image of the Roman city has long been associated with water, mainly because of the arcades of the aqueducts that still dominate the landscape around the ancient towns. The presence of water in cities, both in domestic and public spaces, its abundance and (over)consumption have long been considered essential characteristics of imperial urban space. Among the water-related monuments, fountains are the most representative, because they distributed water and, in the case of the most monumental of them, staged it. A study of these particular buildings addresses several interconnected issues. The architecture and decoration of the fountains allow us to study the staging of power, but also of the profusion of water. In fact, the visual and acoustic dimension of the continuous flow of water in the city is in response to the desire to show the domination of man over the natural elements and the hazards of resource availability and climate change. Moreover, written testimonies make it possible to capture the mental concepts relating to water in the city, which was essential as an element of everyday life and as a characteristic element of urban aesthetics.

Focusing on North Africa provinces with comparisons, this article falls into two parts, the first one dedicated to the Roman imperial period, followed by an investigation devoted to the late antique city, a period for which the problems are different, even though fountains still played an essential role. For each period, three aspects are discussed. First, the location, along with the visibility and accessibility of the fountains will be analysed according to the available sources. In a second part, fountains will be discussed as a meeting point, a place of gathering or recreation, in their social dimension. In a third part, the discussion will focus on the visualisation of fountains, based on architectural data, and on the meaning intended to be given to the monuments, thanks to epigraphic texts.[1]

1 The ideas presented in this article are based on a PhD dissertation on monumental fountains in Roman North Africa. Cf. Lamare 2019. I would like to thank Annette Haug and Nicola Chiarenza for their invitation to the Urban Water Colloquium, the reviewers for their remarks on my paper, as well as Nichole Sheldrick for improving the first draft of the English text. All mistakes remain my own. All dates are AD.

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Fountains in the imperial city

Fountains in the heart of the city: displaying water and power

In general, fountains were located on prominent sites, which must be understood in relation to their iconographic programme, the inscriptions they displayed, and the political context in which they were built. In Caesarea, a fountain must have existed near the south gate of the city and outside the walls. Its construction would have been part of a programme similar to that mentioned in an inscription, dated 201, which evokes the repairing of the road built to enhance the entrance to the city.[2] This inscription is reminiscent of the mention in the *Augustan History* of the construction of the septizodium by Septimius Severus, at the southern corner of the Palatine, to make a good impression on the Africans arriving in Rome.[3] Likewise in the East, at Apameus, the nymphaeum located between the northern gate and the pilaster, constituting the starting point of the great colonnade, was the first intramural building that a visitor would see, thus giving concrete visibility to the emperor's beneficent action that an inscription discovered nearby might highlight.[4]

Fountains adorned, impressed, and were the ideal support for an honorary inscription, whether it was located on the outskirts or in the city itself.[5] We know of a limited number of African fountains for which the associated honorary inscription is available. The Lacus of Terentius is the most representative example:[6] located at the crossroads of several lanes, preceded by a stepped platform and composed of a high podium, the honorary inscription[7] recalled its construction and that of the aqueduct supplying the city, while a base,[8] which can be assumed to have been surmounted by a statue, commemorated the *cura aquarum* which was performed by a notable from the city (Fig. 1). The nymphaeum-septizonium of Lambaesis,[9] according to Michel Janon's reconstruction, highlighted on the entablature the two inscriptions commemorating the construction and restoration of the fountain[10] along one of the city's major roads (Fig. 2). The fountain, as at Dougga, was located at the point of arrival of the aqueduct in the city and was the place where various inscriptions, recalling the developments carried out at the water source or on the aqueduct, were displayed. The same pattern can be seen in Cuicul, where the inscription on the entablature of the Fountain of the Tetrarchy[11] mentioned the restoration of a water supply system for the city (Fig. 3). Other fountains, like any monument that was the result of an act of euergetism, presented a conspicuous inscription on their main façade, sometimes according to an arrangement that gave way to a certain originality. The inscription[12] of the fountain in Calama, if we follow Amable Ravoisié's records, partly followed the curvature of the façade, but also the entablature spur.[13] In Sbeitla, the fountain to the southwest of the forum was decorated with an inscription,[14] the text of which was interspersed with the capitals

2 CIL VIII, 20982 = ILS, 5376; Leveau 1984, 27. 56.
3 SHA Sev. 24, 3.
4 AE 2000, 1495; Balty 1972, 20; Vannesse 2011, 191 f.
5 See in the East, in Gerasa, two monolithic fountains, placed at the corners of an important crossroads, re-using honorary bases dedicated to Trajan and Hadrian, perhaps to recall that the water supply system had been designed under the reign of the former and put into service under the latter: Seigne 2008, 45–49 fountains nos. 12. 13.
6 Golvin – Garat 2010; Lamare 2019, 378–380 no. 48.
7 CIL VIII, 1480 = 26534 = AE 1966, 511 = AE 1991, 1665 = AE 2000, 1725–1726 = ILTun, 1408 = Dougga, 36.
8 AE 1966, 512 = Dougga 37.
9 Janon 1973; Aupert 1974, 97–101; Letzner 1999, 405–407 no. 249; Lamare 2019, 325–328 no. 16.
10 CIL VIII, 2658 = AE 1973, 645; CIL VIII, 2657 = 18105 = ILS, 5626 = AE, 1973, 645.
11 AE 1920, 15 = ILAlg II 3, 7859.
12 CIL VIII, 5377 = 5483 = 5484 = 17525 = ILAlg I, 298.
13 Ravoisié 1846 II, 34 f. pl. 33; Letzner 1999, 398 no. 237.
14 CIL VIII, 234 = 11329 = AE 1958, 158 = ILPSbeitla 84: [DD(ominis) nn(ostris)] / Valenti/niano / et Va/[lente / Augg(ustis) / --- / ---]OTA // [Fontem / --- / ---]lius / Festus / v(ir) c(larissimus) / --- / civibus / [suis d(onum) d(edit)].

Fig. 1: Dougga, lacus of Terentius, view towards the west. The access staircase to the platform has been restored.

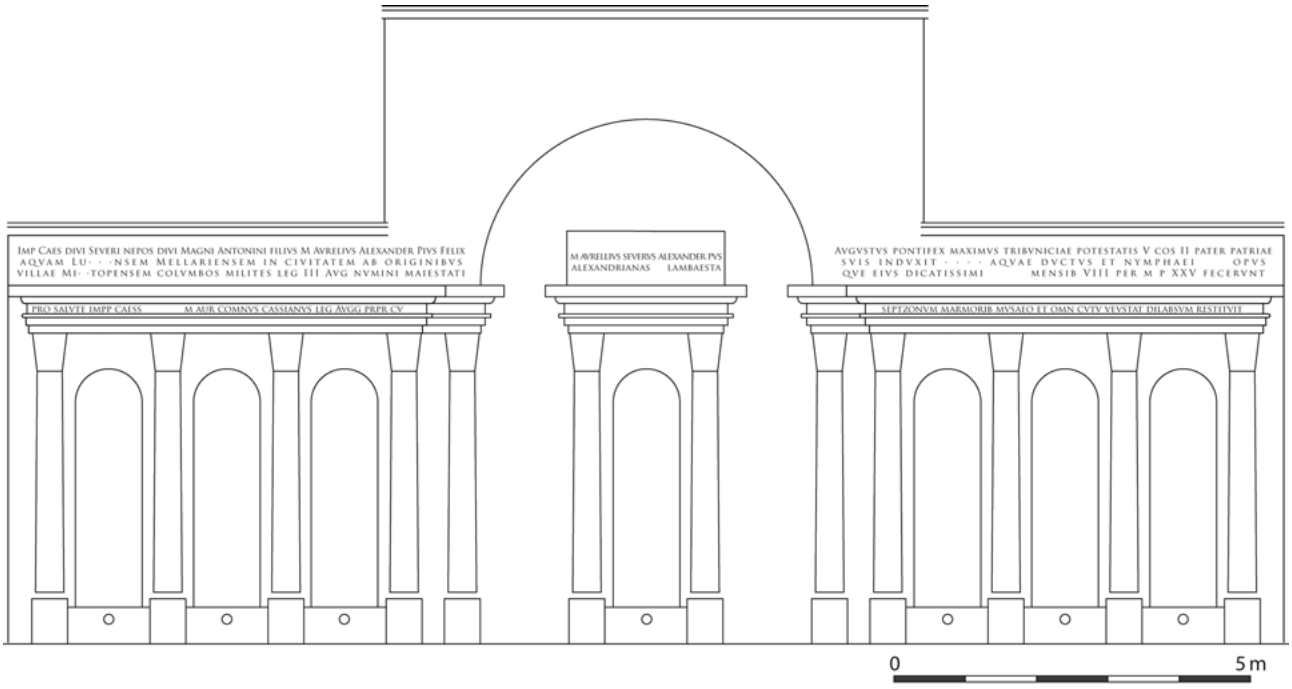

Fig. 2: Lambaesis, restituted elevation of the nymphaeum-septizonium with the inscriptions.

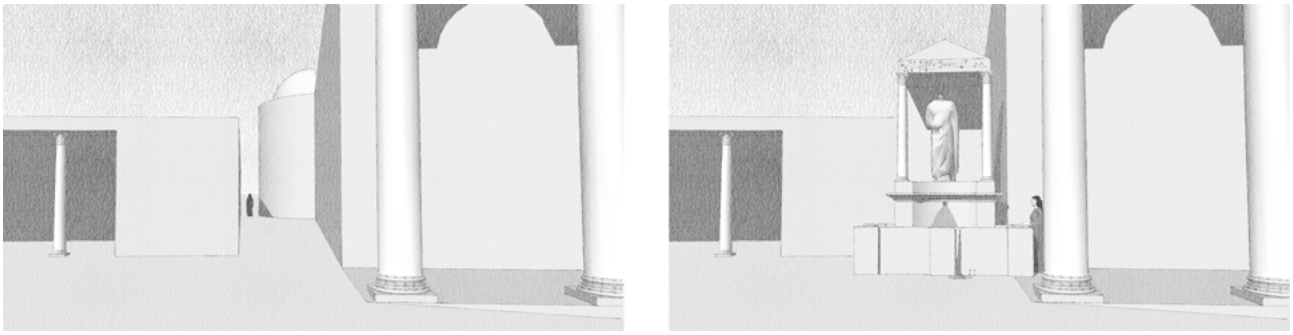

Fig. 3: Cuicul, Fountain of the Tetrarchy, restitution from ground level of the situation before and after the construction of the fountain blocking the street between the House of Bacchus and the Southern Great Baths.

Fig. 4: Sbeitla, Fountain to the southwest of the forum, the inscribed block no. 4.

that punctuated the façade (Figs. 4–5). More classical in its presentation around a centred plan architecture, the inscription of the Fountain of Liberalis in Timgad[15] was placed along the entablature blocks that followed the octagonal plan of the monument (Fig. 6).[16] The uncertainty about the total number of six or eight inscribed fragments raises a question regarding the layout of these blocks: the location along a road and the choice to present only six inscribed blocks that can be restored positioned to the street side, would have allowed the passer-by to read the entire text without stopping as he walked.

15 CIL VIII, 2406; AE 1979, 670.
16 Boeswillwald et al. 1905, 317–319; Lamare 2019, 333–335 no. 20.

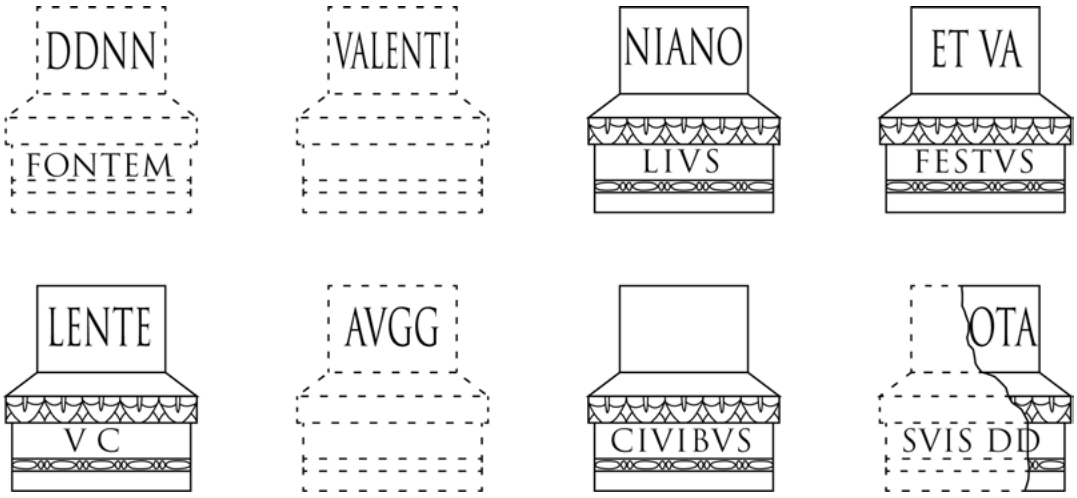

Fig. 5: Sbeitla, Fountain to the southwest of the forum, restitution of the inscribed blocks.

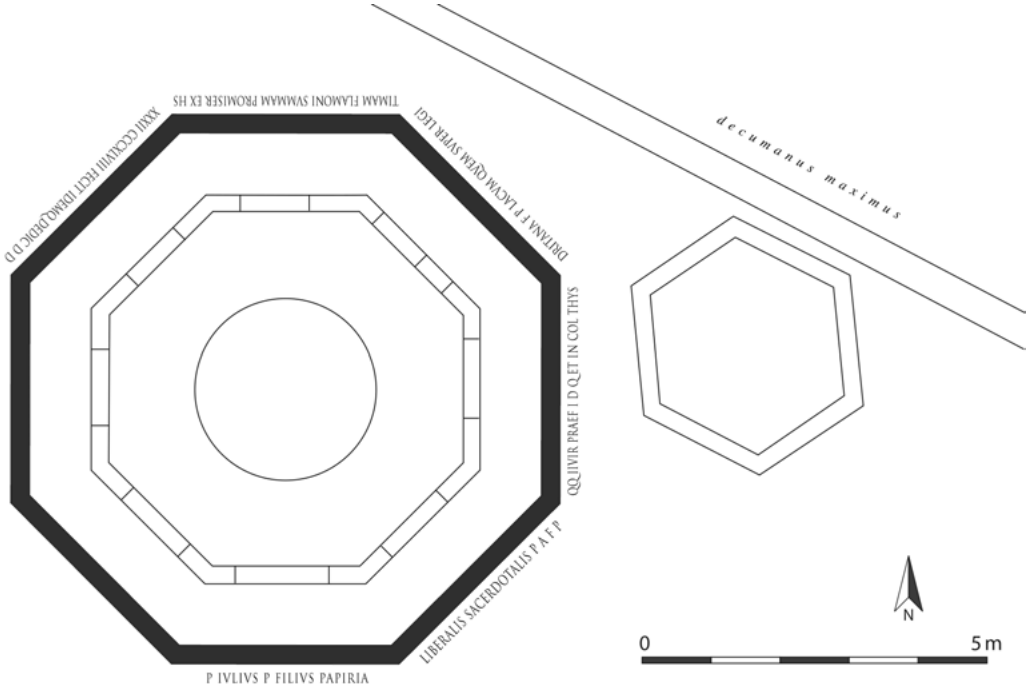

Fig. 6: Timgad, Fountain of Liberalis, plan presenting the hypothetical placement of the inscribed block with the original text.

Meeting at the fountain: monuments of daily life

Roger Ling's suggestion that we should consider the encroachment of public space on a shop for the erection of a fountain as a choice of the owner, because it was likely to benefit his business due to the frequentation around the water point,[17] raises questions about the people who used these places on a daily basis.

In North Africa, among the terracotta figurines of Carthaginian necropolises, a woman carrying an amphora on her shoulder was discovered, probably a servant according to the unbelted

17 Ling 2005.

tunic she is wearing.[18] More generally, we have evidence of *aquarii* in Rome, who could be public or household slaves,[19] as well as free men selling their services to carry water to the *insulae*.[20] However, they could also be members of the water service, and it is difficult to distinguish them from the supposed water carriers.[21] The situation in Rome is very particular in many respects; nevertheless these individuals are attested elsewhere, such as the *collegium* of *aquarii* mentioned in an inscription of Venusia:[22] whether water sellers or people committed to the maintenance of water monuments, it is possible to consider their presence in African territory.[23] The *aquarii*, in Rome as elsewhere, could not only draw water from certain large fountains, but also take over their maintenance. Were they fully committed to this role? There was probably no *cura aquarum* service in small towns that could not afford it.[24] The duumviri or aediles were responsible for this task, which could be assigned to a person on an ad hoc basis, such as L. Terentius Romanus in Dougga.[25] Municipal staff were also responsible for the maintenance of fountains and other public monuments. Sewer maintenance was also the responsibility of the public authorities,[26] but private individuals could not be prevented from repairing and maintaining their pipes themselves.[27]

Roman women also went to the fountain, as Horace testifies in his *Satires*, offering a very vivid description of a daily scene.[28] Much later in Constantinople,[29] during the drought of 562–563, testimonies of fights and even murders,[30] or the crowd rushing around the fountains after damage caused to the aqueduct,[31] confirm the role of these monuments in supplying the population and the convergence point they constituted.

A place of passage and an important meeting point due to its utilitarian function, a fountain could also be a quiet space in the heart of the city. However, there are few indications to validate this role of monumental fountains in North Africa. None, for example, is associated with any benches, at least in stone.[32] Perhaps such arrangements existed in perishable materials as in the exedras,[33] which were equipped with wooden benches. The monumental fountains of semi-circular plan, commonly known as 'semi-circular exedra nymphaeum' – terminology which Sal-

18 Chérif 1988, 10 fig. 11.

19 *Aquarii* could be *serui publici* attached to the water service, whose existence is still attested in late antiquity: Weiß 2004, 117–122; Lenski 2006, 345 f. 348. Eighteen quotes are to be found in Frontin. aq.

20 See Bruun 1991, 108 f. for quotations of the term, in particular Iuv. 6, 332; Bruun 1997, 140 f.

21 Bruun 1991, 190–193.

22 CIL IX, 460.

23 Marano 2015, 152 f. considers that their presence in all the cities of the empire should not be overestimated, *contra* Lenski 2006, 345 and Biundo 2008, 169.

24 A recent study proposed to identify such a service in Vienne (France) based on the stamp of a lead pipe: Rémy et al. 2011.

25 AE 1966, 512 = Dougga 37. The man is honoured *ob aquae curam* but does not bear in the inscription the title of *curator aquae*, which is found neither in North Africa nor in Gaul: Corbier 1984, 272 n. 200. 201; Ronin 2015, 40–42.

26 Dig. 43, 23, 1, 3. Little is known about the officers who conducted this maintenance; perhaps they were slaves and prisoners: Wilson 2000, 170.

27 Dig. 39, 1, 5, 11; 43, 23, 1, 7. About these questions, see Saliou 1994, 166; Ronin 2015, 79–82. 200–204.

28 *Whatever [the poet] has once scribbled on his sheets he will rejoice to have all know, all the slaves and old dames as they come home from bakehouse and pond*. Hor. Sat. 1, 4, 36–38: *et quodcumque semel chartis illeuerit, omnis | gestiet a furno redeuntis scire lacuque | et pueros et anus*. (translation by Fairclough 1961). See Magalhães de Oliveira 2012, 105–107 on the fountain as a privileged meeting place for the neighbours and an essential link in the local social networks that characterized the life of the neighbourhoods, especially the most popular ones.

29 Crow 2012, 129.

30 Theoph. AM 6055.

31 Procop. Arc 26, 23.

32 Regarding the benches in the public space of Pompeii, see Hartnett 2017, 195–223, in particular 220 f. concerning the lack of bench construction by civic authorities and the lack of urban 'comfort' in the modern sense.

33 On the origin and meaning of the term, with bibliographical, literary, epigraphic, and archaeological references, see Settis 1973, 662–682.

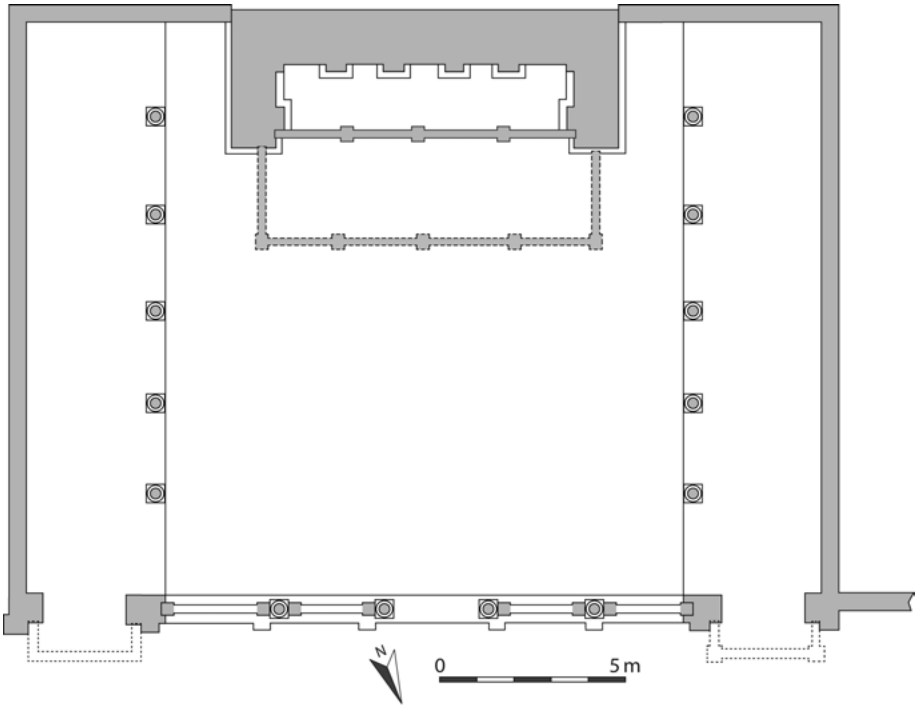

Fig. 7: Sbeitla, Northern Fountain, plan of the original construction presenting the hypothetical draw basin. Two porticoes frame the courtyard.

vatore Settis pointed out is unsuitable and incorrect, recalling the existence of rectangular exedras – were certainly suitable to accommodate passers-by for a moment of rest, but this function can hardly be attributed to them with certainty: no specific arrangement for the Great Nymphaeum of Lepcis Magna,[34] for instance, would support this assumption. On the other hand, fountains associated with a portico were more suitable to accommodate people, such as the hemicycle-fountain of Cuicul under the northern portico of the Forum des Sévères[35] or the Northern Fountain of Sbeitla framed by two porticoes defining a courtyard (Fig. 7).[36] Moreover, the orientation of the fountain could have a significant effect, considering the shadow that a high façade could cast: the nymphaeum of Sbiba[37] presented its façade to the north; the nymphaeum of Chemtou[38] opened to the east, the Great Nymphaeum of Lepcis Magna to the west. Nevertheless, it is difficult to conclude that there was a deliberate choice for the placement of fountains, as the orientations are very diverse and the technical and urban planning constraints were already very numerous and essential. It is worth mentioning that on the platform of the Lacus of Terentius in Dougga a probable 'game' was engraved on the slabs, just as in Sbeitla where there was reported a 'game of marbles' on the pavement of the Northern Fountain,[39] distractions that could be compared to those known at the Timgad forum:[40] the esplanade was thus willingly the place for a relaxing moment and not just for passing.

34 Letzner 1999, 410 f. no. 255; Ward-Perkins 1993, 79–87; Sandoz 2008; Lamare 2019, 343–346 no. 27.
35 Ballu 1921, 49; Aupert 1974, 95; Letzner 1999, 345 no. 136; Kleinwächter 2001, 100 f.; Lamare 2019, 321 f. no. 14.
36 Cèbe 1957, 170 pl. 3; Lamare 2017.
37 Letzner 1999, 396 no. 232; Lamare 2019, 365–367 no. 40.
38 Aupert 1974, 93; Letzner 1999, 487 no. 396; Rakob 1993, 7–16; Lamare 2019, 361 f. no. 38.
39 Poinssot – Lantier 1922, p. CXVII n. 7. The holes of a marble game, according to the authors, were located along the entrance portico in the first intercolumniation on the left.
40 Boeswillwald et al. 1905, 19–21. 27 (the hopscotch). 29–31.

Fountains as way stations: an element of urban agency

Fountains were not the only buildings to feature on their façades the honorary or commemorative inscriptions that were omnipresent in the city. Nevertheless, fountains constitute a category of buildings apart in the townscape that should be analysed from the point of view of the urban context.[41] William MacDonald classified fountains as one of the city's 'way stations', along with exedras and porticoed courtyards. Like arches, they were urban breaks, marking the city's framework, but conversely, they were located along the axes and not across them. These monuments, designed for people to stop and rest and offering a quiet space away from the hustle and bustle of the street, were 'a species of half-building, their volumes, partially defined, joining directly with those of contiguous streets and squares, ready to receive diversions from the traffic alongside'.[42] Francesco Tomasello has already criticised this approach, arguing that it is a simplistic view which belittles the dialectics and inventiveness of the urban project as a whole, where the richness of the solutions recalls the particularity of the projects and perspectives, and the relationship of the monument with the urban context. The example he gives of the Lacus of the theatre in Lepcis Magna[43] is quite enlightening: its construction solved the problem of the view of the two orthogonal and converging streets dominated by the massive presence of the stage body. The fountain formed a cut-off panel and its oblique lateral returns finalised its organic connection with the theatre; the emphasis of the composition was placed on the large niche that gave depth and thus resolved the perspective of the crossroads.[44]

Thus, fountains are indeed way stations, breaks in the urban landscape, especially when they are part of defined spaces, such as small plazas. The fountain near the northern baths in Volubilis blocked and embellished a path inaccessible due to the presence of the aqueduct and of an ancient tumulus, and thus closed a kind of square, later structured by the arch of Caracalla. In Sabratha, the so-called 'Flavius Tullus Fountain' was the only building that occupied the place preceding the Antonine temple: it was thus highlighted on this large esplanade, while being placed on the side so as not to obstruct the view of the temple's façade (Fig. 8). Nevertheless, fountains are buildings in their own right, well linked to the surrounding monuments and whose location has not only been defined by the need to fill an urban 'void'. Moreover, the function of fountains as resting places, as for exedras, should not be overestimated. *Their Naiads babbling through all the streets of Rome*, wrote Propertius,[45] while Pliny the Younger evoked *the most pleasing murmur* of a little fountain in a room of his Tuscan villa,[46] but the largest buildings would have made such a whirlwind noise as to make the voice rise, something that everyone can experience today in front of the Trevi Fountain in Rome. At this point, it is necessary to mention Sidonius Apollinaris, who indicates that in the baths, *so difficult is it to exchange words intelligibly, owing to the roar of the falling stream*.[47] However, answering the question of levels of fountain noise can only be done if we know the flow of water and the way in which

41 For examples in Northern Italy, see Kreuz, this volume.

42 MacDonald 1986, 99–103.

43 Letzner 1999, 482 no. 384; Tomasello 2005, 37–57; Lamare 2019, 350–353 no. 30.

44 Tomasello 2005, 191 f.

45 Prop. 2, 32, 15: *et leuiter nymphis tota crepitantibus urbe* (translation by Butler 1962).

46 Plin. Ep. 5, 6, 23: *Fonticulus in hoc, in fonte crater, circa sipunculi plures miscent iucundissimum murmur* (translation by Melmoth 1961). Vendries 2014, 213 f., insists on the necessity to take into consideration this noise of water in order to imagine the atmosphere of Roman gardens, and recalls, moreover, that Latin literature generally associates it with the chirping of birds and therefore with an element of appeasement.

47 Sid. Apoll. Epist. 2, 2, 9: *quia prae strepitu caduci fluminis mutuae uocum uices minus intelliguntur* (translation by Anderson 1956).

Fig. 8: Sabratha, so-called 'Fountain of Flavius Tullus' on the esplanade in front of the Antonine temple, the access stairs of which are visible on the right.

the pipes were laid out:[48] literary sources clearly show that perceptions were different according to context.[49]

Finally, unlike forums, markets or theatres, which are 'closed' monuments that present their decoration only when one enters their interior space, fountains are among the buildings that display their figurative ornamentation along the streets, also including arches, tetrapylons, and gates. However, two specific features distinguish them from the latter types. First, as mentioned, fountains were placed along or at the intersections of roads and not across them. Their situation generally left a sufficient distance to highlight their façade and the sculpted decoration that was used.[50] The fountains of Althiburos and Volubilis, but also of the Hercules nymphaeum of Lepcis Magna, with their right-angled basins that occupied both sides of the intersection where they were located, exemplify the buildings' integration into the urban landscape. A study from this perspective has been carried out on African triumphal arches, in which the author was interested in the mechanics of vision, the object and its connection with space, trying to determine if they represented a focal point of the urban landscape.[51] The second point is the dynamic aspect that characterizes fountains. Cecelia Feldman Weiss adopted a phenomenological approach to the urban landscape to investigate the Nymphaeum Traiani at Ephesus.[52] Water flowing through the nymphaeum and into the city, from the central mouth to the basin, from the overflow over the parapet to the sewer, produced visual, auditory, and sensory effects. These effects, the result of a human creation, were sought and accentuated by the location of the fountain, clearly visible along the Curetes Street, highlighted by the interruption of the colonnade at its height. A whole 'archaeology of the senses' is thus developing around fountains and water games more generally, as Dylan Rogers has shown, particularly from literary sources.[53]

48 Richard 2012, 161 considers that most of the monumental fountains had a reduced flow and that the noise of the eddies should not be exaggerated. The discussion is extended in Richard 2016.

49 See Rogers 2018, 81–85 for an overview of sources evoking the noise of water games. Aldrete 2014, 50 restores to Rome a sound environment marked by the murmur of the water from the fountains.

50 Lamare 2019, 145–170.

51 Youcef Chennaoui presented his study entitled 'Les arcs de triomphe en Algérie antique: histoire, forme et structures' during the conference 'L'Africa Romana XIX' (Sassari, 16–19. 12. 2010). The paper has not been published in the conference proceedings.

52 Feldman Weiss 2010, 66–69.

53 Rogers 2018, 81–85 and methodological overview 4–10. See also Dylan Rogers, this volume.

Fountains, and water more broadly, thus contribute to the aesthetics of the urban landscape but, beyond that, to the permanence of a prosperous situation.[54] The inscriptions testify to two major motivations in the construction of fountains, which could be referred to as *amœnitas* and *utilitas*.[55] Thus in Abbir Maius, a fountain was built *ad usum utriusque aquae*, probably at the end of the two branches of aqueducts from which it discharged the water into the city, but also as an *ornamentum ciuitatis*, participating in the city's decoration.[56] In Thysdrus, the emphasis is on water availability, *per plateas lacubus inpertita*, divided into fountains or basins throughout the city.[57] Hydraulic installations also refer to the *salus*. An inscription from Althiburos mentions the collection of sources carried out *beneficia etiam ornamentum moenibus et salutem ciuibus*.[58] This idea can be found in the famous inscription of Tiddis, which refers to water supply works, around 250–251.[59] The words *ad salutem populi* would, according to François Jacques, be much more than a reference to the 'good health', *salus* also meaning the preservation of an established situation, coherent with the idea of a restoration of hydraulic structures.

Fountains in the late antique city

Keeping the fountains visible: remodelling the urban space

After the installation of many fountains in cities during the Early Roman Empire, their construction did not stop in late antiquity. In Lambaesis, a nymphaeum was built near the *groma* of the camp,[60] perhaps at the end of the 3rd century during a restoration on the occasion of Emperor Maximian's visit.[61] It is located immediately east of the *praetorium*, on the south side of the decumanus maximus. Similarly, in Tipasa, the nymphaeum is implanted along the decumanus on the south side. The paving of the road was probably modified during the construction of the fountain: just in front of it, the alignment of the slabs stops and the stones are placed in such a way that they form a circular pattern.[62]

In Timgad and Cuicul, fountains were built along the decumanus and the cardo, but over a portion which had been extended in the 2nd century or the Severan period. Indeed, the Fountain of Liberalis in Timgad is 200 m from the 'Arch of Trajan', which marks the boundary of the city's earlier urban setting. These suburbs must have developed very early in the 2nd century, and major monuments, such as the temple of the *Genius coloniae* or the Market of Sertius, located in the western suburb, bear witness to the creation of these districts in a very early period.[63] Thus, the fountain, built in the third quarter of the 3rd century, was most probably built along an existing road (Fig. 6). The opposite reasoning can give us an idea of the urban topography at that time: it is unlikely that Liberalis would have had such a sumptuous fountain built in an empty or sparsely frequented area, which confirms the idea that this suburb was already urbanized.[64] In Cuicul, the Fountain of the Tetrarchy[65] is built in front of the façade of the Great

54 Jacques 1983, 207–209.
55 See Schmölder-Veit 2009, 23–25 for a wider analysis on the Western Mediterranean.
56 AE 1993, 1738.
57 CIL VIII, 51 = ILS, 5777 = AE 2008, 1611.
58 CIL VIII, 1828 = ILS, 5783 = ILTun, 1645.
59 AE 1946, 61 = ILAlg II 1, 3596.
60 Rakob – Storz 1974; Rakob 1979; Lamare 2019, 328 f. no. 17.
61 CIL VIII, 2571 = 18057 = AE 1974, 723a; CIL VIII, 2572 = ILS, 5786.
62 Aupert 1974, 77 pl. 2.
63 Lassus 1966.
64 Lassus 1965, 247 f. suggests that 'thought-out' urban planning was already being projected under the Antonines and continued under the Severan dynasty.
65 Ballu 1921, 66; Lamare 2019, 322–324 no. 15.

Fig. 9: Sbeitla, Fountain near the Basilica of Servus, view towards the east. In the foreground the decumanus, in the background the platform.

Southern Baths. It obstructs a passage between the baths and a residential area to the south: the traffic has therefore been modified in this area[66] (Fig. 3).

In Sbeitla, three fountains were built, one of which is dated by a dedication to the years 364–367.[67] It has been suggested that the other two fountains, because of their similar architecture, were erected at the same time.[68] Each one was built on a more or less vast plaza. One was located to the southwest of the forum, possibly at the end of a small square overlooking a secondary road. A second was placed near Basilica III, also known as the Basilica of Servus: it was built on a platform placed over the decumanus maximus of the city, which prevented vehicle traffic, but allowed pedestrians to pass through via a set of stairs (Fig. 9). The third one, slightly off-centre, 200 m north of the capitol, is preceded by a much larger courtyard (about 20 × 16 m) (Fig. 7).

Other fountains, built during the 2nd or 3rd century, have simply been restored and sometimes enlarged. In Macomades,[69] in 305–306, it is not known whether the lacus was only restored at the same time as a dated water pipe or whether it was built on that occasion, as we saw in the case of Cuicul. In Lambaesis, the nymphaeum-septizonium was restored twenty years after its construction and the sponsor states that all the decoration was redone, mainly with marble.[70] Architectural and archaeological studies have shown that a trapezoidal basin was added in front of the Great Nymphaeum of Lepcis Magna,[71] as well as at the fountain of Mactar,[72] probably in the 4th century. An inscription from Dougga mentions the addition of a portico in front of a fountain – which is not identified among those known on the site – also during the restoration of the hydraulic system.[73] In Pheradi Maius, the nymphaeum was built in the

66 An updated plan of the area is published in Février – Blanchard-Lemée 2019, pl. 1.
67 See n. 14. Cèbe 1957; Lamare 2019, 369 f. no. 41.
68 Cèbe 1957, 170 f.; Lamare 2019, 370–372 nos. 42–43.
69 CIL VIII, 4766 = 18700.
70 CIL VIII, 2657 = 18105 = ILS, 5626 = AE 1973, 645.
71 Sandoz 2006, 406 f.
72 Bourgeois 1973/1974; Lamare 2019, 353 f. no. 31.
73 CIL VIII, 1490 = 26568 = AE 1904, 122 = ILAfr, 533 = Dougga 43.

reign of Antoninus.[74] However, the lack of coherence between the basins and the arcades of the façade suggests that the latter was built in a second phase, perhaps in relation to the large-scale repairs of the 4th century, which are mentioned by an inscription.[75]

The situation in other provinces can be compared to that of North Africa. In Asia Minor, two examples of restorations are worth noting. The first is that of the nymphaeum of Side, which under Gordian III underwent several modifications.[76] The second example is the nymphaeum of Miletus, built in the Flavian period, which was elevated with a third storey and decorated with numerous statuary elements in the 3rd century, under the proconsulate of L. Egnatius Victor Lollianus, dated 242–245,[77] as mentioned on the upper floor inscription.[78] In the Middle East, there is also evidence of fountain restorations dating back to the Early Roman Empire. In Antioch on the Orontes, the construction of a nymphaeum, perpendicular to the porticoed track, which occupied the northern side of a courtyard, makes sense as part of the reconfiguration of this road, dating from the reconstruction that took place under Justinian's reign.[79] The Nysa-Scythopolis nymphaeum, built in the 2nd century according to the architectural study, was destroyed and then rebuilt around 400, under the Governor Artemidorus, as part of a citywide building programme, including the redesign of part of the porticoed street along which it stood, and of a bath building.[80]

Building, restoring, and transforming fountains: maintaining monuments and practices

Do late restorations and constructions indicate a change in the function of the buildings? Andrea Schmölder-Veit uses the name 'Nymphäumsraum' for a type of nymphaeum which she compares to the 'nymphaea a camera' of Norman Neuerburg's typology, and notes that these buildings form a very particular category which has never been highlighted in the existing typologies. These are independent structures, not connected to a public building, sanctuary or house. They are defined by the presence of a covered space or surrounded by porches: thus, the monument could be enclosed or the porches closed by doors. The plan views show much larger buildings, as the monuments were often inserted into existing structures.[81]

It has been suggested that latrines and baths gradually lost their role as places of sociability at a later stage,[82] although this idea has recently been tempered.[83] Schmölder-Veit proposes that nymphaea were able to fill this gap by becoming meeting places. Their location at the bottom of small squares and their semi-circular shape or their structure surrounded by porticoes would have been ideal for welcoming a group. The idea is indeed attractive and the examples she presents of Ostia, Ephesus, and Sbeitla are revealing. In Ostia, the nymphaeum of the Bivio del Castro[84] had a façade more than 26 m wide at a major junction of the city, along the decumanus maximus. Its late establishment, in the 4th century, as recently confirmed by stratigraphy, took place along a section which was cut off by the façade of a house from the Early Roman Empire.

74 Kleinwächter 2001, 190–195; Lamare 2019, 355 f. no. 32.
75 ILTun, 251.
76 Dorl-Klingenschmid 2001, 242–244 no. 106.
77 According to Loriot 1996, 223 no. 16 and not 241–244 as Dorl-Klingenschmid 2001, 215 f. no. 64 indicates.
78 Hülsen et al. 1919, 71.
79 Lassus 1972, 44–52. 125 pl. 69.
80 Tsafrir – Foerster 1997, 95 f. 106–116.
81 Schmölder-Veit 2010.
82 Neudecker 1994, 62–72 quoted by Schmölder-Veit 2010, 113 n. 22; Thébert 1999, 383–388; Thébert 2003, 482 f.
83 Bowes 2010, 52–54.
84 Neuerburg 1965, 179 no. 110; Letzner 1999, 436 no. 309. See the results of recent excavations and the analyses of Lavan 2012, 681–685.

A very large basin then occupied this corner, preceding the façade, giving the crossroads a rich decor. Nevertheless, I would remain more cautious about the interpretation that only because fountains had prestigious architecture, they must have been solely ornamental, based on the width and height of the parapets of the basins that made it impossible to draw water. In Sbeitla, the parapets of the Northern Fountain are indeed quite high and show no signs of wear, which is very surprising. My examination of this building has revealed several elements that suggest that a previous basin existed and provided a source of water.[85] The catchment basins of the other two fountains on the site have disappeared.[86] In addition, on all other examples of fountains, whether late antique or not, the parapets of the basins, when preserved, show signs of wear, which is proof that the fountains were still used to draw water, as in Tipasa, Cuicul, and Pheradi Maius.[87]

This is confirmed by the study of Micrasiatic fountains, which show two types of transformations.[88] The first is the addition of an extra basin in front of the edifice, to facilitate the drawing of water, which was no longer possible due to the height of the original parapet. Sometimes, this basin has been reduced in size, probably due to the decrease in water supply from the aqueduct. The second type of transformation is the perforation of the balusters of the basin parapet. These small holes allowed a stream of water to flow, underneath which a container could be placed, a technique that was easier than bending over to draw from the pool. Sometimes, traces of snagging near the orifice suggest the presence of a bronze waterspout, as in Sagalassos.[89] In North Africa, at Lepcis Magna, a basin was added in front of the Nymphaeum of Hercules before the middle of the 4th century, at a time when part of the original drawing basin had been abandoned.[90] Two holes drilled in the balustrade poured water into this basin, which was accessed by slabs that formed a step. There is also a small monolithic tank buried in front of the basin of the Fountain near the Basilica of Servus in Sbeitla, which could be a late addition of the same type (Fig. 10).

Some larger holes may indicate the presence of pipes that used to supply other buildings. The example of a fountain in Pergamon[91] is a good comparison for the arrangements of the Northern Fountain in Sbeitla. On the latter, three large holes are visible on the southern parapet of the basin, the only one left. One could assume the presence of water redistribution pipes in other parts of the city. Indeed, the construction of fountains in the second half of the 4th century indicates that the water supply was effective at that time, at least for the supply of the three fountains. Also, this supply could have been maintained until the following centuries, when the original network in other parts of the city had potentially declined. Thus, the fountain could, at that time, have been used as a distributing device within the city.[92]

In Asia Minor, many buildings were transformed into fountains in the late antique period.[93] It is enough to mention the most famous of them, the Library of Celsus in Ephesus, transformed at the end of the 4th or the beginning of the 5th century by the addition of a basin in front of its monumental façade.[94] There are no comparable examples to my knowledge in North Africa, although it would be necessary to study in detail the various urban water developments that might reveal such transformations. Nevertheless, this absence can be explained by the chronological shift in the construction of fountains between Asia Minor and North Africa: African foun-

85 Lamare 2017, 99–102.
86 See n.67.
87 Cf. Lamare 2019, 236 f.
88 Jacobs – Richard 2012, 43–54.
89 Jacobs – Richard 2012, 50 fig. 27.
90 Tomasello 2005, 57–111; Lamare 2019, 347–350 no. 29.
91 Jacobs – Richard 2012, 48 f. fig. 26.
92 Lamare 2017, 107–111.
93 Jacobs – Richard 2012, 12–22.
94 IK-Ephesos, 5110. 5115; Dorl-Klingenschmid 2001, 191 no. 29.

Fig. 10: Sbeitla, Fountain near the Basilica of Servus. In the centre, the slot where the parapet's slabs originally stood; on the left, the small tank directly below the original basin.

tains built during the Early Roman Empire were restored until a very late period, but many monuments were not built before the 3rd and early 4th centuries; in contrast, the construction of Micrasiatic fountains was active until the first two decades of the 3rd century and few were newly built after this date.[95]

Clear and abundant water: fountains as a metaphor of urban aesthetics and permanence

These restorations, or even new constructions, should open the way for a discussion on late antique urban planning. The question has been debated about North Africa through the case of Sbeitla. Jean-Pierre Cèbe proposed that the construction of fountains should be an indication of an extension of the city in the 4th century.[96] This hypothesis was rejected by Noël Duval, who pointed out that the three monuments were located in the uniformly planned area, arguing that their construction cannot be explained by an extension of the city or a population increase, but rather represented a change in the supply system, a transformation of the city centre into a residential area, or simply a 'taste of the time' for nymphaea.[97]

Since Claude Lepelley's research on North African cities, initiated by the earlier work of Paul-Albert Février, we know that there was no break in the maintenance of the urban environment after the 3rd century and that it remained one of the major concerns of the local elite, both through constructions and restorations.[98] The fountains erected after the Severan period were all built in already developed parts of the city. Luke Lavan pointed out that in Ostia the construction of new public squares was exceptional in the late period, compared to other provinces.[99] On the other hand, he indicated that the attention paid to the pedestrian function of the decu-

95 Jacobs – Richard 2012, 9–12.
96 Cèbe 1957, 204.
97 Duval 1964, 94–96.
98 Lepelley 1979; Lepelley 1981.
99 Lavan 2012, 686 f.

manus was a characteristic feature of Late Antiquity, an example being the construction of arcades and colonnades, even more frequent in the eastern Mediterranean than in the west. In North Africa, in addition to the Northern Fountain of Sbeitla or that of Dougga which is known by an inscription,[100] whose porticoes could offer passers-by a rest area along one of the city's major avenues, the Fountain near the Basilica of Servus in Sbeitla illustrates this emphasis on the pedestrian use of urban roads: the esplanade in front of the fountain was positioned over the decumanus, cutting off the passage for vehicles, but allowing free circulation for pedestrians by means of stairs (Fig. 9). We must think of the many activities that could take place in the streets, squares, or under the porches of the classical and late antique Mediterranean cities. I have already mentioned a game carved on the slabs of the Lacus of Terentius in Dougga and the one identified along the entrance portico of the Northern Fountain of Sbeitla. It is necessary to take into account not only the building, but the space as a whole, in order to be able to build a topography of the human activities of the late antique city: fountains, because of their ornamental and functional role, are able to contribute to this approach.[101] Nevertheless, regarding the aesthetic impact, if the choice of this location results in the blocking of a traffic lane, it places the fountain in the perfect alignment of a secondary cardo.

On the other hand, Lavan brings up the point that the development of main roads has often been to the detriment of secondary streets, even more frequently in the East. Examples of late antique African fountains were located along the main roads, as in the Early Roman Empire. The Fountain of Liberalis in Timgad and the Nymphaeum of Tipasa are both found along the decumanus maximus; in the latter case, if the apse located on the edge of the decumanus did not offer a perspective on this main road, the probable redesign of the pavement, creating a circular pattern, facing the building, would have enhanced its appearance and staged its decoration. The same applies to the Fountain of the Tetrarchy in Cuicul, situated along the main road going South and which, at the same time, obstructed an alley between the Great South Baths and the House of Bacchus. Its location between these two buildings, at the level of a slight change in the axis of the street, however, allowed the fountain to be seen when coming from the south and the eastern district (Fig. 3), but also to be easily accessible from the portico of the Great Baths.

Fountains reflect a willingness to maintain a certain degree of ornamentation in the city, but they are not a sign of particular wealth or demographic and urban expansion. One will recall the imperial constitution which recommended the construction of a portico at the front of bath buildings in order to increase the beauty of the city.[102] In fact, an aesthetic concern persists until a very late period, a concern that could be satisfied by the construction and restoration of monumental fountains, whose ornamental role must not be neglected. Indeed, while it is difficult to analyse the visual aspect of late antique African fountains, due to the lack of examples and detailed architectural studies, the textual sources do express the meaning that was intended to be given to these monuments.

An interesting aspect mentioned in the inscriptions is that of water quality and its availability to users. The emphasis in the texts is on the opposition between the old and corrupt condition of the pipe or fountain and the remedial action that restored its original appearance and use. At Lemellef,[103] reference is made to the water from the spring that *multo tempore deperierat* while restoration has made it *abundans* again in the fountain. At Dougga,[104] *the conduct which, ruined by obsolescence, could no longer ensure the flow of water, was restored to its original*

100 See n.73.

101 Approach suggested by Lavan 2003. One could propose to develop a 'topography of sociability' in the classical and late antique city.

102 Cod. Theod. 15, 1, 50.

103 CIL VIII, 8809 = ILS, 5785 = AE 1908, 30.

104 CIL VIII, 1490 = 26568 = AE 1904, 122 = ILAfr, 533 = Dougga 43.

function with the nymphaeum which discharged water for the needs of the city (*in usum ciuitatis*). The quality of the water is mentioned in an inscription from the region of Guelma,[105] where a pool contained stagnant water (*aqua pigra*) which, through the work carried out, has become abundant again. In an inscription from Tunis,[106] the two aspects mentioned are linked: the *lacus sordidus* has been renovated so that water abounds again for users. It is a rather similar reference to the three inscriptions of Rome, dated 391, whose almost similar form recalls that the prefect of the city, Flavius Philippus, had restored the *nymphium sordium* to its original state.[107] The same rhetorical process is used by Paulinus of Nola who describes, in *carmen* 21, the old state of the aqueduct and the return of the flow to supply the cities of Abella and Nola.[108]

Conclusion

Fountains were located in prominent locations in the city, on squares, along main roads, or at major intersections, for several technical and practical reasons. Furthermore, the highlighting of these buildings is explained by the willingness of the imperial or private sponsors to represent themselves and to display the benefits they offered to the city. In the context of the simultaneous construction of a water supply and a fountain, the latter symbolises the durability of the water now brought to the city; in the context of a major urban planning programme, it is through its architecture and decoration, capable of glorifying a person and his entourage, that the installation of the fountain is justified, playing with urban perspectives.

The marks of use on the basins testify to how the availability of water was facilitated by the strategic location of the monumental fountains. They constituted important places of meeting and sociability, where people would encounter each other when coming to draw from them, as in the case of small street fountains. As such, their interaction with residential districts and craft workshops should be studied further, on sites whose topography is sufficiently documented.

Beyond the 3rd century, constructions and restorations continued. Fountains, far from being merely decorative, continued to be essential elements of the water distribution system. Although the installation of the fountains was more dependent on an existing hydraulic network, the buildings remained located in the centre of cities. These constructions in the late antique period, documented at least until the mid-4th century in North Africa, do not necessarily mean the development of new districts, but do imply, on the other hand, redevelopments that may be linked to adaptations of the supply network.

Thanks to a study focused on a particular type of building, here the fountain, considering its layout, its decoration, its primary function and the multiple uses that it could have, and the multiple activities that could take place there, it is possible to contribute to the discussion on urban sensory archaeology.[109] It behoves us to reinterpret the uses to which certain places and buildings were put and to distance ourselves from the traditional connections between typology and function. In this way, it will be possible to renew our understanding of the ancient city and to comprehend its agency as well as all its sensory perceptions and subtleties.

105 CIL VIII, 5335 = ILS, 5730 = ILAlg I, 256.
106 AE 1955, 55.
107 CIL VIII, 1728a; CIL VIII, 1728b; CIL VIII, 31912.
108 Paul. Nol. *Carm.* 21, 751–753, 781–784, 799–815; Herbert de la Portbarré-Viard 2013, 214–218, 228 f.
109 Haug – Kreuz 2016.

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Nicola Chiarenza

4 Water, Social Space and Architecture at Selinous: the Case of the Urban Sanctuary

Abstract: The urban sanctuary of Selinous rose on the Acropolis plateau, over an area rich in fresh water and close to the marshy lagoon of the river Cottone's estuary. Even if no cult of water and water deities is archaeologically known, the waterscape influenced both the life of the settlement and the sanctuary in several ways. This paper analyses the architectural and spatial development of Selinous' urban sanctuary, linking the data about its water installations with knowledge on the use of water in Greek rituals and public spaces. The aim is to introduce hypotheses contributing to better understanding the role played by water in Selinous' urban sanctuary.

Moreover, the paper takes into account the iconographies of coinage and literary sources from Selinous to compare them with the data about the settlement's waterscape. Water installations within the sanctuary of Selinous had no aesthetic value and did not architecturally define religious and social space. Nevertheless, lustral water, with its proper agency, might have acted in social space and during ritual activities important to create a shared sense of community.

Introduction

The Greek colony of Selinous was founded by Megara Hyblaea in the last quarter of the 7th century BC. It was located between two rivers on the southwest coast of Sicily. In antiquity, its land- and waterscape were rather different from what we see today (Fig. 1). The settlement consisted of the Acropolis plateau, the Manuzza hill behind it, the western area – nowadays known as Gaggera – and the eastern hill. The central ridge was separated from the outer areas by the river Modione (the ancient Selinus) to the west, and the river Cottone to the east – both with large and irregular estuaries. Thus, the Acropolis plateau looked like a peninsula between two narrow lagoons connected to the sea. Especially Cottone bay, to the east of the Acropolis, was a lagoon-

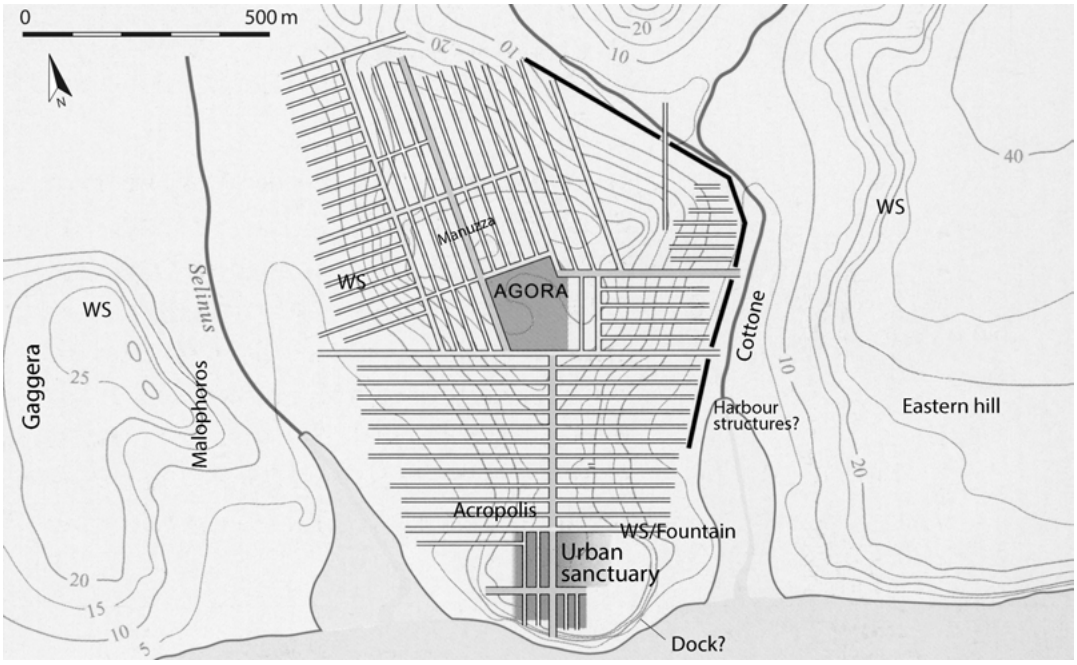

Fig. 1: Plan of Selinous with hypothetical reconstruction of the rivers' mouths. WS: approximate locations of water springs.

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like environment with calm and brackish water particularly suitable for a harbour.[1] The urban sanctuary rose on the southeast edge of the Acropolis and overlooked the Cottone lagoon.

The rivers evidently affected Selinous' landscape and urbanscape in several ways. They influenced the settlement structure dividing the central ridge from the outer hills and made the land fertile. Their estuaries provided bays suitable for harbours and an environment rich in biodiversity. But on the other hand, they were marshy and malarious areas. These positive and negative effects of water affected Selinous throughout the entire course of its history, until the twentieth century.[2]

Geology and water sources

From a geological point of view, the settlement area is composed of sandy clay layers and calcareous rocks. The thickness of the latter is variable, from only a few meters deep on the Acropolis to 15 meters deep on the Manuzza and eastern hills. The overlapping of permeable and waterproof layers has a strong potential for the formation of aquifers and springs.[3]

The first were tapped by circular wells located in many Archaic and Classical houses.[4] With regard to the water springs, it is not easy to identify those available in antiquity. On the basis of archaeological data and historical maps of Selinous,[5] it seems that the settlement was provided with four springs:[6] one at the Gaggera, one at the base of the west slope of the Manuzza hill,[7] one on the east slope[8] of the acropolis and one on the northwest slope of the eastern hill (Fig. 1). These springs might have fed a water supply system attested by short sections of terracotta water-pipes. Nevertheless, the scanty data available do not permit full knowledge of the features, extension and chronology of this system.[9]

Therefore, it seems that the water supply at Selinous during the Archaic and Classical periods depended mainly on the initiative of individuals.[10] Most of the inhabitants relied on wells in their houses for most of their needs and resorted to springs and fountains when they needed fresh running water. Only two springs were located within the city walls, while the two others were outside the city and beyond the rivers. This made it difficult to reach running water sources

1 Rabbel et al. 2014, 146. Structures and blocks located at the foot of the Acropolis' southeast slope are usually considered to be harbour docks (Fig. 1). Nevertheless, recent geophysical investigation indicates that harbour structures might have been located also at the northern edge of Cottone bay (Albers 2019, 124 f., with previous references).

2 On the rivers' estuaries and marshy landscape see: Marconi 1994, 301; Greco – Tardo 2012, 193–196 figs. 1. 2; Rabbel et al. 2014; Bouffier 2015, 236. 238 figs. 2. 5; Greco – Tardo 2015, 108 f.; Mazza 2016, 179. 183 f. About the harbours: Tusa 2010, 219–226; Hermanns 2014; Albers 2019.

3 Regarding the geology of Selinous see: Crouch 2003, 70–74; Furcas 2019, 77.

4 Furcas 2019, 81–83. Bouffier 2009, 71.

5 The richest in details is that published in Cavallari 1872, pl. 1. The plan shows, among the architectural remains, the position of water springs ('fontana') and wells ('pozzo'). The same plan is published in Mertens 2003, fig. 6.

6 The relation between Selinous and the so called 'vasca selinuntina' (about 15 km to the northeast of Selinous) is still debated. Some scholars argued that this basin and the related section of water-pipe provided Selinous with fresh water from several springs (Fourmont 2012, with previous references). However, the dating of the 'vasca selinuntina' is still debated and there is no evidence of an aqueduct running from the basin to Selinous (Mertens 2006, 331; Furcas 2019, 79 f.).

7 Crouch 2004, 81 fig. 3, 18 and Furcas 2019, fig. 3 indicate also a spring in the middle of the eastern slope of the Manuzza hill, but the source of this information is not clear. The plan published by J. Schubring (republished in Mertens 2003, fig. 7) indicates the presence of a water spring ('Quelle'), but according to Cavallari 1872, pl. 1 only a well was located there.

8 The existence of this water spring is inferred by the presence of the fountain (see below).

9 Furcas 2009, 80 f.

10 Bouffier 2009, 71. 74.

from many areas of the city. Moreover, it is interesting to note that only two springs were located in main public areas (Gaggera and Acropolis), and they were related with sacred spaces in both cases.

The Gaggera spring likely played an important role in the development of the *temene* and sacred buildings located in this area. Nevertheless, it is not yet clear how the people of Selinous controlled and used its water during the Archaic and Classical periods. Moreover, the existence of a monumental fountain is still debated.[11]

The spring on the west slope of the Manuzza hill was quite far from the agora and no public fountain has been retrieved there so far.[12] The same holds true for the spring on the eastern hill: no evidence hints that its water was used for the temples located to the south of it.

The second case of a relation between water spring and public spaces concerns the urban sanctuary that rose up in the southeast area of the acropolis[13] upon an area rich in water, where also a public fountain was built later.

The urban sanctuary from the beginning to the first half of the 6th century BC

This area was dedicated to cult activities from the foundation of the colony.[14] After a period of open air cult activities and buildings made of perishable materials, the first temples made in stone (Temples R and S, and maybe the forerunner of Temple C) were built in the southeast area of the acropolis during the first decades of the 6th century BC. At the same time, the sanctuary was extended eastward by the construction of two consecutive terraces[15] (Fig. 2).

A detailed reconstruction of the sanctuary is not possible at this stage, but its shape was likely influenced by the landscape, despite the construction of the terraces. If the reconstruction of the northeast side is correct, the *temenos* followed the edge of the plateau. In light of the fountain built later, we can postulate the presence of a water spring on the slope of the rocky plateau, under the northeast side of the sanctuary.[16] Moreover, the drain channel along the south wall of the lower terrace is another clue testifying to the presence of water along the east edge of the acropolis plateau (Fig. 3). The channel, carved into the blocks at the base of the wall, came out from the inside of the lower terrace and ended at its southeast corner, over the guard stone located at the crossing between the east-west road and a north-south road.[17] The construction of the two terraces upon an area rich in underground water is the outcome of building activity of the first generations of Selinous inhabitants, who gradually turned landscape to urbanscape. Further evidence of this process can be recognized a little further north –

11 The channel coming from the spring and passing through the *temene* has been related to the latest phases of Selinus (Late antiquity) by C. Greco and V. Tardo. The same authors considered the so-called Temple M a monumental fountain. Regarding the different interpretations of these structures see: Greco – Tardo 2012, 198–202; Greco – Tardo 2015, 110–113.

12 No public fountain in the agora is known at present. Dieter Mertens mentioned semi-public fountains embedded within the agora's Archaic façade. These could be used both from the internal shops and the external square. Mertens did not provide further details on the installations and their exact location (Mertens 2006, 214).

13 Crouch 1993, 284 fig. 20, 5 interprets as a small fountain the niche in the house facade at the north corner between streets Sd-E and SA on the Acropolis. M. Fourmont follows this reconstruction but specifies that it is not clear if the fountain was fed by a cistern or a water line (Fourmont 2019, fig. 5). Nevertheless, there is no evidence concerning the water delivery system and basin. Moreover, the niche is less deep than the reconstruction made by D. P. Crouch. Finally, the entire wall seems to have been rearranged, probably during the Punic-Hellenistic phase.

14 Marconi 2018, 180.

15 Di Vita 1984, 11–23. On the first stage of Temple R: Marconi 2018, 180 fig. 5.

16 Di Vita 1984, 39; Mertens 2003, 91; Mertens 2006, 187; Bouffier 2009, 71; Furcas 2019, 79.

17 Di Vita 1984, 21–23 figs. 2. 3. 11–13.

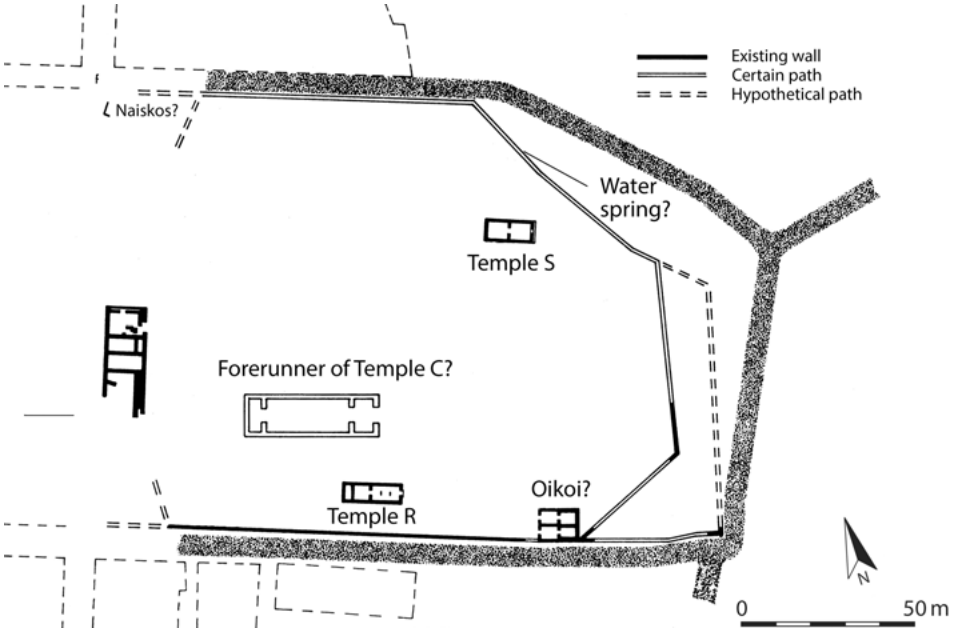

Fig. 2: Selinous, the urban sanctuary during the first half of the 6th century BC.

Fig. 3: Selinous, urban sanctuary, the drain channel along the south wall of the *temenos*.

here an artificial fill was created at about the same time next to the east edge of the Cottone lagoon, before the urban development and the construction of city walls.[18]

Abundance of water (at the foot of the plateau, close to the sea and the river's mouth) must have influenced the first settlers looking for an appropriate place to establish the main urban sanctuary.[19] Moreover, a water spring was considered divine evidence and water was used in sanctuaries for the performing of several practices, regardless of the kind of deity worshipped.[20] Especially underground water was considered to be suitable for ritual activities, because it was particularly pure.[21]

The monumentalisation process during the second half of 6th century BC

Around 560 BC, the urban sanctuary underwent a monumentalisation process that lasted probably until the last years of the century[22] (Fig. 4). The *temenos* was extended to the east, thanks to the construction of a huge artificial terrace made of earth and retained by a step-wall.

A lower terrace was created at the base of the northeast side of the sanctuary but, due to later building activities, it is not possible to know its shape in the north corner. We don't even know if the lower terrace was provided with buildings during this phase. Nevertheless, it is

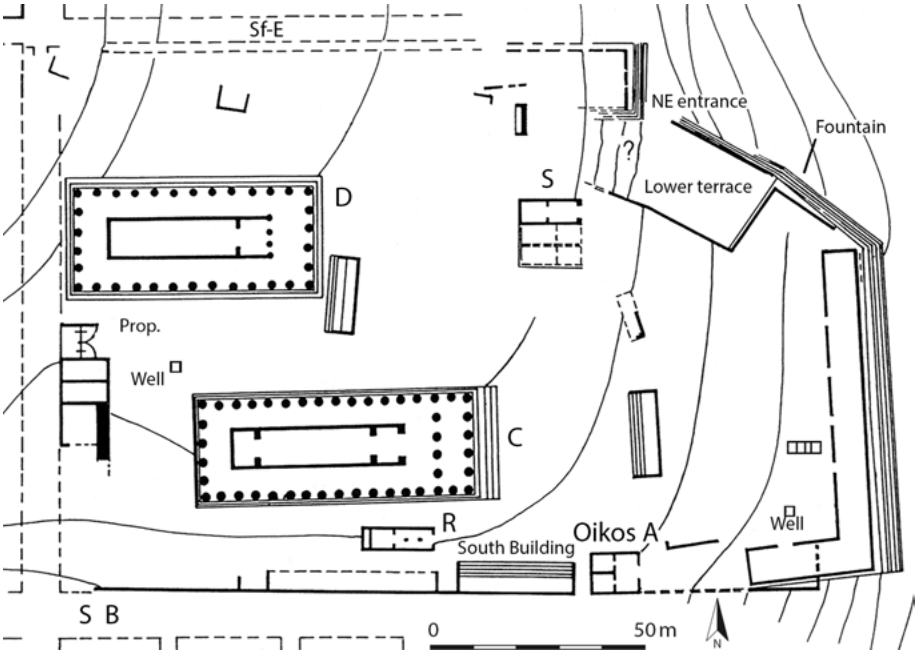

Fig. 4: Selinous, the urban sanctuary during the second half of the 6th century BC.

18 Seismic surveys have detected here a hard artificial layer located over the silted edge of the lagoon and under the urban development with buildings and city walls (Rabbel et al. 2014, 145). This artificial layer has not been dated, but the city walls over it date back to the middle of the 6th century BC, yielding a terminus ante quem.

19 Visibility and easy access to the plateau also played a role in choosing this area (Di Vita 1984, 12).

20 Ginouvès 1962, 283–318; Tomlinson 1988, 170.

21 Rudhardt 1971, 97–100.

22 This was part of building activities involving streets and other areas of the settlement, too (Marconi 2007, 72–74; Chiarenza 2020).

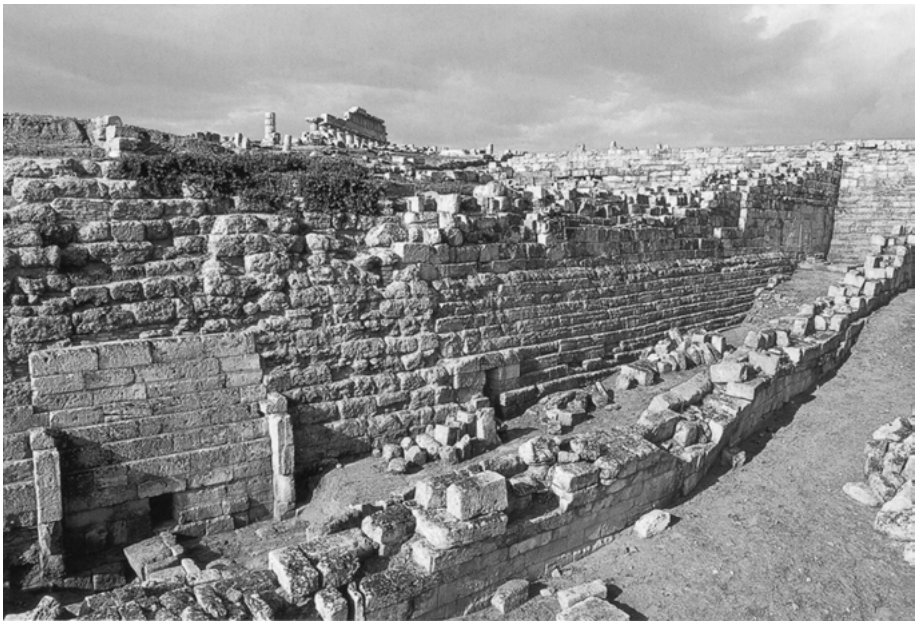

Fig. 5: Selinous, urban sanctuary, the northeast retaining wall of the terrace with the fountain, looking west. The wall running parallel to the terrace dates back to the Late Classical period.

possible to reconstruct an entrance between the north corner of the sanctuary and the lower terrace.[23]

The north corner of the sanctuary covered the spring, but a channel canalized its water to feed the fountain built inside the retaining step-wall, to the east of the lower terrace. The channel ran at the bottom of a gallery inside the wall and reached a small internal rectangular basin. This was provided with a rectangular opening framed by two protruding pillars made of vertical ashlars[24] (Fig. 5). The outside structure of the fountain still needs an accurate study, but it was likely provided with a rectangular basin. A light canopy or an awning, covering the external basin, was fixed to two small rectangular holes above. The fountain has interestingly close parallels in the Cantera fountain at Megara Hyblaea, according to the suggestion of Henry Tréziny.[25]

We cannot reconstruct the sensory effects of the fountain without a detailed reconstruction of its outside structure and water flow.[26] Nevertheless, it seems that the fountain had no particular visual effect as it was a square opening – likely provided with a frontal basin – embedded in the massive retaining wall of the terrace.[27]

Further considerations refer to the functional and social levels. The fountain location suggests that people entering the sanctuary from the northeast side used the water from the

23 The entrance is attested by the corner of a structure made of ashlars, under the wall of the 5th century BC which is oriented north-west/south-east ('Mauerzug A'). For the corner, see Mertens 2003, 92 fig. 101 Beil. 4. R. Martin argued that this was the main entrance during the Archaic and Classical periods (Martin 1980/1981, 1014). The limited extension of the excavation does not allow us to state whether a ramp or a staircase linked the entrance to the upper terrace. According to A. Di Vita, the corner structure was the base of a monument located outside the *temenos* (Di Vita 1984, 39 fig. 18).

24 Mertens 2003, 89–92 figs. 91–98 Beil. 4. The current arrangement is the outcome of later modifications. A new feeding channel coming from the southwest was built later, but its date is unknown. Even though this indicates that the first spring had dried up, it is evident that the new channel tapped the same aquifer located under the artificial filling of the terrace.

25 Tréziny 2004, 278–287 figs. 307–312; Bouffier 2009, 71 f.

26 About the aesthetics of water display, see Glaser 2000a; 2000b. About the pleasure of water in Roman culture: Rogers 2018, 83–85.

27 The perspective vision in fig. 6 gives an idea of the fountain visual effects, even if it does not reconstruct any basin and does not take into account the original level of the street, that was lower than today.

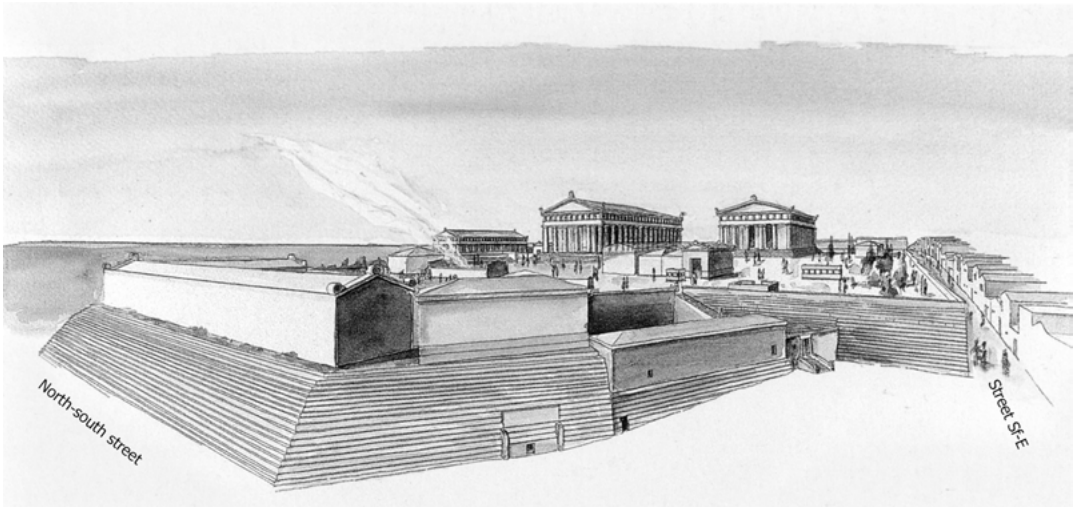

Fig. 6: Selinous, reconstruction of the urban sanctuary during the 5th century BC, looking northwest.

spring.[28] Moreover, the fountain looked out onto an open space accessible from several directions: the streets Sf-E and SB and the north-south street running next to the retaining wall (Fig. 6). Also, a street parallel to the city wall and coming from northeast likely reached the open space in front of the fountain.[29] If we consider that the fountain was probably the only one in the acropolis area and one of the few public water sources in the whole settlement, it is evident that its water was tapped by the majority of inhabitants when they needed fresh water, instead of that drawn from the wells in the houses.[30] This raises the question about who exactly attended this place. According to iconographic and written sources, drawing water from fountains in Greek cities seems to have been an action performed mainly by women. Their social status is a matter of debate and there might have been differences according to time and cultural areas.[31] However, it is important to stress that, regardless of their status, women (and men?) came together and chatted in front of public fountains. Thus, this routinized household activity performed in the public space in front of fountains turned out to be a social practice.[32] This might hold true also for Selinous' fountain. Indeed, even though it was related to the sanctuary, the fountain overlooked an outside square accessible from several directions. Moreover, the fountain location – close to the harbour – likely made it a water source also available for seafarers looking for fresh water during their stops at Selinous.[33] Therefore, the fountain and the area in front of it might have been not only a space of social interaction for the inhabitants, but also a space of encounter between locals and foreign people.

28 According to Mertens 2006, 214 and Furcas 2019, 79, there was a functional relation between the fountain and entrance to the sanctuary.

29 R. Martin argued that a street for religious parades ran here and was related with the northeast entrance to the sanctuary (Martin 1980/1981, 14).

30 On the wells of Selinous, see Furcas 2019, 81–83.

31 Extensive literature exists on the subject and is manly based on Athenian figured pottery. An extended and useful contribution on the topic is Kosso – Lawton 2009 (with previous references). Iozzo 2003, 20–22 suggests that the depictions of women at the fountain on Athenian figured vases had different meanings according to different contexts and periods.

32 On social practices as routinized activities, see: Reckwitz 2002. About social practices as spatial phenomena, see Schatzki 2015, 1–3.

33 Bouffier 2009, 71 argues that, because of its off-centre location, the fountain was used by people arriving at Selinous from outside or coming from the harbour. We would like to know if inhabitants of Selinous and foreigners could freely access the fountain and if it was managed by the sanctuary or other authorities. Regarding the legal and economic aspects of water resources in Greek sanctuaries, see: Panessa 1983; Alberico 2017. See also Kobusch, this volume.

Social space: the area to the east of Temple C

During the Archaic period another entrance led to the east part of the sanctuary from the south side. It was located next to the Archaic *oikoi*[34] and led directly to the space between Temple C and its altar, both built around the middle of the 6th century BC[35] and likely consecrated to Apollo Paian, according to a later inscription.[36]

It is not by accident that the main temple of Selinous – located in the urban sanctuary over an area rich in underground water and next to a malarial and marshy lagoon – was consecrated to Apollo the healer, a god who was the sender and curer of disease.[37]

In front of the sacrificial area, a long two-winged hall[38] rose up on the east edge of the terrace together with the construction of the retaining wall.[39] The east wing was provided with three or four entrances[40] giving access to the hall which was paved with terracotta tiles. In front of the corner between the two wings, a circular well drew water from the aquifer under the artificial filling of the terrace.[41] The tiled floor suggests that the hall was likely a banquet building where communal meals after the sacrifices and during religious ceremonies took place.[42] The location of the well in front of the Archaic hall strengthens this hypothesis. Water sources were indeed inevitabilities for halls, *stoai* and other kinds of buildings or spaces where ritual feasting took place. Water was necessary for the cleansing of worshippers before the meal, as well as cooking, diluting the wine and washing the floor after the meal.[43] For the latter, a floor

34 Marconi 2007, 73 (with previous references).

35 Østby 1995, 87–92; Mertens 2006, 118–125; Marconi 2007, 127–184; Voigts 2017, 25–41. A second, smaller altar was built during the second half of the 6th century to the north of the first one (Voigts 2017, 46–48).

36 Marconi 1999; Marconi 2007, 132 f. See also n. 66.

37 On the possible connections between healing cults of Apollo and sacred water springs, see Parker 1983, 213 (with other references). On the cathartic and healing aspects of Apollo, see Parker 1983, 331–344. 392. On the connection between the malarious landscape and the cult of Apollo Paian in Temple C: Marconi 1994, 302; Greco – Tardo 2012, 193 f.; Muccioli 2015, 264 f. The healing aspects were, of course, not the only reason for the consecration of Temple C to Apollo, who was the most prominent god also in Megara (Selinous' mother-city). Regarding the similarities of Apollo's features between Selinous and Megara, see Marconi 2007, 196–199.

38 I prefer to use this definition instead of the most common *stoa*, because the portico was added later to the building. This is confirmed by two main observations: 1) the stratigraphic relation between the portico's antae and the outer wall of the north wing; 2) the position of the north anta (slightly further south than the north corner of the hall), showing that the portico was built after the L-shaped building to the north of the hall. On the later construction of the portico, see: Coulton 1976, 32. 95. 281. 283; Kuhn 1985, 262 f.; Mertens 2003, 240 n. 833.

39 Di Vita 1967; Di Vita 1984, 21 (n. 17). 34; Mertens 2003, 239 f.

40 A rectangular structure (ca. 7.40 × 2.15 m), east-west oriented, was next to the south entrance. It consisted of three or four squared openings and today is partially covered by the portico. The rectangular structure was therefore built together with the two-winged hall (before the portico) and might have been used for cult activities related to ceremonies performed in front of Altar C.

41 This was probably the same aquifer that made it necessary to build the drain channel along the south wall of the terrace during the previous building phase.

42 For this interpretation of the hall, see: Kuhn 1985, 264; Bergquist 1992, 144. Both scholars suggested this interpretation also in light of a drainage close to the south-west sector of the hall, possibly linked to the drain channel along the south wall of the terrace (see the previous note). The drainage was discovered by A. Di Vita in 1953, but was no longer visible already in 1967 (Di Vita 1967, 7 n. 10). The scholar thought that the drainage flushed out the rainwater from the hall's roof down to the channel. Later, Di Vita suggested that the channel along the south wall drained water under the terrace during the first half of the 6th century BC and no longer mentioned any link with the drainage in the south-west sector of the hall (Di Vita 1984, 21–23). Therefore, the existence of a drainage from the hall south corner to the channel at the base of the terrace is questionable. Moreover, only one drainage for such an extended hall does not seem enough to flush out the supposed cleaning water, especially if we consider that the slope in the hall's floor went from west to east (the supposed drainage would have been located at the highest point and not at the lowest one).

43 On the necessity of water for feasting activities, see the remarks of R. Tomlinson on the Heraion at Perachora and other Archaic and Classical sanctuaries in Greece (Tomlinson 1988, 170 f.). Other examples of water installations in *stoai* and dining rooms within Greek sanctuaries are in Guettel Cole 1988, 164 f.

with a solid covering made of marble, mortar or terracotta tiles was particularly suitable, as several examples in Greece testify.[44]

The extension of the *temenos* to the east is usually related to the need for an expanded sacrificial area in front of Temple C and its altar.[45] Nevertheless, a comparison between the available space in the upper terrace during the first half of the 6th century BC and the later *temenos* expansion indicates that the main reason might have been different (Figs. 2, 4).

In Greek sanctuaries, the fundamental space for ritual actions was composed of two elements: the altar and the area to the west of it, where most of the ritual practices took place.[46] The sacrifice (*thysia*) and the subsequent communal meal had religious and social goals. The first was to reinforce the bonds between deities and the religious community, the second to regulate the social relations between actors and groups of actors, and to strengthen the bonds amongst them.[47] In Selinous' urban sanctuary, there was already enough space to build the monumental Temple C and its altar during the first half of the 6th century BC. Missing from the earlier sanctuary configuration was an appropriate space to allow larger groups of people to take part in sacrifices and perform social activities, thereby reinforcing community cohesion. This goal was achieved by the second half of the 6th century BC, thanks to the hall and large space in front of it. Moreover, it is important to underline that this space – specifically intended for practices different from the sacrifice – was even larger than that to the west of it, where the sacrifice itself was performed.

On the basis of several literary and iconographic sources about Greek rituals,[48] water was used in the sacrificial space to wash the hands of the officiants and sprinkle the animals, the participants and the altar.[49] It seems, therefore, that water acted in the sacrificial space as a sort of *trait d'union* among all the actors involved in the sacrifice, turning them from an impure to a pure status.[50]

We might assume that this holds true also for the space in front of Temple C. Water drawn from the circular well in front of the two-winged hall, and maybe also from the fountain next to the northeast entrance, might have been used to perform these actions.[51]

Water likely was also used inside the two-winged hall and in front of it, during ritual and social activities important for community cohesion. Here, perhaps, the agency of water changed physically and symbolically the status (impure/pure; unclean/clean) of actors and space.

If these were the cases, water might have been one of the (non-human) agents acting in those religious and civic rituals (sacrificing and feasting) that created a shared sense of community and togetherness. This association between community and lustral water in public space seems to be confirmed also by literary sources by way of contrast: those who were impure and consequently not community members were kept away from lustral water collected in public spaces and/or used for sacred rituals.[52]

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44 Roux 1973, 552–554; Kuhn 1985, 240. 264.

45 Di Vita 198, 34. 48; Østby 1995, 88; Mertens 2006, 187; Marconi 2007, 72.

46 Sassu 2017, 197 (with other references).

47 Sassu 2017, 191.

48 Ginouvès 1962, 299–318; Burkert 1977, 101–108; van Straten 1995, 31–49 figs. 30–53; Gebauer 2002, 213. 246–252; ThesCRA I (2004) 65–67. 116 s. v. Sacrifices (A. Hermary – M. Leguilloux). ThesCRA II (2004) 23 f. 26 f. s. v. Purificazione, Gr. (O. Paoletti).

49 In Greek sacrifice, a specific kind of vessel (*chérnips*) usually contained the lustral water intended for these ritual actions. On the instruments for ritual cleaning with water: ThesCRA V (2005) 165–183 s. v. Kultinstrumente (I. Krauskopf).

50 On the cathartic power of water used in sacrifices, see: Ginouvès 1962, 316 f.; Burkert 1977, 132–134. Rudhardt 1992, 173 f. argues that the water of the pre-sacrificial rituals had a 'qualité religieuse positive' and was 'chargé de puissance'.

51 On the importance of underground water for ritual activities, see n. 21.

52 Ginouvès 1962, 313: in the Eumenides by Aeschylus (458 BC), Orestes – murderer of his mother – cannot touch the lustral water used by the *phratria* for the sacrifices. In two different orations of Aeschines ('Against Ktesiphon' and 'Against Timarchus'), people not allowed to enter the Agora were kept away from *perirrhanteria*. For other

The western entrance and the function of perirrhanteria

In addition to the northeast and south entrances, the sanctuary had a third one during the second half of the 6th century BC. The latter was located in the middle of the west *temenos* wall and maybe provided with a gate during this phase.[53] A circular well was located in front of it, a couple of meters to the east. People entering the sanctuary[54] likely used this water for purification rituals.[55]

Two of the three entrances to the sanctuary, therefore, were provided with water installations likely used by worshippers approaching the sacred space: the fountain next to the northeast entrance, and the circular well in front of the west entrance. Another circular well was located not far from the south entrance and provided the space to the east of Temple C with necessary water. Due to the lack of information from the excavations, we can only postulate the existence of *perirrhanteria* and other kinds of basins located close to entrances, wells and altars in order to facilitate ritual activity performed with water. *Perirrhanteria* from Selinous were usu-

Fig. 7: Palermo, Museo Archeologico Antonino Salinas, human-shaped stand of a *perirrhanterion* from Selinous' urban sanctuary.

examples of these prohibitions, see also ThesCRA II (2004), 26 f. s. v. Purificazione, Gr. (O. Paoletti). On the relations of the *thysia* with notions of community and purity, see also Rudhardt 1992, 257–266.

53 Mertens 2003, 84, figs. 77. 80.81; Mertens 2006, 101 f. figs. 145–147. According to Marconi 2007, 74, there is no evidence that the gate belongs to this phase.

54 The well is partially covered by a later north-west/south-east wall built after 409 BC. For both well and wall, see: Gabrici 1929, pls. 1. 3; Helas 2011, Faltbeil. 1. 4. 6. The circular opening in Mertens 2003 fig. 81 and Mertens 2006, fig. 146 likely belongs to a Punic-Hellenistic cistern (Helas 2011, 235 fig. IX 49 Beil. 24).

55 On the purification rituals required before entering Greek sanctuaries, see Kobusch, this volume.

ally made of terracotta and showed cylinder-stamped decoration along the rim,[56] but the most beautiful examples were made of marble. One of them has a human-shaped stand (Fig. 7) and is comparable with Archaic *perirrhanteria* from the major Greek sanctuaries.[57]

The location of water sources close to the entrances of the Selinous' sanctuary, therefore, had mainly a practical purpose, but might have been related also to the idea that basins with lustral water represented symbolic borders in *temene* and public spaces, to such an extent that the term *perirrhanterion* was used sometimes instead of the word *temenos*.[58]

The sanctuary during the first half of the 5th century BC

Between the end of the 6th and the first decades of the 5th century BC, the east sector of the *temenos* changed again (Fig. 8). The previous northeast entrance was covered by earth and also by the northwest/southeast wall running from the lower terrace to the northeast corner of the sanctuary.[59] In the lower terrace, a tapered door with a few low steps was installed.[60] It led to the upper terrace, through a flight of stairs next to the retaining wall. Unlike the entrances from the west and south sides, the sequence of low steps in front of the door, the lower terrace, and the long stair introduced the visitor into the *temenos* via a progressive and slow ascent that prepared him or her to enter into the sacred space, possibly creating a sense of expectation.

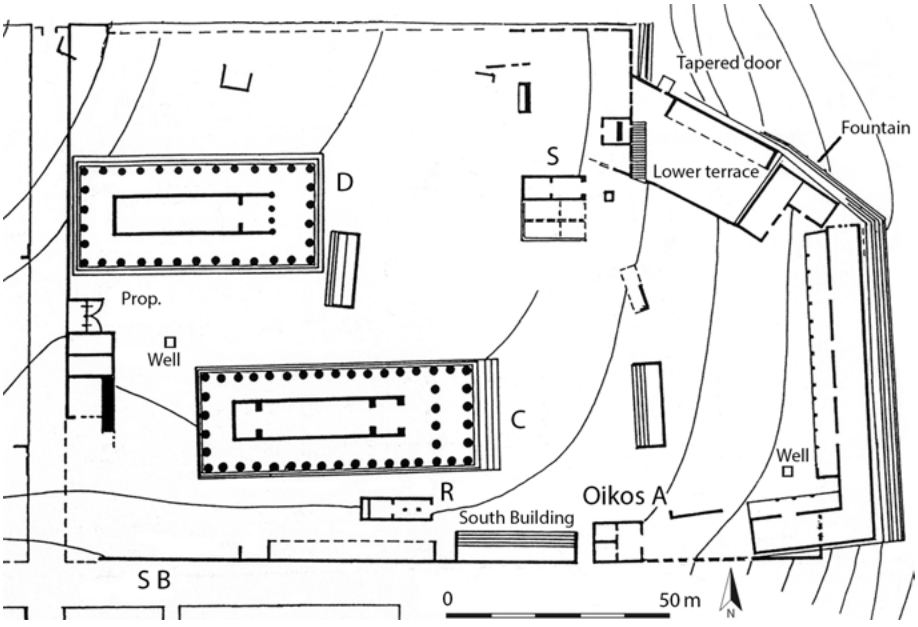

Fig. 8: Selinous, the urban sanctuary during the 5th century BC.

56 Terracotta *perirrhanteria* have been retrieved during excavations in the sanctuary, but their original location cannot be retraced, because they have been found in secondary positions or because of information lacking in old archaeological reports (see for example Gabrici 1929, 93). Selinous is considered to have been one of the major production centres in Sicily of this kind of object. About them see: Allegro 1982; Farinholt Ward 2018. On the location of *perirrhanteria* and ritual of *perirrhansis* in Greek sanctuaries see Kobusch, this volume.

57 The *perirrhanterion* was retrieved in 1935 to the north of Temple D among debris from previous excavations, but its original location is unknown (Tusa 1983 129 n. 28, with previous references). For similar marble *perirrhanteria* from Olympia and Samos, see Pimpl 1997, 164–166. 169 f. fig. 5.

58 Burkert 1977, 146; ThesCRA II (2004) 26 f. s. v. Purificazione, Gr. (O. Paoletti). See also the literature quoted in n. 52.

59 Mertens 2003, Beil. 4.

60 On the problems related to some elements of the lower terrace, see Mertens 2003, 92–97.

After taking in the view of the bay with the harbour to the east, the visitor entered the upper terrace and admired the sacred buildings.

During this building phase, the south entrance of the sanctuary was partially changed, too. The so-called south building – a stepped structure which was likely used as a theatre – was built to the west of the entrance, against the south wall of the *temenos*.[61] It allowed worshippers to attend sacrifices and other ritual performances (e. g. processions and sacred dances). The south building to the left and the Archaic *oikoi* to the right framed this entryway. The visitor got only a partial glimpse of the sanctuary from the entrance and only at the end of the entryway was there a complete view of Temple C and its altar.

Two other constructions can probably be dated between the end of the 6th and the first decades of the 5th century BC: the two-roomed building to the north of the hall[62] and – slightly later – the portico attached to the latter.[63] We have no information about the two-roomed building and can only speculate that it was somehow involved in the religious activity within the sanctuary.

The portico attached to the two-winged hall might have been built as a consequence of an increase in the number of people taking part in sacrifices and feasts. It provided a covered space to the worshippers attending the ritual activities or visiting the sanctuary.

The two new constructions (the two-roomed building and the portico) affected both the perception of the (social) space and the ritual practices performed in it. The new building to the north of the hall enclosed definitively the space to the east of Altar C and interrupted the last possible visual connection between this sector of the *temenos* and the eastern hill with its temples. The building therefore contributed to defining the social space of ritual practices and probably reinforced the sense of community and togetherness perceived by the worshippers taking part in sacrifices and feasts.

The building activities of this phase also consistently affected the ritual practices in the sanctuary. The sequence of tapered door, lower terrace, and long stair made it impossible for processions with animals to enter the *temenos* from this side.[64] Ritual practices to the east of Altar C probably changed too, because the portico covered the structure with squared openings next to the south entrance of the two-winged hall.[65]

Another important change occurred in the sanctuary (possibly in the east sector) during this phase. It was the construction or reconstruction of a monumental altar consecrated to Apollo Paian and Athena, as an inscription dated to the second quarter of the 5th century BC indicates.[66] Even if we do not know the reasons for the changes that occurred during the first decades of the 5th century BC, it is interesting to consider some more or less contemporaneous events and iconographies related to rivers and water at Selinous.

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61 Clemente Marconi dates this structure to the end of the 6th century BC (Marconi 2018, 181 fig. 7). Clemens Voigts argues for a slightly later date (Voigts 2017, 48–57 fig. 35).

62 I consider the two-roomed building to be later than the hall for two reasons: the confined space between the hall and the two-roomed building seems to indicate that the latter was built later; the south-east side of the two-roomed building covers the north corner of the hall's foundation (see Merten 2003, Beil. 4; Helas 2011, Faltbeil. 2).

63 On the features indicating that the portico was attached later to the hall, see n. 38.

64 Processions had to enter by the West and South entrances. The theatrical structure (South building) next to the South entrance might be related to this phenomenon (see above).

65 See n. 40.

66 The inscription contains a dedication to Apollo Paian and Athena. The inscribed block was retrieved between Temples C and D and belonged to a monumental altar, but its original location is unknown (Marconi 1999; Marconi

Empedocles, the rivers and the nymph: memories of reclamation works at Selinous?

According to Diogenes Laertius, the philosopher Empedocles, who lived in the 5th century BC, ended a plague caused by the stench from one of Selinous' rivers. The philosopher diverted two different rivers in order to sweeten the water of the foetid one. After his action, the inhabitants of Selinous venerated Empedocles as a god.[67] This story has numerous historical and historiographical problems, but describes technically feasible events fitting Selinous' waterscape and history.[68] It might be related to important reclamation works that later were ascribed to Empedocles, who was the most famous philosopher and 'scientist' of the 5th century BC.[69] Even if the text does not specify the name of the marshy river, this might be the Cottone, to the east of the Acropolis. Its mouth, indeed, was a very calm lagoon filled with brackish water – ideal conditions for stench and plagues. This lagoon silted up over time for natural reasons, but the harbour built at its edge might have accelerated the process.[70] Moreover, it is interesting to note that flood problems in the area in front of the eastern gates seem to have been solved in the Early Classical period.[71]

Some scholars have tried to establish a link between the story of Empedocles and the iconographies of tetradrachms and didadrachms issued by Selinous, starting from the first quarter of the 5th century BC.[72]

On the obverse of the tetradrachms, the personification of the river Selinous performs a libation on an altar flanked by a rooster – an animal linked with chthonic and healing gods; the statue of a (domesticated?) bull stands on a base. The reverse depicts Apollo and Artemis on a cart. The goddess drives the vehicle, while her brother shoots an arrow (Fig. 9a)

The didadrachms show on the obverse the personification of river Hypsas[73] performing a libation on an altar, while a snake – again an animal linked with chthonic and healing gods – coils on the structure; behind the river, a heron or a crane – typical birds of lagoons and marshy areas – leaves the scene. On the reverse Heracles tames a bull[74] (Fig. 9b).

Even if personifications of rivers are common among issues from other cities of Sicily and Magna Graecia,[75] and in the case of Selinous their direct link with the Empedocles story is unlikely, the numerous water- and marsh-related elements in these coins during the 5th century BC are striking.

The same holds true also for other water-related iconography depicted on Selinous' drachmae and litrae during the same decades. The drachma shows the head of the river Selinous on the obverse and, on the reverse, the head of the water nymph Eurymedousa, daughter of the river god Achelous. A water bird stands behind the nymph's head (Fig. 9c).

2007, 132 f.). The existence of Paian at Selinus is likely confirmed by the so-called Getty Hexameters, in which Paian appears four times, interestingly associated with the term φάρμακα (Rutherford 2013). On the Getty Hexameters see Antonetti 2018 (with extended literature).

67 Diog. Laert. 8, 69–71 (quoted by Muccioli 2015, 261 f.).

68 Muccioli 2015, 262–264.

69 Rambaldi 2010, 14.

70 Rabbel et al. 2014, 146. Rambaldi 2010, 16 claims, on historical considerations, that the river mentioned by Diogenes was the modern Cottone. According to Muccioli 2015, 264, the river was the Selinous (modern Modione), because it was the eponymous river of the city. Nevertheless, this conclusion is not sufficient.

71 Mertens 2003, 395 f.

72 For the coins: Cutroni Tusa 2010, 159–162 figs. 2–3. On the link: Muccioli 2015, 265 with previous literature.

73 The Hypsas is identifed with the modern river Belice (a few kilometres to the east of Selinous).

74 This iconography is usually related to one of Heracles' labours, but, in this case, might refers also to the domestication of a river – often depicted as a bull.

75 Rambaldi 2010, 17.

Fig. 9: Selinous' silver coinage during the 5th century BC; a: tetradrachm; b: didrachm; c: drachm; d: litra; pictures not to scale.

On the lytra's obverse, a female figure sits on a rock and caresses (or tames) a snake with her right hand (Fig. 9d). On the reverse, the river Selinous is depicted as a bull with a human head. It has been suggested that the sitting female figure represents Eurymedousa, depicted as the nymph of one of Selinous' water springs.[76] Does the nymph sitting on a rock refer to water spring of the Acropolis plateau? The hypothesis is fascinating, but cannot be confirmed at present.[77]

For the purposes of this paper, it is important to underline that water-related events and public works might have occurred or been undertaken, respectively, at Selinous during the 5th century BC, and maybe they influenced the coins' iconography, as well the story about Empedocles. Human action, of course, was not enough to ensure a perfect outcome of the reclamation works. Divine action – especially that of the healer-god worshipped in the urban sanctuary – was necessary as well.

The iconographies of Apollo shooting arrows,[78] river gods in front of altars, water nymphs and birds, as well as the Empedocles story and dedication to Apollo Paian date back to the first half of the 5th century BC and might have been interrelated.[79] This is not an accident, if we consider Selinous' waterscape and the building history of its urban sanctuary.

Conclusion

The southeast area of the Acropolis plateau had been dedicated to cult activities since the foundation of the colony. The abundance of water played an important role in choosing the appropriate place to establish the main urban sanctuary, both for religious/ideological and practical reasons. During the 6th and the 5th centuries BC, the sanctuary increased in dimensions and ritual activities and underwent a quasi-uninterrupted building process with the construction of monumental structures. It is interesting to note that, against this backdrop, water had no architecturally and aesthetically relevant role for the urban sanctuary:[80] the fountain consisted of a basin in front of an opening embedded in the retaining wall; there was no fountain in a

76 Zoppi 2009, 67–69 figs. 20–23 (with previous references).

77 Zoppi 2009, 69 thinks that Eurymedousa was related to the Gaggera spring.

78 Regarding the possible connections between this iconography and the altar's dedication to Apollo Paian, see Marconi 1999, 12.

79 On this interrelation see the meaningful observations of Marconi 1994, 300–303.

80 The same holds true for sanctuaries of the Greek mainland and Asia Minor during the Archaic and Classical periods (see Kobusch, this volume).

prominent position within the sanctuary; the wells – as usual for Archaic and Classical times – had no monumental structure.

The scanty data from the first archaeological reports do not allow a detailed reconstruction of the use of water within the sanctuary. However, this paper has introduced some hypotheses on the agency of water, examining the sanctuary's architecture and space in the light of Greek literary and iconographic sources.

Water installations had mainly a practical function for Selinous' civic and religious community. They were located close to sanctuary entrances and in spaces where important activities for community cohesion were likely performed: meeting and chatting in front of the fountain, sacrificing and feasting between Temple C and the two-winged hall.

The agency of water affected action and perception in the sacred space, starting with the first religious activities. Fresh water influenced the choice of location for the sanctuary and acted in ritual activities. Especially lustral water might have affected the status of all the ritual's participants (humans and animals) within the sanctuary, and marked symbolic and temporal borders. Marshy water also caused plagues, and likely these had consequences in reclamation works and maybe also in religious activities within the sanctuary. On the other hand, throughout Selinous' history, human agency affected landscape and waterscape in the sanctuary area. The artificial filling next to the edge of the Cottone lagoon was the precondition of the urban development and the construction of the city walls. The construction of the harbour likely accelerated the silting of the lagoon. The artificial terraces over the area rich in water at the base of the Acropolis plateau allowed for the monumentalisation of the sanctuary and covered the water spring.

The outlined framework, therefore, underlines the mutual influences among landscape, action and perception of water.

Illustration Credits

Fig. 1: Nicola Chiarenza after Mertens 2006, fig. 302.
Fig. 2: Nicola Chiarenza after Di Vita 1984, fig. 5.
Fig. 3: After Di Vita 1984, fig. 3.
Fig. 4: Nicola Chiarenza after Mertens 2006, fig. 326.
Fig. 5: After Mertens 2006, fig. 329.
Fig. 6: Nicola Chiarenza after Mertens 2006, fig. 332.
Fig. 7: After Tusa 1983, 129.
Fig. 8: Nicola Chiarenza after Mertens 2006, fig. 328.
Fig. 9: a–b: after Pugliese Carrattelli 1985, figs. 64–65; c: after Poole 1876, 141 no. 38; d: after Hill 1903, pl. 6, 5.

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Philipp Kobusch

5 Fountains and Basins in Greek Sanctuaries

On the Relationship Between Ritual Performance and Architecture

Abstract: Ancient written sources emphasise the importance of water sources for Greek sanctuaries. However, this significance is only mirrored in exceptional cases in an elaborate architectural staging of fountains or springs. Despite an often very prominent location within the temenos, they usually do not play any role in the structuring and hierarchisation of spaces. The ritual use of water differs significantly from this. Sacred space was explicitly constituted and structured performatively through various lustral rituals in which water played a dominant role. These ritual acts usually took place in front of or behind the actual architectural entrance, often a monumental propylon, as proved by the corresponding basins and fountains. Ritual and architectural boundaries were therefore not identical. Architecture and ritual, or the experiences of crossing the architecturally marked border and the performative rite de passage, are thus to be regarded as clearly differentiated phenomena despite their spatial proximity.

> *τοῦ ναοῦ δὲ οὐ πόρρω στάδιον χῶμα γῆς ἐστι* [...]. *ἔστι δὲ ἐν τοῖς πρὸς ἄρκτον τοῦ ναοῦ κρήνη, καὶ ἐπὶ ταύτῃ βιασθῆναι τῇ κρήνῃ φασὶν Αὔγην ὑπὸ Ἡρακλέους* [...]. *ἀπωτέρω δὲ τῆς κρήνης ὅσον σταδίοις τρισίν ἐστιν Ἑρμοῦ ναὸς Αἰπύτου.*
>
> *Not far from the temple [of Athena in Tegea] is a stadium formed by a mound of earth* [...]. *To the north of the temple is a fountain, and at this fountain they say that Auge was outraged by Herakles* [...]. *Some three stades away from the fountain is a temple of Hermes Aepytus.*[1]

Introduction: In the description of the sanctuary of Athena Alea in Tegea, Pausanias mentions only the stadium and a spring as worth seeing in addition to the temple he described in detail before. On the other hand, he did not mention any other architectural structures, though their existence can be proven archaeologically in Tegea.[2] In other places, too, Pausanias repeatedly emphasizes springs and fountains as essential features of Greek sanctuaries in a very similar way.[3] Partly, as in Tegea, they are connected with a myth,[4] partly a specific use in ritual is tangible[5] or special qualities were attributed to water, for example in the context of healing cults.[6]

Many other text sources emphasize the importance of water in the Greek sanctuary, which is reflected here.[7] Water could possess mantic qualities,[8] springs could be assigned a sacred character if they were consecrated to deities or nymphs, and they could receive their own cult officials and their own cult facilities, such as a statue or a cult table, as is recorded epigraphically for Andania.[9] It is obvious that water sources beyond such specific cultic implications fulfilled purely practical tasks, especially in extra-urban shrines, which had to offer visitors overnight accommodation and refreshments. Sacred laws, for example, do not only prove a great effort to

1 Paus. 8, 47, 4 (translation by Jones 1979).
2 Østby 2014, 16.
3 Paus. 2, 27, 7; 3, 22, 8; 3, 26, 1; 4, 31, 1; 4, 33, 4; 7, 5, 2; 7, 24, 3; 7, 27, 9; 8, 10, 4; 8, 19, 2; 8, 32, 5.
4 Paus. 1, 21, 4; 2, 32, 4; 3, 21, 2; 3, 24, 2.
5 Paus. 1, 34, 4; 2, 17, 1; 5, 16, 8; 6, 20, 2; 7, 21, 12–13.
6 Paus. 4, 35, 8–11; 5, 13, 11; 6, 22, 7; 8, 29, 1; 10, 24, 7. Plut. Mor. 41, 433 B-C mentions the special quality of the river Alpheius in Olympia.
7 Summarizing: Cole 1988.
8 Friese 2010, 96–98.
9 Gawlinski 2012, 84–86 = IG V,1 1390, 84–86. For other holy fountains, cf. Paus. 2, 24, 6; 3, 20, 1; 3, 23, 8; 7, 22, 4; 9, 10, 5; 9, 24, 4.

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protect water purity,[10] but a whole series of inscriptions also shows that the sale of drinking water or the installation of baths was a source of income for the sanctuaries that should not be underestimated.[11]

Water therefore played a special role in the Greek sanctuary in a variety of ways, also in a variety of uses. The characteristics of the springs and wells were presented to foreign visitors as attractions. In Tegea, the spring was also used by Pausanias as a starting point for describing the immediate surroundings, thus it had a quality as a topographical point of reference and orientation.

Against the background of such a multi-layered image – only sketched here – that can be derived from the written sources, the question arises of what role the provision and presentation of water also played in the architectural design of Greek sanctuaries or what significance water played in the structuring, hierarchisation or even constitution of spaces within the sanctuary.

Therefore, on the one hand, how water resources were positioned within the sanctuary and how they were architecturally staged will be examined. On the other hand, the spatial quality of the ritual use of water and its relation to architecture will be examined. To limit the material, the view is directed only to sanctuaries of the Greek mainland and Asia Minor from Archaic to Hellenistic times. Even when sanctuaries were located extra muros, they usually were closely linked ritually (e. g. through processions) and institutionally to the city they belonged to. Both the priesthood and many visitors were citizens of the city, so that the social communication that took place in the sanctuary, for example in the form of rituals, building activities or even donations of smaller votive offerings, always had a direct effect on the urban society. This, combined with their substantial architectural design, shows that sanctuaries can be understood as quasi-urban spaces.

Placement and architectural staging of water sources

Basically, two areas within the sanctuary can be distinguished in which water sources were more frequently placed. On the one hand, this is the immediate vicinity of the temple or altar, and on the other hand, the entrance area and the main routes of the sanctuary.

In Tegea[12] (Fig. 1) and Delphi[13] (Fig. 2,1), there are typologically very similar fountains from the 6th and 5th centuries BC on one of the long sides of the temple – the former can most probably be identified with the Fountain of Auge cited above. In both cases, these are narrow stairwell shafts which lead to a well shaft in Tegea or to a basin fed by a pipe in Delphi.

The stairwell is enclosed by narrow slabs that support the surrounding soil. While the well in Delphi, located far to the west of the temple, has no relation to the temple front and the altar, in Tegea there is a visual connection from the altar area. In addition, the lateral cella door connects the fountain area closely to the temple interior. Although lateral cella doors have recently been found in the Hellenistic temple of Delphi[14] as well, the fountain there was probably cut off from its water supply by the new temple construction and thus lost its function. It can at least be assumed, however, that the side doors already existed in the Alcmaionid temple, since in many other points its basic structure was adopted during the rebuilding process in the 4th century BC.

10 LSS no. 4; LSCG no. 152 = Le Guen-Pollet 1991, 60–63 nos. 13–15, with French translation.

11 E. g. LSCG, no. 45; LSCG no. 75 = Le Guen-Pollet 1991, 35 no. 6; 58–60 no. 12, with French translation.

12 Glaser 1983, 14 no. 7; figs. 19–22; Østby 2014, 16 f. figs. 5–6; Papathanasopoulos 2016, 118–121 figs. 55–58.

13 Courby 1927, 171–188 figs. 129–139; Glaser 1983, 22–24 no. 15 figs. 42–43; Bommelaer – Laroche 2015, 275 f. fig. 102.

14 Amandry – Hansen 2010, 270–275 fig. 9, 1.

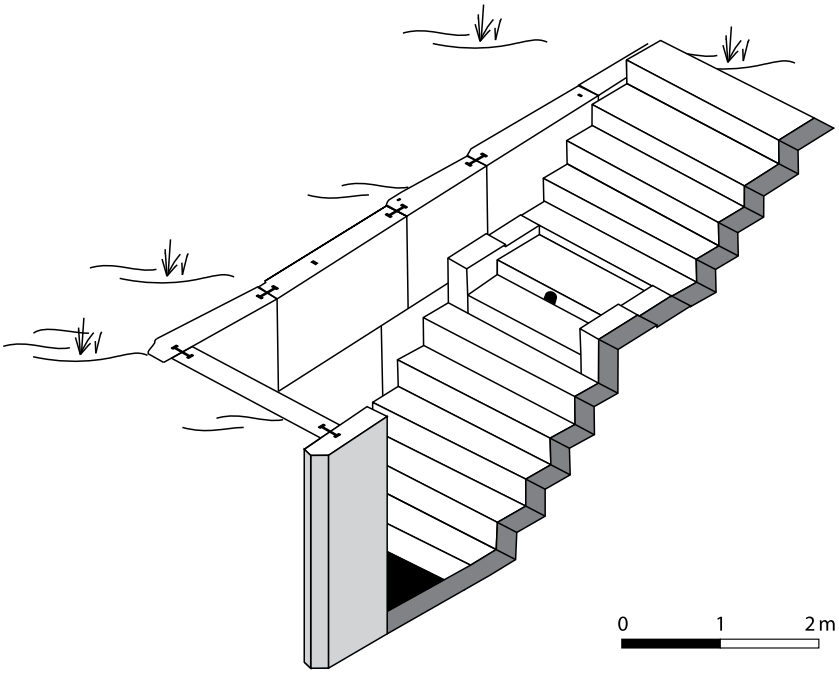

Fig. 1: Tegea, so-called Fountain of Auge, isometric drawing.

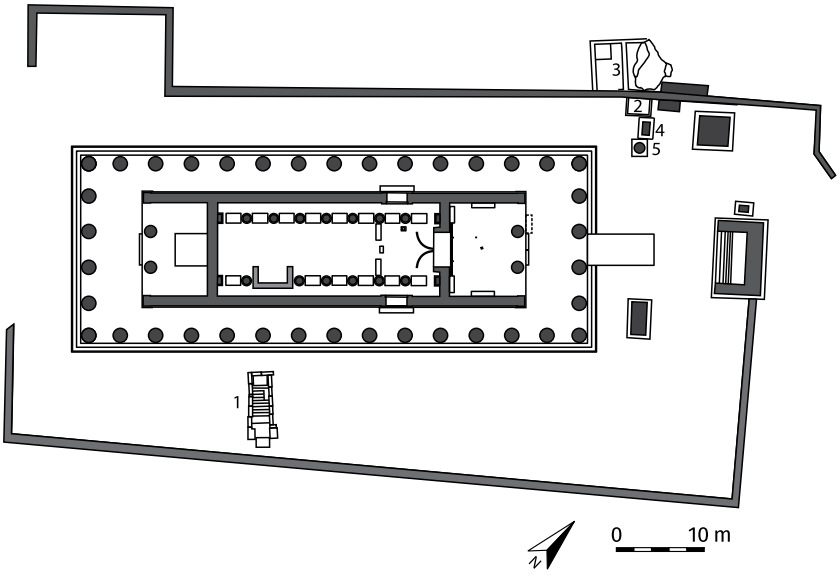

Fig. 2: Delphi, the temple-terrace.

Contrary to this very prominent position, however, both wells in Delphi and Tegea had no representative structure above ground. In Tegea, the presence of clamp holes on the upper sides of the slabs indicates that the wall continued upwards over the outer level – presumably it secured the shaft in the form of a low parapet. In both cases, however, a higher or even monumental architecture above ground can certainly be ruled out, as the low thickness of the wall of 0.2–0.25 m does not support this.[15] Therefore, the parapet and stairwell were the only visible elements. Significantly, the stairwells are not directed towards a central viewing position.

15 Glaser 1983, 14 interprets the middle step of the staircase as a support for door jambs, as later Østby 2014, 17. Such a door would require a certain height of the wall, since the pivot of the door leaf requires an upper counterpart. However, there is neither a threshold with the usual holes for a door (pivot hole and latch hole), nor dowel holes for a possible anchoring of the door jambs, so that this interpretation is more than questionable. In Delphi,

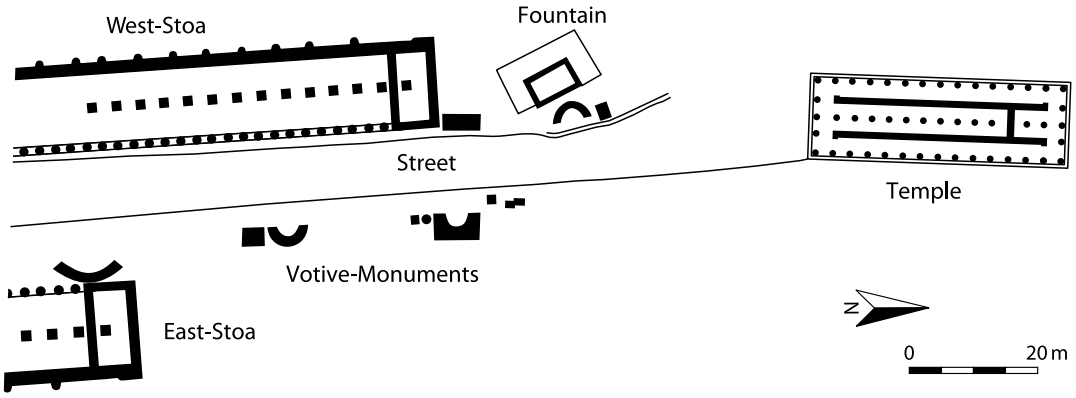

Fig. 3: Thermos, Sanctuary.

The same generally applies to fountains that were positioned in the immediate vicinity of the main altar. For example, the wells in Thermos (Fig. 3),[16] Magnesia[17] and Aulis[18] do not have any monumental structures – the latter follows the same type as the wells in Tegea and Delphi. This does not mean that they could not be part of a designed architectural prospectus, especially in Hellenistic times, as is known from Magnesia, for example. Here the basin is embedded in the pavement in front of the main altar and is thus integrated in the central view-axis from the *propylon* via the altar to the temple front. Nevertheless, the source in this ensemble does not receive any independent architectural emphasis, but remains clearly subordinate to the two monumental architectural units. In Thermos (Fig. 3), in comparison, the approach to the temple was elaborately architecturally designed in the Hellenistic period due to the so-called agora, a street which is bordered by long galleries. But the probably older source was not included in this ensemble. Rather, it was located not only on a lower level from this access road, but was also concealed by an exedra monument oriented towards the road.

In Aulis, the situation is hardly assessable, because the connection to the temple is obscured by a modern street. Therefore, it is questionable whether the small foundation in front of the fountain must be addressed as the main altar of the sanctuary. However, written sources tell about a plane tree in the direct vicinity of the fountain.[19] A natural monument, not an elaborate architectural design, therefore served as an eye-catcher here.

Even more vividly, the low interest in an architectural staging of important water installations can be seen in different examples in Delphi.[20] After the landslide in 373 BC, a water basin (Fig. 2,2) was placed in front of the northeast corner of the temple during the construction of the new retaining wall, the so-called Ischegaon. A water pipe supplied it with running water. The traces in the rock show that the basin was not framed architecturally. It also lay behind the

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the thin walls were possibly reinforced by a small stone package: Courby 1927, 172. However, even the excavators were uncertain whether this could indicate a structure above ground. Fernand Courby interpreted the thick blocks that adjoin the slabs on the west side as foundations for this package (Courby 1927, fig. 129). However, they do not have a worked surface and are therefore unsuitable as a foundation for a neatly placed and stable wall.

16 Sotiriades 1899, 61 f.; Papapostolou 1984, 127 f. fig. 1; pl. 105; Papapostolou 2014, 184 figs. 79. 90. 111.

17 Bingöl 2007, 84 f.; Hammerschmied 2018, 102 f. figs. 2. 6. It was a wide basin (12 × 3 m) embedded in the ground and accessible by six steps on the east side.

18 Threpsiades 1958, 48–51 figs. 3–4; Drögemüller 1961, 218 f. fig. 12; Glaser 1983, 16–18 figs. 30. 31. The reconstruction by Glaser 1976/77, fig. 1 is in the end hypothetical. The situation in Xanthos cannot be assessed with certainty. Parts of the Imperial Nymphaion seem to date back to the Hellenistic period and seem to have formed an artificial grotto. The source, which originated directly in front of the temple, may have been in ritual use before Hellenistic times, as older findings suggest: Balland 1974; Metzger 1979, 10, 14 f.; Le Roy 1988, passim, especially 127; Dorl-Klingenschmid 2001, 252 f. no. 120 fig. 180; Longfellow 2012, 146–151 figs. 13–15.

19 Paus. 9, 19, 7; Hom. Il. 2, 305.

20 Glaser 1983, 26–28 figs. 48–50; Bommelaer – Laroche 2015, 222 f. fig. 77.

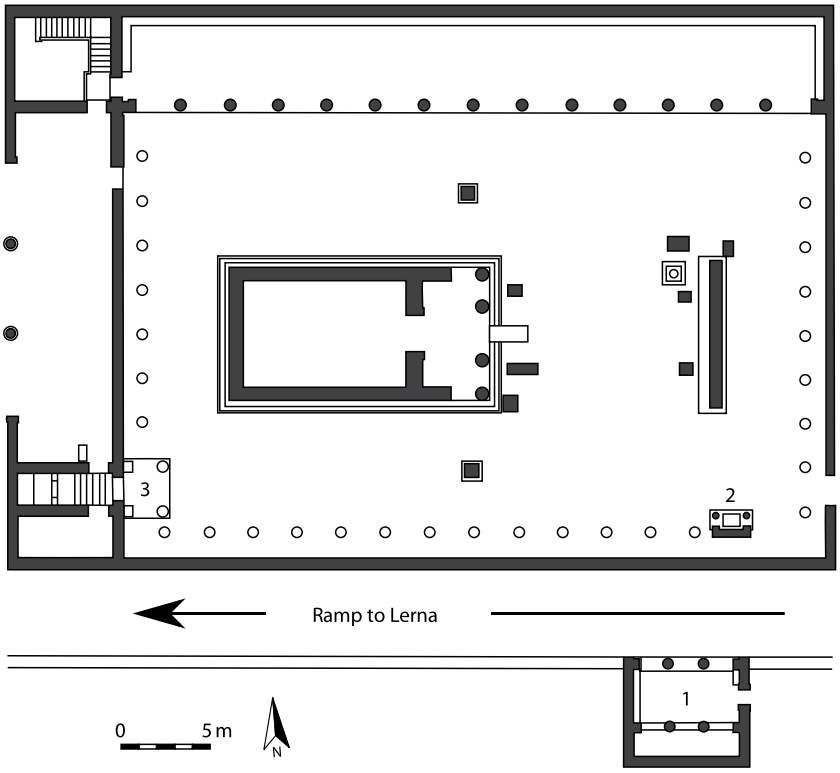

Fig. 4: Corinth, Asclepieion.

victory palm, donated in the 5th century BC after the Battle of Eurymedon (Fig. 2,5). At the latest with the erection of the pillar monument of Prusias (Fig. 2,4) in the 2nd century BC, the view from the temple forecourt to the fountain was completely blocked. Despite the particularly prominent location in one of the most important areas of the entire sanctuary, little attention was paid to the source. It is disputed whether the basin was part of the famous (younger) Cassotis – sometimes associated with a structure directly above the basin (Fig. 2,3) – which played an important role in the oracle. Pausanias[21] reports that there is 'a wall of no great size, and the ascent to the spring is through the wall'. Therefore, some scholars have reconstructed a staircase next to the basin.[22] Although this attribution is more than uncertain, the description of Pausanias shows that even the Cassotis did not have a monumental façade. So even this important source, analogous to the source of Auge in Tegea, did not have a visual-aesthetic effect strengthened by architecture.

The situation in these sanctuaries becomes particularly apparent when compared to one of the very rare cases in which a source of water indeed plays a very dominant role in the architectural concept: in the Asclepieion of Corinth, a stepped fountain with its own *propylon* (Fig. 4,3)[23] is located exactly in the axis of the entrance, thus gaining its own architectural weight next to the temple's façade.

In contrast to such installations in the centre of the sanctuary, fountains with a more elaborate architectural design can be found more often in the area of the entrance to sanctuaries and sometimes along their main streets.

21 Paus. 10, 24, 7.

22 E. g. Pouilloux – Roux 1963, 88–92 fig. 25; for the Kassotis in general, cf. Roux 1971, 126–134; for the younger Kassotis, especially 132.

23 Roebuck 1951, 46–51. 157 f. fig. 11; pls. 12, 1. 13, 2; Glaser 1983, 24 f. no. 17; figs. 46–47.

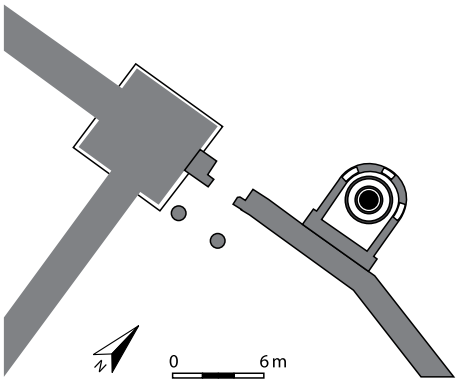

Fig. 5: Eleusis, entrance area of the late archaic sanctuary with the so-called καλλίχορον φρέαρ.

One of the most prominent installations can be found in Eleusis (Fig. 5) already from the Late Archaic period.[24] Here a high, sigma-shaped balustrade with several entrances secured the round well shaft, which was probably rightly identified with the literarily known καλλίχορον φρέαρ. The fountain is located directly next to the archaic entrance gate outside the walled area of the sanctuary.

Similarly, a monumental fountain house with two columns *in antis* dominated the access ramp to the Asclepieion of Corinth[25] (Fig. 5,1) – it, too, was therefore outside the actual temenos.

The fact that a fountain house could also be placed directly behind the entrance is shown by a second fountain in the same sanctuary which can probably be reconstructed in the form of a small *aedicula*[26] (Fig. 5,2). The building mediates between altar and entrance, to which it can be assigned in the same way by its orientation and location. So here in Corinth, two prominent sources were placed in front of and behind the entrance.

Another example for a fountain house behind the entrance inside the *temenos* may be found in Labraunda, where the so-called Doric building[27] is located in the intersection between the south and east *propylon*, though its function as a fountain is not finally secured. In the spacious sanctuary it frames the lower terrace, but is separated from the sanctuary's core by several further terraces and open stairs.

The same applies to another well house in Labraunda,[28] as well as to a fountain façade in the Asclepieion of Kos (Fig. 6,1).[29] Both are located at the retaining wall below the main temple terrace and are situated in front of the entrance to this terrace. However, the situation in Kos is difficult to assess. The fountain possibly dates back to the 4th century BC. But, neither the exact *temenos* boundary nor the access situations can be reconstructed for this first phase of the sanctuary's expansion.[30] In the last phase of the sanctuary's expansion, the fountain was located near the western side entrance to the lower terrace, while the main entrance in the form of a large *propylon* was in the north. At this time at the latest, the fountain was located only in a marginal position on the edge of the newly created large courtyard and was not related to the axis of the *propylon* or the flight of steps.

24 Ziro 1991, 19–48 figs. 8–22. In comparison to the low parapet in Tegea, here the thickness of the wall is about 40 cm. For an older reconstruction without surrounding walls, cf. Noack 1927, 73 f. fig. 34.

25 Roebuck 1951, 69–74 fig. 20; pl. 18, 5; Glaser 1983, 55 f. no. 41; figs. 46. 114. 145.

26 Roebuck 1951, 26–28 pls. 8, 2–3; Glaser 1983, 91 f. no. 61; figs. 46. 176; Kerschner 1996, 109 f.

27 Dorl-Klingenschmid 2001, 207 no. 52 fig. 135; Hellström 2007, 74 f.

28 Dorl-Klingenschmid 2001, 208 no. 53 figs. 8 b; 37 b; 136; Hellström 2007, 95–97.

29 Schazmann 1932, 58 f. pls. 30–33; Glaser 1983, 10 f. no. 4 figs. 10–15; Dorl-Klingenschmid 2001, 204 f. no. 46 fig. 131.

30 On the problem, cf. e. g. Interdonato 2013, 78 f. She assumes the original main entrance on the opposite side, presupposing a predecessor of the Roman baths.

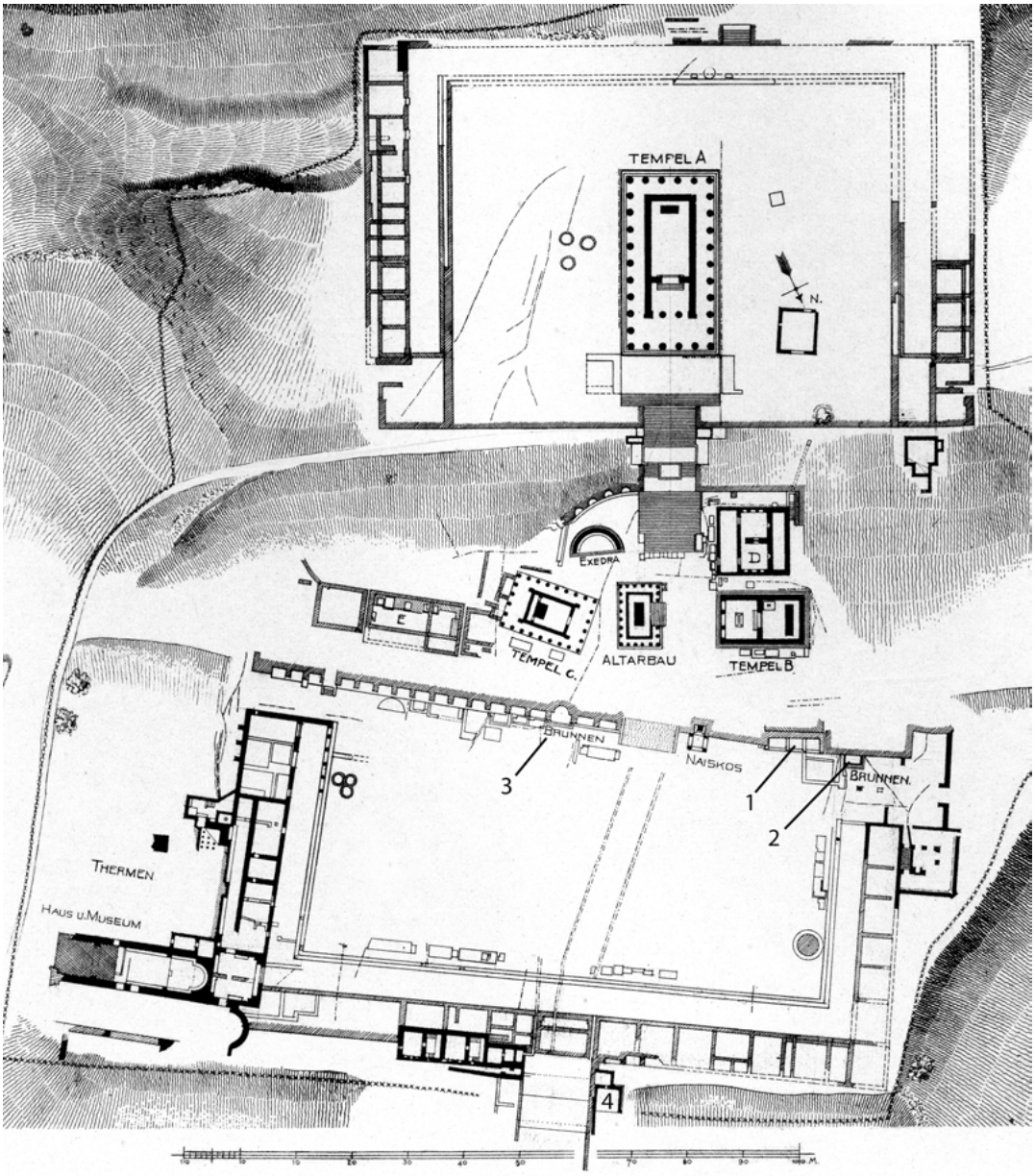

Fig. 6: Kos, Asclepieion.

In many other cases, however, the water installations in the entrance area consist only of simple rectangular basins, such as in Lousoi[31] (Fig. 7), in the sanctuary of Demeter at Priene,[32] in Megalopolis[33] and in another example from the Asclepieion of Kos (Figs. 6,2; 6,4).[34] The reconstruc-

31 Reichel – Wilhelm 1901, 15–18 figs. 6–9. They reconstruct a well house with a façade of columns or pillars on the basis of some slabs in front of the basin which formed a regular pavement. Glaser 1983, 58 f. no. 43 fig. 107, on the other hand, assumes only a wooden construction, because the typical traces of stone columns are missing. In addition, the slabs are not well founded, so that a heavy stone superstructure is unlikely.

32 Wiegand – Schrader 1904, 149 fig. 119 c; Dorl-Klingenschmid 2001, 236 no. 94 fig. 164. von Kienlin – Schneider 2003, 391 also report on lime mortar beds in the entrance area of the *temenos*, which they interpret as remains of water basins. They assume that these were fed by the well.

33 Lauter-Bufe 2009, 33 f. Beil. 5.

34 Schazmann 1932, 60 pls. 32, 3.4; Glaser 1983, 30 no. 20 fig. 53; Dorl-Klingenschmid 2001, 205 no. 47 fig. 132. The basins next to the main *propylon* in the north have not been published yet, except the plan by Schazmann 1932, pl. 38.

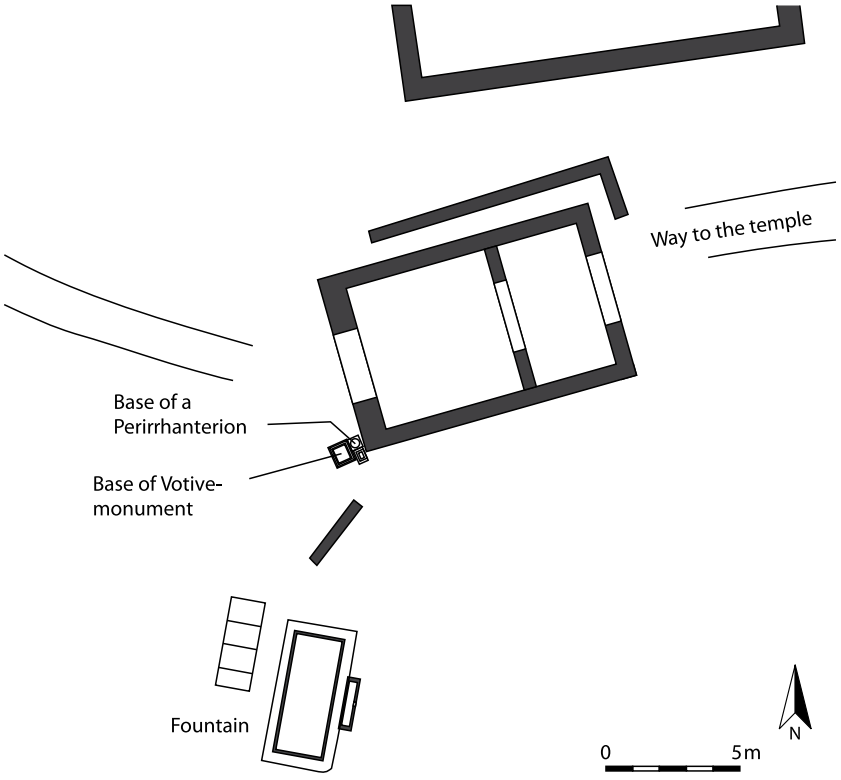

Fig. 7: Lousoi, entrance area of the sanctuary of Artemis.

tion of the fountain in the Hellenistic forecourt of Demeter's sanctuary in Pergamon is unclear, but a fountain-house, as is often assumed, is not secured.[35] Occasionally, circular well shafts are also available, as for example at the Great Propylon of Epidauros[36] or to the left of the *propylon* in the sanctuary of Demeter in Pergamon.[37]

All these structures are located in a prominent position in front of or behind the *propylon* or near a central stairway. Normally, this creates a free space in front of the basin, which ensures visibility and usability. However, this visibility was quite rarely emphasized by architectural means.

Significantly, many other monumental sources, such as the spring of Castalia in Delphi[38] or the so-called Minoia Fountain on Delos,[39] are placed outside the actual sanctuary's area at some distance to the entrance. In Epidauros, the quite monumental water installations[40] were located in a separate, remote area inside the *temenos*. The fact that they were not understood as part of the monumental core of the sanctuary is evident not only by their orientation, but also by the fact that the area is closed off from temple, altar or tholos by dense rows of votive monuments.

A special case without direct parallels is therefore the large fountain house with exedra in the sanctuary of Poseidon and Amphitrite on Tinos. Its elaborated façade is oriented towards the temple, so that it can be regarded as an important part of the monumental sanctuary, although it is placed at a distance of 27 m from the temple. It may not be a coincidence that such a

35 Bohtz 1981, 15 f. pl. 43, 1; Dorl-Klingenschmid 2001, 222 no. 77.

36 See below, n. 73.

37 Bohtz 1981, 15 pls. 6, 2. 43.

38 Glaser 1983, 97 f. no. 68 figs. 182–185. 191; 101–105 no. 71 figs. 192–196.

39 Courby 1912, 103–119 figs. 134–155; Glaser 1983, 15 f. no. 8 figs. 23–29; Bruneau – Ducat 2005, 196 no. 30. It may be possible to add a further fountain in the southeast area outside the sanctuary of Thermos, which has not yet been published in detail, so that no reliable information can be given about the possible layout: Sotiriades 1902, 49–51; Glaser 1983, 123 no. 95; Papapostolou 2014, 184 fig. 112.

40 Roux 1961, 286–291 figs. 83–86 pls. 82.83; Glaser 1983, 44 f. no. 35 figs. 85–87; 62 f. no. 46; figs. 115–117.

singularly emphasized staging of a water complex can be found in a sanctuary dedicated to deities associated with water.[41]

In general, however, the significance of the water resources of Greek sanctuaries, which is often documented in literature, is in reality often not reflected in an elaborate architectural presentation. The initial focus lay on the usability and protection of the water. An increased architectural-aesthetic value was not in the primary focus of the architects. Especially in comparison with the monumental well houses in urban contexts, which had been very common since Archaic times,[42] the water architecture in sanctuaries remains comparatively modest.

This did not change before Roman times, when more and more fountains with elaborate façades were built even in sanctuaries. The most prominent example is the Nymphaion of Herodes Atticus in Olympia.[43] But elsewhere, too, there is an increased awareness of the fountains and springs. Some were extensively renovated and enlarged. For example, the water installations in the Demeter shrine of Pergamon[44] or in the Letoon of Xanthos,[45] and, to a lesser extent, the fountain in the Asclepieion of Kos,[46] were given elaborate façades. In Kos, a further fountain with a circular niche in the central position of the terrace wall was installed, which now had a clear axial relationship with the main *propylon* (Fig. 6,3).[47]

In spite of the often prominent position at the entrance to the sanctuary or near the temple and altar, water installations in the pre-Roman period did not necessarily acquire an architectural form that defined the space. Accordingly, the mythological or ritual significance of water systems was normally not emphasized or even increased by elaborate architectural forms.

Ritual use of water: Purification

If one includes the ritual use of water in the context of the Greek sanctuary, however, the picture is much broader. Hippocrates reported in the late 5th or early 4th century BC that entering a sanctuary required ritual purification with water:

> *αὐτοί τε ὅρους τοῖσι θεοῖσι τῶν ἱερῶν καὶ τῶν τεμενέων ἀποδεικνύμενοι, ὡς ἂν μηδεὶς ὑπερβαίνῃ ἢν μὴ ἁγνεύῃ, εἰσιόντες τε ἡμεῖς περιρραινόμεθα οὐχ ὡς μιαινόμενοι, ἀλλ᾽ εἴ τι καὶ πρότερον ἔχομεν μύσος, τοῦτο ἀφαγνιούμενοι.*
>
> *And we ourselves fix boundaries to the sanctuaries and precincts of the gods, so that nobody may cross them unless he be pure; and when we enter we sprinkle ourselves, not as defiling ourselves thereby, but to wash away any pollution we may have already contracted.*[48]

Similarly, many epigraphic sacred laws define the need for both physical and moral purification before entering the sanctuary.[49] The purity of the visitors, achieved by a complete washing or a

41 Etienne – Braun 1986, 73–91; Glaser 1983 87–89 no. 59 figs. 161–163. He doubts the usual dating. On a smaller scale, a fountain house with a small *aedicula* in the Asclepieion/Hippolyteion of Troizen can be added: Welter 1941, 30 pl. 17 c; Glaser 1983, 56–58 no. 42 figs. 103–106. The reconstruction of the monument of the Nike of Samothrace as a fountain has been disproved with certainty: Wescoat 2015.

42 E. g. the so-called Enneakrounos in Athens: Glaser 1983, 67 f. no. 49 figs. 123. 124. The possible size of fountain buildings in Hellenistic times is demonstrated by the Fountain of Arsinoë in Messene: Reinholdt 2009, 159–176 Beil. 8.

43 Glaser 1983, 110 f. no. 75 figs. 204–209; Longfellow 2012, 141–146.

44 Bohtz 1981, 15 f. pls. 6, 3. 43, 2. 44.

45 Cited above, n. 18.

46 Schazmann 1932, 59 pl. 31; Glaser 1983, 10 f. no. 4 figs. 12.13. 15.

47 Schazmann 1932, 55 f. figs. 35–36 pl. 29; Glaser 1983, 45 f. no. 36 figs. 88.89; Dorl-Klingenschmid 2001, 205 f. no. 48 fig. 133. Further examples for newly built fountains in sanctuaries in Lagina and Samos: Dorl-Klingenschmid 2001, 210 no. 55; 240 no. 100 fig. 27. For the phenomenon in general, cf. Longfellow 2012.

48 Hippoc. Morb. Sacr. 4, 55–60 (translation by Jones 1981).

49 Wächter 1910; Le Guen-Pollet 1991, 77–80 nos. 22–23; Pimpl 1997, 55 f.; Gawlinski 2012, 61. For the *perirrhansis* in general, cf. RE 37 (1937) 856 f. s. v. Περιρραντήρια (L. Ziehen); Durand – Lissarague 1980, 91 f.; Kerschner 1996,

symbolic sprinkling with water (ritual of *perirrhansis*), can therefore be regarded as an existential prerequisite for the constitution of sacred space.

Water also played a decisive role in the sacrificial ritual at the altar: at the beginning of the sacrifice, sacrificial servants usually walked around the altar carrying the *kanoun* and the *chernips*, a vessel filled with water. This water was then used to sprinkle the victims and the cult participants. In addition, the priest or the head of the sacrifice washed his hands with it later. Thus, integrated into a complex lustral ritual, water played a central role in defining the space of the subsequent sacrificial process. Here, water was used to define both a physical and a social space by bringing the participants together as a group.[50] But water also marked a temporal limit when it was explicitly used at the start and end point of the ritual.

The written tradition proves that *perirrhanteria*, i. e. vessels that contained the water for the *perirrhansis*, regularly surrounded sanctuaries or were placed in a central position at the entrances, thus limiting the sacred space.

> *Εἴη δ' ἂν ὁ μὲν εἴσω τῶν περιῤῥαντηρίων τόπος ἔνθεος, ἱερός καθιερωμένος ἀβέβηλος, ὁ δὲ ἔξω βέβηλος.*
>
> *But let the place within the perirrhanteria be holy, consecrated, filled with God, inviolable, outside generally enterable.*[51]

> *καὶ τὸ μὲν πρόγραμμά φησι μὴ παριέναι εἰς τὸ εἴσω τῶν περιῤῥαντηρίων ὅστις μὴ καθαρός ἐστιν. τὰς χεῖρας: ὁ δὲ ἱερεὺς αὐτὸς ἕστηκεν ᾑμαγμένος.*
>
> *And although the notice says that no one is to be allowed within the holy-water [within the perirrhanteria] who has not clean hands, the priest himself stands there all bloody* [...][52]

Archaeologically, such movable objects are naturally difficult to detect. Nevertheless, there is some evidence for basins at the entrance to sanctuaries, which has already been collected in detail by various authors.[53] Mostly these are ashlar bases with a round cavity for a basin, which in most cases were placed to the right of the entrance. This is the case, for example, in front of the entrance to the sanctuary of Poseidon on Thasos[54] (Fig. 8) or in the sanctuary of Artemis at Lousoi,[55] where, in addition to the well, such a basin was set up on the right of the *propylon* (Fig. 7).

Occasionally, corresponding basins can also be found in the entrance area of temples. Well documented examples are found in the *pteron* of the archaic temple of Poseidon at Isthmia,[56] on the right of the access ramps of both temples of Asclepius and Artemis (Fig. 9) in Epidauros[57]

107–111; Pimpl 1997, 4–8. 49–65; ThesCRA 5 (2005) 165 s. v. Rituelle Reinigung (I. Krauskopf); ThesCRA 5 (2005) 179–181 s. v. Peirrhanterion/Louterion (I. Krauskopf).

50 E. g. Gebauer 2002, 213. 246–252; van Straten 1995, 31–49; Pimpl 1997, 63 f.; van Straten 2005, 22 (see as well Chiarenza, this volume). About the potential of lustral rituals in general to mark borders and divisions: Parker 1983, 18–24.

51 Poll. 1, 8.

52 Lucian. de sacr. 13 (translation by Harmon 1960).

53 Kerschner 1996, 107–110; Pimpl 1997, 49–54; Seiffert 2006, 72–77. The following examples can possibly be added: a) tripod base in front of the *propylon* in Klaros: Etienne – Varene 2004, fig. 14 a. 100; Ortaç 2001, 153; b) tripod base behind the *propylon* in the sanctuary of Athena in Pergamon: cf. below, n. 72. In terms of typology, no distinction can be made between washing basins (*louteria*) and basins for *perirrhansis* (*perirrhanteria*, *aporrhanteria*, *hagisteria*): Kerschner 1996, 104 f.; Pimpl 1997, 4–8; ThesCRA 5 (2005) 178 s. v. *Perirrhanterion*/*Louterion* (I. Krauskopf).

54 Bon – Seyrig 1929, 322 f. fig. 2 pl. 16. 20; Pimpl 1997, 51; Seiffert 2006, 76.

55 Reichel – Wilhelm 1901, 18 f. fig. 6. 10; Pimpl 1997, 52.

56 Broneer 1971, 6. 12 pl. 7. 8 c; Gebhard – Hemans 1992, 33. 36 f. figs. 8. 10; Kerschner 1996, 113; Pimpl 1997, 25; Seiffert 2006, 78 f.

57 Kavvadias 1905, passim, especially 48–50 fig. 4 pl. Β',1, e; Roux 1961, 216; Kerschner 1996, 111 f.; Pimpl 1997, 59. 106–110. 113 f.; Seiffert 2006, 77 f.

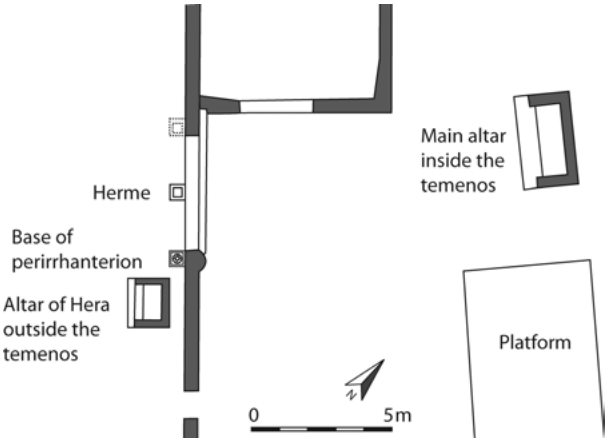

Fig. 8: Thasos, entrance area of the sanctuary of Poseidon.

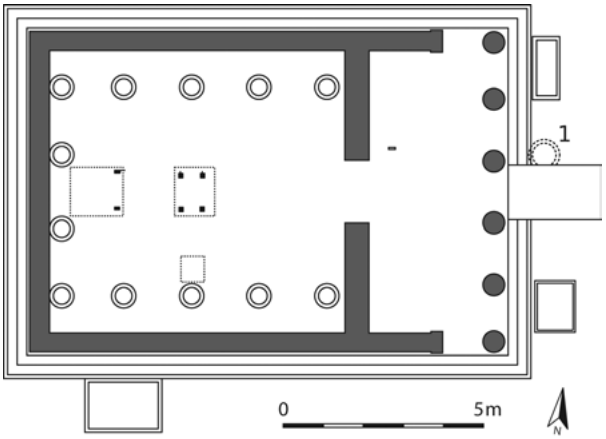

Fig. 9: Epidauros, Temple of Artemis.

and in front of the temple of Athena in Stymphalos.[58] The fact that these basins were indeed used for ritual cleansing is documented by a series of sacred laws[59] which formulate distinctive rules of purity for the temple. Of particular interest is the inscription on the Temple of Asclepius in Epidauros,[60] which can be directly associated with the basin found there.

Water therefore not only served the constitution of sacred space in general, but also helped to identify areas within the sanctuary as particularly worthy of protection and thus to structure the inner space.[61]

Although there are some very elaborate *perirrhanteria* with figurative designs from Archaic times, in Classical and Hellenistic times simple bowls on high feet are usually to be expected.[62] Between the manifold votive offerings that filled the paths and places of the sanctuaries, they will hardly have had a significant effect as individual monuments. The verifiable basins in front of the two temples in Epidauros, for example, were densely surrounded by other, often much larger votive bases.[63] In Lousoi, in fact (Fig. 7), there was a monument directly in front of the *perirrhanterion* and thus obscuring the view.

Only in a few exceptional cases was a more elaborate design and thus an explicit emphasis on these basins achieved. For example, very rarely fountain figures were used as water dispensers. Such a figure is, for instance, verifiable in front of the temple of Asclepius in Epidauros, which replaced or supplemented the old basin at the ramp.[64]

Similar to what has already been stated for the fountains, basins and *perirrhanteria* were also regularly placed at the decisive intersections of the sanctuary's area, but possessed only in exceptional cases an emblematic monumentality which helped to emphasise and constitute spaces.

58 Williams 2001, 79 n. 14; Schaus 2014, 17. 24 figs. 2, 8. 2, 25. 2, 27. In addition, there are basins in antechambers of some mystery cults, for example for the Kabiroi: Kerschner 1996, 113.

59 E. g. LSAM 12, 1–4; LSAM 51, 1–4; LSS 91, 1–3; LSS 108, 4–7.

60 This inscription has only been recorded by Porph. abst. 2, 19: [...] ἐν γοῦν Ἐπιδαύρῳ προεγέγραπτο, ἁγνὸν χρὴ ναοῖο θυώδεος ἐντὸς ἰόντα ἔμμεναι· ἁγνεία δ' ἐστὶ φρονεῖν ὅσια. *There was an inscription at Epidauros: pure must one be to enter the incense-fragrant temple, and purity is thinking holy thoughts* (translation by Clark 2000).

61 Hippoc. Morb. Sacr. 4, 55–60, as well, uses the terms *temenos* and *hieron* to distinguish different areas of the sanctuary.

62 Pimpl 1997, 28–34. 41–46. 106–110.

63 An impression of this can be conveyed by the imaginative illustrations in Defrasse – Lechat 1895, figs. on p. 53. 164; pl. 12, even if he did not draw the basin itself.

64 Kavvadias 1905, passim, especially 46–48 fig. 3 pl. B',1–2, c; Kerschner 1996, 95 f.; Pimpl 1997, 111–116 with only four examples.

Performance and Architecture

The procedure of the *perirrhansis* can be reconstructed with the help of a few vase depictions.[65] Usually they show a human figure standing between a basin and a single column with entablature.[66] Although it will hardly be possible to identify the architecture with certainty,[67] the depictions at least prove the connection between *perirrhansis* and an architectural entrance. As a rule, the figure either holds a branch in its left hand or dips its right hand into the basin. While the figure usually stands motionless in front of the basin, a cup in Krakow (Fig. 10)[68] shows a male figure in a wide protruding step as he dips his right hand into the basin. This shows that *perirrhansis* could also be carried out in motion, as in passing through the entrance.

Especially the position at a ramp, as it is documented at the temples in Epidauros, shows that it will not have been an insignificant, casually executed ritual. The ramp not only provided an architectural setting for the approach to the temple,[69] but also isolated and exposed the individual visitors who approached the temple and performed the *perirrhansis*, due to its small width and rising height. Accordingly, the ritually necessary cleansing upon entering the temple, which was prominently demanded by inscriptions, must also be understood as a social act. The structural setting with a ramp and a basin aligned to it emphasized and codified it in a significant way.

The execution of *perirrhansis* with the right hand is confirmed by the predominant position of the corresponding basins to the right of the entrance to the sanctuary, to the *propylon* or temple. Usually *perirrhanteria* are directly dependent on the *propylon* and lean against its façade, while wells with their own water supply tend to maintain a certain distance as a more

Fig. 10: Attic red-figure cup with the depiction of a *perirrhansis* in motion.

65 Durand – Lissarague 1980; ThesCRA 5 (2005) 179–182 s. v. Peirrhanterion/Louterion (I. Krauskopf).
66 E. g.: a) Attic red figure cup, Pan Painter, Villa Giulia 50422; b) Attic red figure cup, Boot Painter, Warsaw, Nat.Mus. 142313. Durand – Lissarague 1980, 93 fig. 4. 8; Kerschner 1996, pl. 24,1. 3.
67 References in the individual images are either to the context of a *gymnasion* or a shrine. For the discussion, see e. g. Kerschner 1996, 104 f.; Pimpl 1997, 70 f.; ThesCRA 5 (2005) 178 f. s. v. Perirrhanterion/Louterion (I. Krauskopf).
68 Attic red figure cup, painter of the Paris Gigantomachy, Krakow, Czartoryski Museum 1211.
69 Sporn 2015.

independent structure.[70] In all cases, however, the *propylon* or the framing of the entrance to the sanctuary dominated the mostly simple basins and fountains. Those are subordinate to the gate buildings.

The ritual cleansing ceremonies – washing and *perirrhansis* – therefore mostly took place in front of the *propylon* or when entering it. A real integration of the water resources into the *propylon* is not proven.[71] Rather, as shown, water resources are occasionally placed directly behind an entrance, for example in the Asclepieia of Kos and Corinth or in the Demeter sanctuary of Priene. Also, in Epidauros there is a circular well shaft several metres behind the *propylon* and thus already in the sanctuary's area. It may even have been possible to position *perirrhanteria* in the interior of the district, behind the *propylon*, as demonstrated by a tripod base in the sanctuary of Athena in Pergamon, for which a *perirrhanterion* is known from an inscription.[72] The use of these facilities for ritual cleansing can in no case be conclusively proven, but at least for Epidauros there are some indications for it. Judging by the forms of the clamps, the fountain originates from Archaic times. Before the erection of the *propylon* in the 4th century, it lay isolated at the *temenos* border, so that a corresponding use is reasonable.[73] For the later period, continuous use can at least have been achieved by repairing the rim, which emphasises the importance of the well. When building the *propylon*, however, no explicit consideration was obviously given to the ritual boundary and no attempt was made to tie the well closer to the *propylon*.

Conclusion

As was shown, water installations, be they fountains with flowing water or simple basins, rarely were given a monumental shape or an architectural form in the Greek sanctuary. This applies both to sources that were of great importance for the cult and to sources that were presented to visitors as worth seeing for other reasons. Architecture was therefore not used in this case to increase and explicitly stage this significance.

In those cases in which water installations received an architectural emphasis, this was usually near the entrance or a central access road within the shrine. In general, they were often located in particularly prominent places, which were of decisive importance for the structuring of the sanctuary's area. However, it was not water structures or water monuments that were used to define or stage those boundaries by architectural means, but monumental gates or specially designed access paths, such as ramps and staircases. In most cases, the water installations were subordinate or assigned to these buildings.

This is particularly remarkable, because at the same time water was intensively used in rituals that defined boundaries. It is only through the use of water, i.e. through a performative act, that water gains a central and then explicitly space-constituting meaning.[74] The association with these possible uses can nevertheless assign a marker function to the sometimes very simple

70 For another example from Sicily, see Chiarenza, this volume. The exception is the basin fed by clay pipes in front of the westernmost column of the *propylon* in Megalopolis, cited above.

71 It was different in Roman times. For example, in the Lesser *Propylaea* of Eleusis in the later Imperial period, two basins were installed as part of its inner façade: Hörmann 1932, 43–45. 110. He explicitly emphasizes the usability of the basins for washing.

72 Bohn 1885, 55 pl. 18; LSAM 12, 7–9; Ortaç 2001, 153.

73 Though the well is recorded in most of the plans, it has remained as yet nearly unpublished. For a short description, the dating, and its lustral function, cf. Tomlinson 1983, 46 fig. 3; Kerschner 1996, 110; Riethmüller 2005, 173.

74 Hölscher 2013, 51 has already pointed out that actions play an important role in the constitution of borders in Greek urban space in general.

monuments, as can be observed in the text sources in which the *temenos* can occasionally be equated with the area within the *perirrhanteria*.

Consequently, boundaries marked by water, or by the ritual use of water, are not congruent with the architectural boundaries. In particular, the monumental *propylon* architecturally marked the transition to the sanctuary. The rite de passage of purification could take place both spatially in front of and behind the *propylon*. The specific ritual of *perirrhansis* may also have been carried out while entering the *propylon*. However, the *propylon* was never a place of extensive washing and water basins were not integrated into the architecture as an integral part. Although the *propylon*'s main task was to make the crossing of the border a spatial experience, for example, through the difference in level or the strong shading in a closed building, it did not primarily serve as a place of ritual performance. This means that the central ritual action, which can be regarded as a prerequisite for the constitution of sacred space, often did not receive its own prominent architectural staging or was spatially separated from the architecturally marked boundary itself. Ritual and architectural staging, respectively agency and perception, may to some extent lie spatially close together, but in most cases they remain conceptually clearly separated, independent elements.[75]

Illustration Credits

Fig. 1: drawing by Philipp Kobusch.
Fig. 2: drawing by Philipp Kobusch, after: Amandry – Hansen 2010, plan 1; Courby 1927, fig. 132; Pouilloux – Roux 1963, plan 22.
Fig. 3: drawing by Philipp Kobusch, after Papapostolou 2014, fig. 79.
Fig. 4: drawing by Philipp Kobusch, after Ziro 1991, fig. 22.
Fig. 5: drawing by Philipp Kobusch, after Glaser 1983, fig. 46.
Fig. 6: Schazmann 1932, pl. 37.
Fig. 7: drawing by Philipp Kobusch, after Reichel – Wilhelm 1901, fig. 6. 9–10.
Fig. 8: drawing by Philipp Kobusch, after Bon – Seyrig 1929, pl. 16.
Fig. 9: drawing by Philipp Kobusch, after Roux 1961, pls. 53–54.
Fig. 10: drawing by Philipp Kobusch, after Kerschner 1996, pl. 24,4. Krakow, Czartoryski Museum 1211.

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75 In early Christianity, the opposite can be observed. For baptism as a ritual directly connected with water, a special type of building was developed – the Baptistery – , which explicitly referred to the performance of the ritual. See Zimmermann, this volume.

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6 Water in Early Christian Ritual: Baptism and Baptisteries in Corinth

Abstract: Water has been the central element of Christian baptism since the very beginnings of Christianity. After briefly introducing the origins and development of baptism, the article focuses on the relevance and performance of baptism in an early urban context, in ancient Corinth. How did Corinthians practise and understand baptism, what kind of connotations did the baptismal use of water evoke in the Corinthian context, and what significance did baptism gain during the 1st centuries AD? Baptism seems to have been developed in the early years in close contact with the local religious context and the construction of baptisteries in the 6th century AD adapted local pagan elements of architecture. The early Christian baptisteries featured water as the central element of baptism in an architecturally, ritually and theologically reflected way.

Early Christian baptism

Already in the first Christian narratives about Jesus, water plays a crucial role. The oldest of the four gospels, the gospel of Mark, begins at the River Jordan with the 'baptism' of Jesus by John 'the Baptist'. The literal meaning of the Greek words *baptizein* and *baptistes* is, respectively, submerge and submerger. John performs a baptism of repentance not only on Jesus, but also on many Jews who came to the Jordan to be cleansed of their sins (Mk 1, 1–11).

The baptism of Jesus by John most probably was an historical event.[1] The gospels of Mark, Matthew, and Luke theologise the baptism of Jesus by connecting it with the installation of Jesus as son of God by the sending of the spirit.[2] Baptism therefore becomes crucial with respect to the divinity of Jesus. After crucifixion, the followers of Jesus likely remembered the baptism of Jesus, took up the baptism of John, and began performing a similar act,[3] by which Jews – and soon after pagans – willing to follow Jesus and his teaching prepared themselves for the coming kingdom of God and joined the new movement. As the Acts of the Apostles tell us, the Jesus followers Peter, Philippus, and Paul performed baptisms. Ablution of sins was now supplemented by the transfer of the godly spirit (*pneuma*) after the baptismal act, which symbolised the believers' participation in God by the spirit and integrated the converts into the community of Christ believers. During baptism, the name of Jesus was recited and he was understood to be the new lord of the believers.

In the early years of Christianity, the newly-founded Christian communities most probably differed in the use of formulae during baptism and in performative details, as they differed in the theological understanding of baptism. Despite local differences in performance and theological interpretation of baptism,[4] water was a crucial element of this act.[5]

The Didache, the earliest Christian church order from Syria, shows that, at the beginning of the 2nd century AD, there was already a need to regulate baptism in the growing church. In Did. 7, 1–3 we read:

> *But with respect to baptism, baptize as follows. Having said all these things in advance, baptize in the name of the Father and of the Son and of the Holy Spirit, in running water. But if you do not have running water, baptize*

1 Avemarie 2002, 246 f. n. 176.
2 Mk 1, 11; Mt 3, 13–17; Lc 3, 21 f.
3 Cf. Betz 2011; Labahn 2011.
4 Müller 2012, 84–90; Ferguson 1993.
5 Cf. Klostergaard Petersen 2011, 12–14 on the ritual effects of water.

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> *in some other water. And if you cannot bapitze in cold water, use warm. But if you have neither, pour water on the head three times in the name of Father and Son and Holy Spirit. But both the one baptizing and the one being baptized should fast before the baptism, along with some others if they can. But command the one being baptized to fast one or two days in advance.*[6]

The act of baptism includes preparatory fasting of the persons involved, baptism, and a formula spoken by the Baptist: *in the name of Father and Son and Holy Spirit* (cf. Mt 28, 19). A special focus here is on the quality of water: the recommendation is to baptise in running or 'living' water; still water is the second choice and if there is no cold water, warm could be used as well. The mention of still water and warm water could be references to urban circumstances where 'living' water was not easily available.[7]

Another point discussed in the church order notes situations where there is no possibility of immersion or submersion: the Didache validates pouring water over a person (affusion) instead of immersing the person in water.[8] This regulation might refer to urban situations, too, where open water-places were not available everywhere. There is no mention of baptismal basins, fonts, or even special buildings for baptism, i. e., baptisteries. Later texts inform us about different elaborations, such as baptismal instruction and different theological interpretations of baptism.[9]

The earliest rites of baptism described in 2nd century AD texts did not demand a specific location or building for baptism, but they did demand submersion or affusion – probably most often performed in rivers – and a baptismal formula. A precondition for baptism therefore is the environmental access to (flowing) water. Around AD 200, Tertullian points out that there is no difference between being baptised in the sea, a pond, a river, a spring, a lake, or a basin (Tert. bapt. 4, 3); he attests a development of the ritual which, at least in Carthage, included praying, fasting, confession of sins, triple submersion, anointing, and the laying on of hands. Other texts from the 3rd century AD attest to similar, but also different wide-ranging developments; in the 4th century AD, we find that baptism could last several weeks (Jerusalem, Antioch) and become a long process that culminated in the baptismal act as such.[10] Baptism therefore was not practised in a singular and consistent way from the very beginning, but seems to have been a purification and entrance rite[11] into the group of Christ believers that developed within the context of the local settings of the Christian communities.

During the first Christian centuries, baptism might have been performed either in living water outside, in open or public water places,[12] or in private buildings in still water.[13] The earliest church buildings and intact, free-standing buildings of baptisteries date from the 4th century AD, when Christian religion became the official religion in the Roman empire.[14] It was only then that baptism acquired its own fixed architectural location. In addition to the introduction of baptisteries, which defined a fixed place as a kind of 'entrance' building in close connection with the church buildings, baptism definitely took place inside and was no longer visible to outsiders; it became a hidden act in which only chosen members of the Christian community would participate, with a special preparation and liturgy known only by members of this Christian group.

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6 Translation by Ehrman 2014. On baptism in the Didache, see Mitchell 2014.

7 Fürst 2008, 125.

8 Klauser 1974; Lindemann 2011, 784.

9 Strecker 2011, 1391–1404, gives a short summary of the material from the first Christian centuries.

10 Strecker 2011, 1396–1404.

11 On the problem of definition, see Klostergaard Petersen 2011.

12 Cf. Justin, 1 Apol. 61, 3: *Then they are led by us where to there is water and are reborn in the kind of rebirth in which we ourselves were also reborn* (translation by Minns 2009).

13 Klauck 1981; Meeks 1993, 159–180. On the problem of identifying private Christian houses, see Mell 2010, 19 f. 33 f. The so called house church of Dura Europos in Syria, which dates from AD 241, remains to this day a singular example: it had a room with a rectangular water basin that might have served as a baptismal basin.

14 Brandt 2011; Mell 2010, 33; Fürst 2008, 169 f.; Ristow 1998.

Baptism and the Early Christian community in Corinth

Corinth, the famous city in the north-eastern Peloponnese, was an important centre of Greek cultural and commercial life, destroyed in 146 BC by Lucius Mummius. After a period of reduced urban life, it was re-founded by the Romans as a colony in 44 BC. In 27 BC, Corinth became the capital and administrative centre of the Roman province of Achaia.[15] In addition to local inhabitants and migrants, Corinth was inhabited by Roman veterans and freedmen from leading families. Its location attracted many merchants; the city saw remarkable growth and became the 'first' city of Greece, as John Chrysostom called it in the 4th century AD.[16] During the 1st century AD, when the Christian gospel reached Corinth, a significant number of cults of Greek, Roman, Egyptian, and local gods was already established in the city. Corinth also had a Jewish community, and Clarion Apollon was venerated as the ancestor-God of the Emperor Augustus.[17]

The community of Christ believers added another type of cult to this diversity. Initially, this cult was almost invisible to outsiders, as it lacked a sacral building or a special building exclusively for reunions. In reconstructing the early community of Christ believers in Corinth – their gatherings, preaching, and practises – we only have a few written sources at our disposal: the letters of Paul to the Corinthians written in the early 50s (1 Cor and 2 Cor); a notice in the Acts of the Apostles on Paul coming to Corinth (Acts 18, 1–18), written after AD 70; the letter of the church of Rome to that in Corinth, the so-called First Clement (written about AD 100); finally, from Eusebius (AD 260/64–339/340), quotes and observations concerning the church historian Hegesippus, who travelled to Rome by way of Corinth around AD 160, and Bishop Dionysios of Corinth, who officiated around AD 170.

After having founded communities of Christ believers in Galatia, Philippi, Thessaloniki, and Beroia, Paul came to Corinth in AD 51/52 for the first time[18] and founded[19] a community of Christ believers there, which he visited again in around AD 55.[20] The author of Acts 18, 7–8 describes how he imagined Paul's first stay in Corinth: *he left there* [i.e. the synagogue] *and went to the house of a man named Titius Justus, a worshiper of God. His house was next door to the synagogue. Crispus, the ruler of the synagogue, believed in the Lord, together with his entire household. And many of the Corinthians hearing Paul, believed and were baptized*.[21] Titius Justus, a so-called worshiper of God (*sebomenos tou theou*), was a pagan man who was attracted to the Jewish religion and finally by Paul's preaching on Jesus. Crispus, the ruler of the synagogue, was also converted to the Christian gospel and baptised. His conversion, however, was not imitated by many of his kinsfolk. At the end of Paul's stay, after 18 months (Acts 18, 11), a significant part of the Jewish community no longer tolerated Paul's preaching and brought an indictment against him. This led to court action, presided over by the proconsul Gallio (Acts 18, 12–17).[22] We do not know if this story told by the author of Acts reflects historical facts, but Paul's preaching in the synagogue is quite probable, while the existence of Jews in Corinth is attested by Philo.[23] The name of Crispus is mentioned by Paul himself, who confirms baptising Crispus in 1 Cor 1, 14.[24] Paul does not mention how he performed the baptism, but from other

15 On the urban development of Corinth in imperial times, see Fouquet 2019, 28 f., who is critical about the status of Corinth as capital of the new province.

16 PG 61, 9.

17 Bookidis 2005, 151–163; for domestic cults, see Ehrensperger 2016, 108–119.

18 Koch 2014, 256 f.

19 Possibly there were already Christians in Corinth who Paul gathered into a community; see Koester 2000, 118.

20 Koch 2014, 266.

21 All translations of the New Testament texts in this article are from the English Standard Version (ESV).

22 Koch 2014, 567–571.

23 Phil. Legat. 281. Jos. BI. 3, 540 mentions that Vespasian (AD 9–79) sent 6,000 young Judaeans from Magdala to help with the building of the canal through the Isthmus of Corinth.

24 Lüdemann 1989, 203 f., argues that the identity of the two men and the Jewish background of Crispus is historically credible. On the historical credibility of the conversion of Titius Justus, see Lüdemann 1989, 203.

New Testament texts we can infer that he probably immersed or submerged converts like Crispus into living water (Acts 8, 38). How and if the transfer of the spirit was performed is not clear from Paul's texts, but in his letters he presupposes the sending of the spirit, which most probably happened during or after baptism.[25] Paul's own texts let us further assume that he baptised 'in Christ' (*eis Christon*), this is, 'in the name of Christ',[26] assigning the converts to Jesus as their new Lord. The converts most probably then confessed Jesus as 'Lord Jesus' (*kyrios Iesous*).[27] The Pauline letters show, moreover, that the converts finally thought of themselves as 'children of God', who addressed God as 'Father', probably in Aramaic *abba*, which was the original address of God by Jesus.[28] Through baptism, Christ believers entered into a community that considered themselves the family of God. From Paul's letters (and Acts) we know 12 members of the community of Christ believers in Corinth by name,[29] but the true number of members was most probably around 50 and perhaps as many as 100.[30] Only some of them, however, were baptised by Paul.

After his first stay, Paul wrote at least three letters[31] to his community in Corinth, which struggled with obvious problems of a new religious community that had to find its place in the context of the synagogue, as well as in the broader context of the Graeco-Roman and other cults of the time. There were both inter-religious problems – for example, Christ believers eating meat coming from pagan cult sacrifices[32] – and intra-religious problems, such as those caused by other Christian preachers. One point of friction among Christ believers seems to have been baptism.

In 1 Cor 1, 10–17, Paul mentions quarrels among the Christ believers of Corinth who apparently had begun founding groups. Paul urges the Corinthians to stop these quarrels:

> *I appeal to you, brothers, by the name of our Lord Jesus Christ, that all of you agree, and that there be no divisions among you, but that you be united in the same mind and the same judgment. For it has been reported to me by Chloe's people that there is quarrelling among you, my brothers. What I mean is that each one of you says, 'I follow Paul', or 'I follow Apollos', or 'I follow Cephas', or 'I follow Christ'. Is Christ divided? Was Paul crucified for you? Or were you baptized in the name of Paul? I thank God that I baptized none of you except Crispus and Gaius, so that no one may say that you were baptized in my name. – I did baptize also the household of Stephanas. Beyond that, I do not know whether I baptized anyone else. – For Christ did not send me to baptize but to preach the gospel, and not with words of eloquent wisdom, lest the cross of Christ be emptied of its power.*

Paul criticises the formation of groups in Corinth, as they threatened the unity of the young community. These groups connected themselves with leading figures, possibly associated with a certain standard of 'eloquent wisdom' (see 1 Cor 1, 18 ff.).[33] It seems that certain Christ believers in Corinth tried to convince their Christian brothers and sisters to follow one of the leading figures mentioned.[34] Apollos, a later missionary in the Christian community of Corinth, might

25 Gal 4, 6.
26 Cf. Acts 22, 16; Hartman 2011; Hellholm 2011.
27 Rom 10, 9.
28 Gal 4, 6; Rom 8, 15. Zimmermann 2007, 76–79.
29 Koch 2014, 265.
30 Lindemann 2000, 13. The total number of inhabitants of Corinth at Pauĺs time might have been around 100,000; Ebner 2012, 85.
31 The first letter is not preserved; Paul refers to it in 1 Cor 5, 9. 2 Cor might be a collection of letters. 3 Cor is a pseudepigraphic letter not included in the canon of the New Testament.
32 Cf. 1 Cor 8.
33 The Kephas, i. e. Peter-group, may have its origins in the mission of followers of Peter in Corinth. There are no indications that Peter himself came to Corinth. The Christ-group is often explained as a later addition; cf. Schrage 1991, 135 f. 143–148; Schrage explains the Christ-group as a deliberate hyperbole of Paul, who wants to show the absurdity of group-building.
34 Gerber 2010, 230–232.

have played an important role here.[35] Paul himself mentions him again in 1 Cor 3, 4–6. Acts 18, 25 relates that Apollos *knew only the baptism of John*. If this notice is reliable, it might imply that, apart from the new Christian baptismal ritual, another ritual was propagated and even practised in Corinth that resembled the baptism of John, but included neither the confession to Christ nor the transfer of the spirit.[36] Apollos might have underlined the importance of his person in connection with baptism or might have baptised in a different way and he might have been an eloquent preacher. Paul therefore counteracts the growing importance of Apollos – and possibly other leading Christians – by underlining that he himself did not baptise many people,[37] because the crucial element of his missionary work was preaching the gospel of the cross, a preaching that was authorised by God.[38]

The link between the group-building-process and baptism is disputed, but it is evident that Paul connects his critique of group-building with baptism. The groups in Corinth thus may have been related to different ways of baptism and possibly even different understandings of spirit.[39] Later in his letter, Paul refers to baptism again to point out the importance of unity instead of divisions in the Christian community: baptism gives participation in Christ (1 Cor 12, 13: *For in one Spirit we were all baptized into one body*, [...] *and all were made to drink of one Spirit*). The community of Christ believers forms the 'body' of Christ which cannot be divided into different groups. Group-building in any case contradicted the aim of baptism of creating unity and threatened the stability of the community of Christ believers.[40] Therefore, baptism had obviously started to play an important role in the early Corinthian community of Christ believers. They took baptism quite seriously, and it might be that even different forms of baptism were performed.

This assumption is confirmed by 1 Cor 15, 29. This verse shows that Christ believers in Corinth apparently not only came to be baptised themselves, but they asked for their dead relatives to be baptised, too. The verse has to be read in the context of 1 Cor 15, 12–28. In 1 Cor 15, 12–19, Paul strongly criticises Corinthians who deny resurrection and describes the process of resurrection in detail (1 Cor 15, 23–28). Then, in 1 Cor 15, 29, Paul asks: *Otherwise, what do people mean by being baptized on behalf of the dead? If the dead are not raised at all, why are people baptized on their behalf?*. Paul refers here to baptism on behalf of the dead, which apparently was practised by some Corinthians who at the same time denied resurrection. The verse is highly disputed,[41] but it seems that baptism was understood by some of the Corinthian believers not as an assurance for participating in resurrection, but probably as simply improving the status of the deceased. Richard E. DeMaris explains this concern with a general focus on death and the dead in Roman Corinth, and interprets baptism on behalf of the dead as a kind of support to enter the community of the dead.[42] If we add the consideration by Kathleen Warner Slane that Corin-

35 Cf. Horn 1992, 165; Pascuzzi 2009.

36 Cf. Avemarie 2002, 429–432. 443–452; Wolter 1987. Cf. Acts 19, 1–7, where Paul is said to have baptised anew disciples who only received the baptism of John (Avemarie 2002, 443). In Acts 8, 26–40 Philippus baptises the Ethiopian eunuch without transferring the spirit. This story possibly reflects a special rite of baptism performed by Philippus.

37 He mentions Crispus, Gaius, Stephanas, and his house by name, then downplays baptism by saying *I do not know whether I baptised anyone else* (1 Cor 1, 16). 1 Cor 10, 1–13 seems to emphasise the critique. Paul recalls the fate of the Israelites in the desert with allusions to baptism. Cf. Ostmeyer 2000.

38 Cf. 1 Cor 3, 5–9.

39 Cf. 2 Cor 11, 4.

40 Clement, the bishop of Rome, in his letter to the Corinthians, written at the beginning of the 2nd century AD, repeats this Pauline argument in stressing that the one spirit (*pneuma*) given to all (in baptism) is meant to keep the 'body' of Christ, the Christian community together (1 Clem 46, 6).

41 DeMaris 1995, 661 f.

42 DeMaris 1995; DeMaris 2008, 57–71. DeMaris argues that excavations on the north cemetery show a 'steady interest in supplying the dead with adequate goods' (DeMaris 2008, 66) and he underlines the importance of cults connected with death in Roman times (DeMaris 2008, 66–69: Palaimon, Demeter). 'Differences in burial customs might have heightened the concern about the disposition of the dead' (DeMaris 2008, 70).

thian graves in Roman times might have been seen as the final resting place of the body and not as the gateway to the underworld,[43] these believers might have sought – without believing in resurrection – to integrate their ancestors into the new religious community of Christ believers by baptism on their behalf and thus create a strong identity between the Christian and the physical family, including the ancestors.[44] Baptism on behalf of the dead is not attested elsewhere in Early Christianity and seems to have been a local Corinthian speciality in the development of this Early Christian ritual. It might indeed have its motivation in the special Corinthian interest in the care for the dead, who were no longer meant to travel into the underworld, but to stay in their graves.

Quarrels in Corinth around baptism are thus attested from the very beginnings of the gatherings of the Christ believers, and while baptism seems to be a premise for participating in the community of Christ believers, there seem to have been different practices and understandings of baptism in Corinth.

Although Christians in Corinth met in private homes (1 Cor 16, 23),[45] baptism probably did not take place in residences, but was performed somewhere outside: in the sea, under the running water of a spring[46] or in one of the baths of Corinth. Most likely, places with running water and water places not connected with the many pagan sanctuaries in the city were preferred,[47] as were thermal baths.[48]

Use of water in pagan cults and the semiotics of water in Corinth

Thus, in contrast to the probably private gatherings of the first Christians, baptism was an act initially visible to non-Christians, too. How would they perceive baptism? Did they use water in their cults too? Whereas different archaeological data suggest 'a varied and extensive use of water for cultic purposes' as in the Asclepieion or in the cult of Demeter in the Greek era of Corinth, we see a 'decline in the religious use of water' in the Roman period.[49] This phenomenon might suggest that baptism would have appeared as a strange ritual in Roman Corinth.[50] But pagans and Jews watching Christians being baptised somewhere in running water in Corinth or

43 Slane 2017, 6. The consideration follows the information that Roman tombs of the northern cemetery did not yield any vessels, 'which are usually interpreted as providing sustenance for the deceased on the journey to the underworld'.

44 DeMaris 1995, argues that baptism for the dead was a way of maintaining connections to ancestors for these Corinthians. Concannon 2016, 100, looking on migrants interprets it rather as a 'vehicle with which some Corinthians connected with the ancestral spirits of their homeland'.

45 The house of Gaius apparently offered enough space for the assembly of all Christ believers in Corinth (Rom 16, 23); Koch 2014, 265 f. Other houses offered space for at least smaller assemblies, cf. 1 Cor 16, 15 (house of Stephanas); Acts 18, 7 f. Mell 2010, 42, assumes the house of Stephanas as the earliest meeting place of Christians in Corinth; cf. Horn 2008, 82–98. On the location of these places in Corinth, cf. Schowalter 2010, 335 f: 'It is time to admit that our ability to distinguish potential *ekklesia* space in the 1st century AD Corinth is compromised for the immediate future by a lack of specific archaeological evidence'. Heid 2019, 69–160, has recently questioned the existence of house churches radically.

46 See n. 61.

47 Early catacomb paintings show baptism practised in public places with running water, too: Jensen 2011, 5.

48 Cf. Pall. Dialogus de vita sancti Iohannis Chrysostomi 9, 162–166 (Sources Chrétiennes 341, 194–196); Brandt 2011, 1589 f.; Fürst 2008, 170. On the thermal bath on the east side of the Lechaion street, see Fouquet 2019, 51 f.

49 DeMaris 2008, 48 f. The water basin of the Asclepieion (close to the gymnasium) was covered, the lustral room went out of use in Hellenistic times already. The bathing facilities of the Demeter and Kore sanctuary did not survive the sack of Corinth by the Romans. The Sacred Spring was obliterated in Roman times as well. Wickkiser 2010, 56. On water basins in the Asclepieion, see Kobusch, this volume.

50 DeMaris 2008, 49.

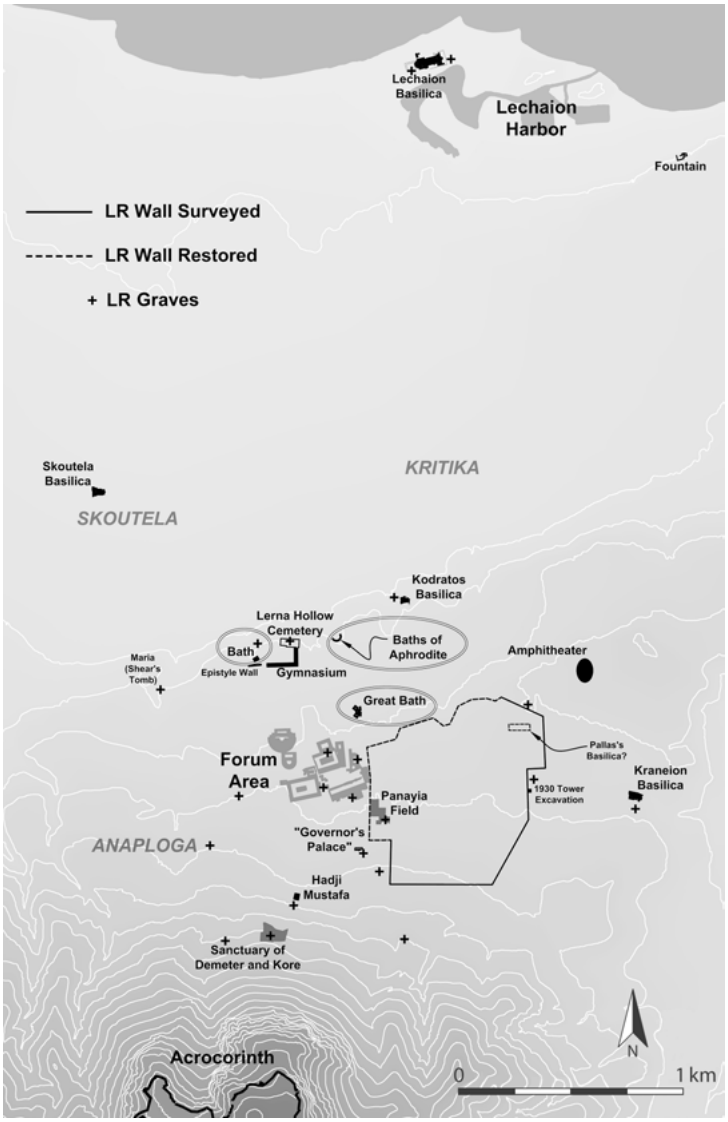

Fig. 1: Corinth, baths in Roman times. LR: Late Roman.

in a public water place nonetheless would not be surprised: Jews practised their own ritual washings, and baptism practised as an immersion into water would first of all resemble a washing connected with words which might not even have been heard by passers-by. Taking into account that this was a religious act, and knowing that after baptism Christ believers participated in meetings held in private homes, pagan Corinthians probably would have thought of similar pagan rituals and gatherings as in the Mysteries,[51] although there is no real parallel to Christian baptism in the pagan cults.[52]

Demeter and Kore had a sanctuary at the hill beneath Acrocorinth (Fig. 1) and Eleusis with its Mystery cult of Demeter and Kore was not far from Corinth. The cult images of Demeter and Kore in Corinth were not exposed to view[53] and might have been part of a mystery cult too.[54] Although water facilities in the sanctuary apparently were no longer in use in Roman times,[55]

51 Lucian (2nd century AD) called Christianity a new τελετή (Lucian. De morte Peregrini 11) and Celsus (2nd century AD) compared Christianity to the other τελεταί (Orig. 3, 59). Kloft 2003, 114.

52 Graf 2011, 101 f. 110–114.

53 Paus. 2, 4, 7. Reichert-Südbeck 2000, 222. 225–227; Brown 2018, 142–144.

54 Reichert-Südbeck 2000, 225, notes the large number of cult members, most probably exclusively women.

55 See n. 49.

the memory of the former importance of water in the sanctuary might still have survived. Isis, linked with Mysteries in nearby Kenchreai, if we follow Apuleius (Met. 11), was venerated in Corinth already in the 1st century AD and even before.[56] The sanctuary of Isis in Corinth might have been located close to the Hadji Mustafa fountain spring (Fig. 1) serving to supply water.[57] The famous narrative of Apuleius on the Mysteries of Isis in Kenchreai dates only from the 2nd century AD and might be pure fiction, but in Apuleius' description, bathing was part of the preparation (*sueto lavacro traditum*, Apul. Met. 11, 23), as was an affusion by a priest of Isis (*purissime circumrorans abluit*, Apul. Met. 11, 23). Additionally, the initiation ritual of *travelling through the elements* (*per omnia vectus elementa remeavi*, Apul. Met. 11, 23) might include contact with water, too. We do not know about the real practices of the Isis cult in Kenchreai nor in Corinth, but at least there are archaeological traces of the use of water in the context of this cult.[58] But even if we suppose an initiation ritual in connection with water in the Mystery cults, baptism is unique in performing not only a cleansing act, but in connecting this act with granting the Holy spirit of God and transfering the believer under the dominion of Christ.

While the cultic use of water in Corinth declined in Roman times and the use of water in the Isis cult remains hypothetical, interest in bathing facilities grew considerably. A number of public baths were built during this period (Fig. 1), suggesting a manifold presence and importance of water in Corinth.[59] In the 2nd century AD, Pausanias summarises:

> *The Corinthians have baths (loutra) in many parts of the city, some put up at the public charge and one by the emperor Hadrian. The most famous of them is near the Poseidon. It was made by the Spartan Eurycles, who beautified it with various kinds of stone, especially the one quarried at Croceae in Laconia. Throughout the city are many wells (krenai), for the Corinthians have a copious supply of flowing water, besides the water which the emperor Hadrian brought from Lake Stymphalus* [...].[60]

Water was present at many places in Corinth, which was named 'well-watered', as springs[61] and many local aquifers brought water to the city.[62]

Apart from the possible use of water in local cults and Mystery cults, the growing importance of bathing in Roman Corinth, and the obvious cleaning effects of water, there were more aspects of water that the local inhabitants could associate when experiencing the use of water in baptism. Local Corinthian traditions show that water places, especially fountains, not only supplied water or offered a refreshing and relaxing atmosphere, but told stories connected with life, death, and the idea of transformation.[63] Some of the Corinthian water places thus offered a mental background for the belief in the transformative character of water and baptism. One

56 Brown 2018, 141; Concannon 2016, 90 f. Paus. 2, 4, 7 knows of two sanctuaries of Isis and two of Sarapis. Ebner 2012, 32, mentions an inscription from Corinth dedicated to Isis (AD 50) and refers to a possible mystery cult in the area of the Isthmic games.

57 Brown 2018, 141.

58 In the Isis cult in Kenchreai, a hydria symbolising Osiris apparently had a central cultic function; cf. Apul. Met. 11, 11; Nagel 2013, 167; Rife 2010. The location of the Isaeum in Kenchreai is still disputed; Rothaus 2000, 69–71.

59 Concannon 2016, 97. Examples are the Roman Baths on the Lechaion Road and the Great Bath, see Brown 2018, 60–62; Fouquet 2019, 51–53. The Great Bath was the major bathing complex of third-century Corinth, Brown 2018, 62. Another impressive bath dates from the end of the 2nd or early 3rd century AD: Biers 1985. Baths from the 5th and 6th centuries AD are mentioned by Brown 2018, 62–64, as well as springs which were tapped in the Roman era (Brown 2018, 131).

60 Paus. 2, 3, 5 (translation by Jones 1979). Cf. Str. 8, 6, 21.

61 Cf. the Hadji Mustafa fountain spring on the road up to Acrocorinth and the Kakavi spring to the east; Brown 2018, 63; Landon 2003, 46–48.

62 Concannon 2016, 97; Brown 2018, 58–70; Landon 2003; Fouquet 2019, 104–106, assumes that the Fountain of the Lamps, a Hellenistic *loutron*, close to the Asclepieion, was renovated in Roman times, too. On the water supply system in Corinth, see Fouquet 2019, 39 f. From the 2nd century AD onwards, around 80,000 cubic meters of water were transferred from the lake of Stymphalia to Corinth via the Hadrianic Aqueduct.

63 Robinson 2011, 30.

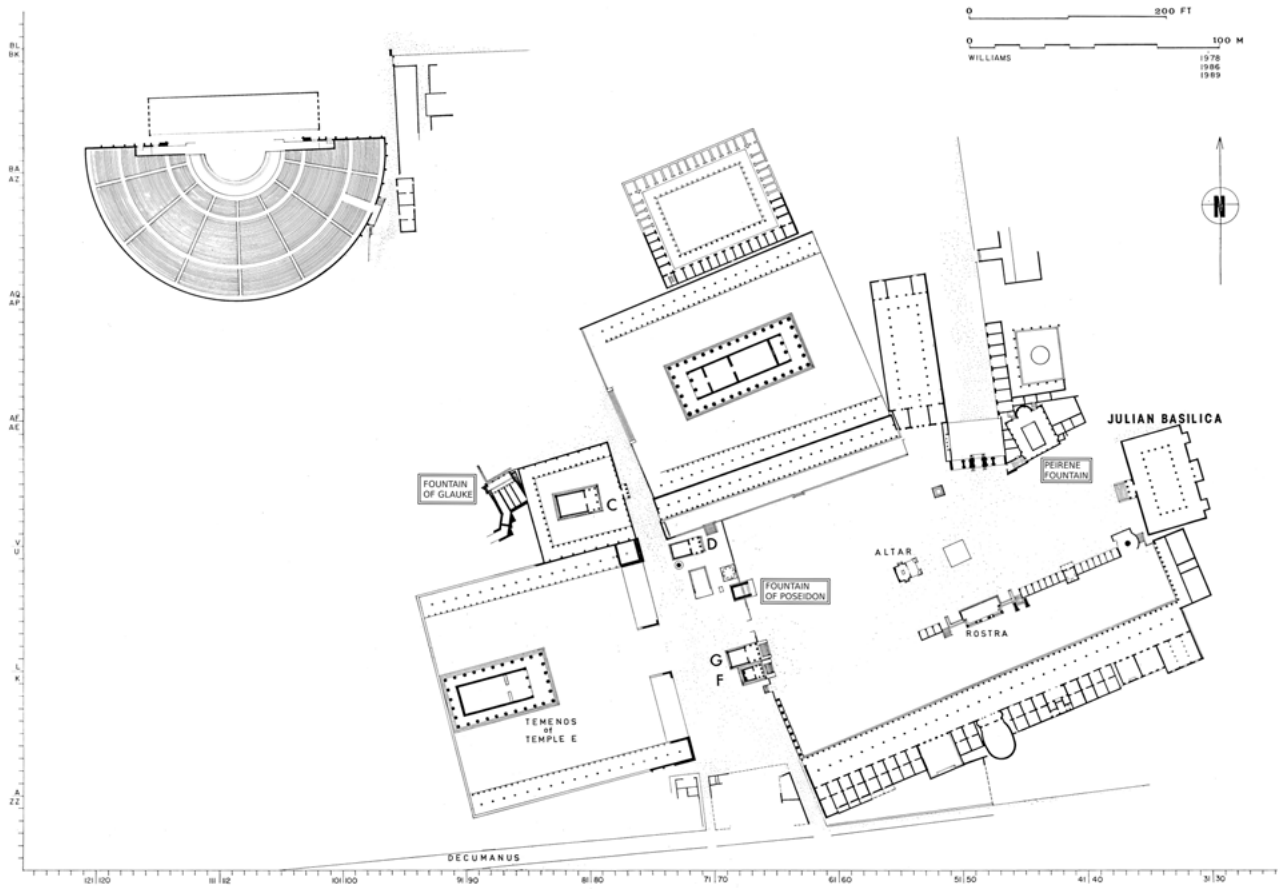

Fig. 2: Corinth, forum, mid-1st century AD (Fountain of Glauke, Fountain of Poseidon, Peirene Fountain).

example is the fountain of Glauke[64] (Fig. 2), named after the second wife of Jason, who sought relief from the burning sensation of the poisoned dress that Medea, Jason's first wife, had sent her as a wedding gift (Paus. 2, 3, 6). Glauke hoped for salvation through water, but nevertheless died.[65] Another example is the lower Peirene fountain to the north of the forum (Fig. 2), which has a long history. Remodelled after the city was re-founded, the fountain was transformed into a luxurious marble revetted courtyard in the late 1st or early 2nd century AD.[66] Since the 1st century BC, the upper Peirene fountain had been located in a meadow below Acrocorinth and was probably connected with the lower Peirene fountain.[67] The lower Peirene fountain commemorates the location of Bellerophon's taming of Pegasus,[68] but Pausanias provides more information: 'the legend about Peirene is that she was a woman who became a spring because of her tears shed in lamentation for her son Kenchrias, who was unintentionally killed by Artemis' (Paus. 2, 3, 2–3).[69] The myth connects the fountain with a story about the tears of a mother having lost her son. The fountain was 'one of the most famous Corinthian landmarks in the ancient world', known by many authors of antiquity.[70] There was also the fountain of Poseidon

64 The fountain was revived after the middle of the 1st century AD; Robinson 2011, 201.
65 See Fouquet 2019, figs. 11–13. The original context of the fountain might have been different, see Reichert-Südbeck 2000, 155 f.
66 Robinson 2011, 175–203. Fouquet 2019, 48 f. 131–133.
67 Robinson 2011, 20.
68 Robinson 2005, 116–127.
69 The two harbours of Corinth were named after Leches and Kenchrias, the sons of Peirene (Paus. 2, 1, 3).
70 Robinson 2011, 28–30.

(Fig. 2), father of Kenchrias, and lord over life and death at sea, located on the forum's west terrace.[71]

Despite the absence of water from cultic rituals in Corinth after the city's re-founding by the Romans, the refreshing atmosphere of baths and the myths and stories linked to the fountains offered a local encyclopaedia connecting water with purification, renewal, and stories about life, death, and transformation.[72] Thus, baptism most probably dovetailed with the general importance and connotations of water in Corinth. Christ believers discussing different models of baptism and practising baptism interacted 'with the complex cultural situation that typified life' in Corinth.[73]

Late Antique baptisteries in Corinth

Christianity in Corinth spread during the first centuries: Clement, the bishop of Rome, addressed a letter to the Corinthians at the beginning of the 2nd century AD, exhorting the still-confrontational Corinthian Christians to be humble; a number of martyrs are known from the times of prosecution, including Silas, Kyriakos, and Leonidas.[74] But there are no archaeological remains to help reconstruct baptismal rites, rooms, or churches from the 2nd to the 6th centuries AD.[75] After the Pauline letters that confirm the growing importance of baptism, there are no hints in the following centuries regarding the development of baptism in Corinth.

In the 6th century AD the situation changes. Various churches were built (Lechaion basilica, Quadratus basilica, Kraneion basilica; a basilica with a martyrion;[76] basilica in Skutela),[77] possibly in connection with the building policy supported by Emperor Justinian and a resulting local competition.[78] None of these basilicas was built in the centre of Corinth[79] (Fig. 3), a phenomenon that might have its cause in the apparent connection of the churches with Christian cemeteries.[80] The effect of this building policy seems to have been a most visible sacralisation of the landscape around Corinth, pointing to Christianity as the major religion at this entrance gate to the Peloponnes.[81] 'The basilicas announce visually, aurally and olfactorily that Corinth was Christian [...] the basilicas proclaimed that the aristocracy, and the Empire were fully in support of this Christianity'.[82]

71 Concannon 2016, 97; Robinson 2011, 201; Fouquet 2019, 60–62. Another prestigious central fountain was built in the South Stoa of the forum, Fouquet 2019, 79 f.

72 Concannon 2016, 91–93, connects the Peirene fountain with the taming of Pegasus by Bellerophon, but this is only one – certainly important – element of the myth.

73 DeMaris 2008, 50.

74 Pallas 1990, 748.

75 In the fountain of Lamps, however, some 4,000 lamps were found, many inscribed with Christian invocations, which might be connected with baptism, see Brown 2018, 131 f.

76 Pallas 1990, 764, dates it to the time of Justinian I.

77 Brown 2018, 147, counts 'at least eight large, new sixth-century AD churches built, all adjacent to earlier pagan sanctuaries'. As far as the basilicas of Lechaion, Quadratus, and Kraneion are concerned, we can assume that they were built on earlier Christian buildings which most probably did not date to before the 4th century AD. Rothaus 2000, 94 f., discusses other possible Christian remains. Another basilica was built close to the Temple of Aphrodite in Acrocorinth (4th /5th century AD?), see Peloschek 2010, 21 f.; Brown 2018, 146 f, mentions a second one.

78 Vionis 2017, 152. On the economic prosperity of Corinth from the 5th to 7th century AD, allowing this building boom, see Jacobs 2014, 86 f.

79 Nevertheless, remaining pieces of Christian buildings and sculpture found close to the agora hint at the existence of a church in this area, too, see Pallas 1990, 760.

80 Brown 2018, 147.

81 Rothaus 2000, 102.

82 Rothaus 2000, 103.

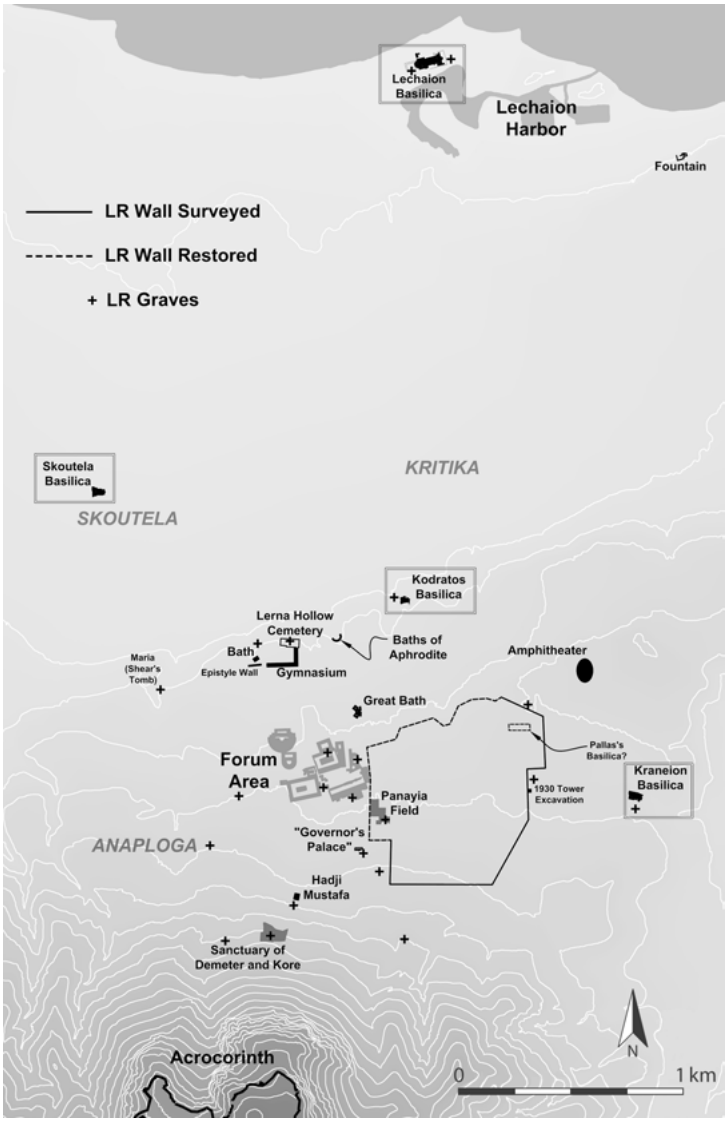

Fig. 3: Corinth, the main basilicas, 6th century AD. LR: Late Roman.

Some of these churches, the basilicas of Lechaion, Skutela and Kraneion, were connected to baptismal buildings[83] (Fig. 4), which localised baptism now in the sacred area of the basilicas and transferred the Christian initiation ritual into a fixed architectural structure.[84] The baptisteries built adjacent to the basilicas, but not integrated into them, interpreted baptism in an architectural way as a rite de passage from the non-Christian to the Christian world.

The Lechaion basilica near the harbour, probably built in the mid-6th century AD,[85] was one of the largest basilicas of the time and possibly the seat of the archbishop. From the 1st to the 6th centuries AD, Christianity in Corinth had spread considerably, especially after the Constantinian shift, but the basilica's size does not just reflect the growing numbers of Christians, but imperial policy, too.[86] The basilica demonstrated the power of Christianity – now

83 Ristow 1998, 155 no. 247, mentions a piscina belonging to the church on Acrocorinth, which might have had a baptistery, too.

84 Fürst 2008, 170–192, gives an overview of architectural forms and decoration of late antique baptisteries.

85 Pallas 1990, 774, dates the building process between AD 450–457 and AD 518–525 (repairs). Sanders 2005, 440, suggests the restoration process dates to after AD 525.

86 Caraher 2014, 148. 151 draws this conclusion from the size, style and quality of the Lechaion basilica; cf. Brandt 2011, 1588.

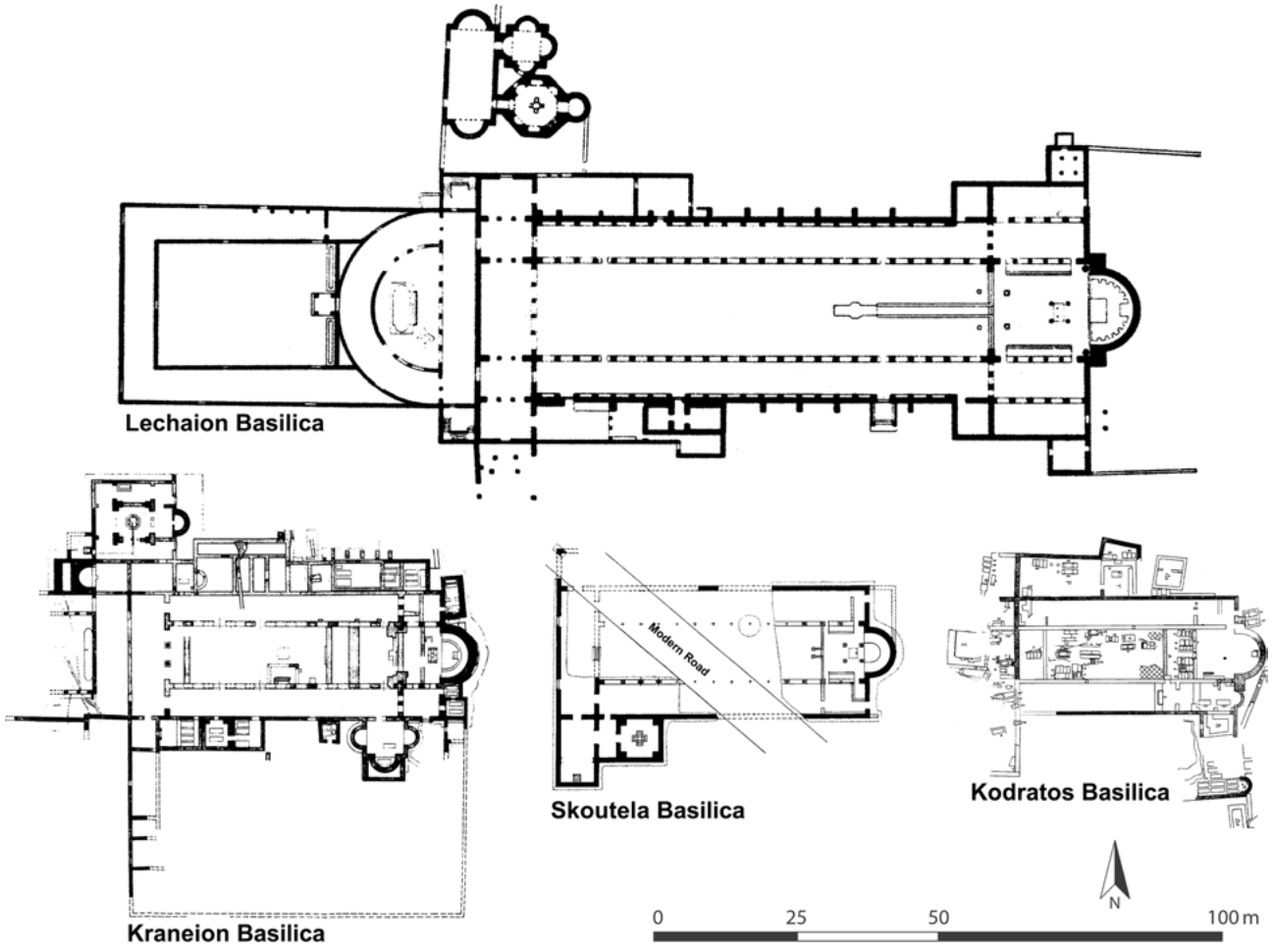

Fig. 4: Corinth, the basilicas and baptisteries, 6th century AD.

supported by the imperial family – to anyone passing by. Everybody approaching Corinth from the sea would notice that Christianity was the religion supported by the authority of the emperor.

The Lechaion basilica most likely was built close to a place where a former martyr, St Leonidas, had a shrine.[87] Leonidas and seven Christian women accompanying him were drowned in the sea during the persecutions and miraculously were washed up onto the beach.[88] It is very possible that Early Christians in Corinth used water and practised baptism as an initiation ritual reflecting the death and resurrection of Jesus in a context which allowed commemoration of the dying and 'rising' of these martyrs, too. The death of these martyrs was understood as their birth into spiritual and eternal glory, as baptism was understood as a kind of death and rebirth. Converts would benefit from their confession to Christ and the divine patronage of the martyrs.[89] The basilica featured water prominently and not only in the baptistery: several water basins were built in the atrium, possibly for purification rituals,[90] while there were tubs for washing feet near the gate.[91]

87 Pallas 1990, 776. There are no indications that the basilica was built in place of a former pagan sacral building. Cf. Peloschek 2010, 15.

88 Pallas 1990, 770; Halkin 1953; Brown 2018, 135 f.

89 Brown 1981.

90 On purification rituals in pagan Greek sanctuaries in Hellenistic times, see Chiarenza and Kobusch, this volume.

91 Pallas 1990, 770; Rothaus 2000, 96 f. Under the main room a sewage system was installed (Pallas 1990, 773).

The baptistery of the Lechaion basilica (Fig. 5) follows the floor plan of pagan baths[92] and evokes martyria and tombs in Italy and north Africa; this may allude to the function of the church and baptistery as a martyr shrine.[93] The form of the baptistery, then, corresponds to the theological understanding of baptism as the washing away of sins, and as dying and rising with Christ. But the architecture of the baptistery followed a growing liturgy for baptism, too, which demanded different steps for confirmation, including the rejection of Satanic powers,[94] and the changing of clothes before the ritual act performed in the basin. 'The baptistery itself consists of three architecturally distinct compartments. The largest is a 16.20 × 7.60 m hall with apses on its north and south end. This main hall was entered from the south end, presumably from the basilica, through the apse. To the east of this apsidal hall were two additional chambers. The northern chamber has a central core measuring 5.05 m square with apsidal exedra at the cardinal directions. Entered from the west through the western apse, this room was identified by the excavator as the *apodyterion*. This chamber lacks a font and seemed well positioned for this purpose. Immediately to the south of this chamber was the octagonal *photisterion* or baptistery proper which measures 3.15 m across. It appears to have communicated with the *apodyterion* to its north through the triangular space formed by the east wall of the long hall and the west walls of the north and south chambers. The octagonal room featured apses at the corners and square exedra at the cardinal directions. To the west, the *photisterion* communicated with the long hall. To the east projects a usually shaped apse. Marble revetment decorated the walls of the elaborate buildings and the interior of the font. The *photisterion* preserved two fonts. The centre of the octagonal interior space featured cruciform octagonal font set in the floor with stairs on the northern and southern cross-arms. It is just under 0.50 m in depth [...] A smaller font sits in the southeast apse'.[95]

Catechumens, after having confirmed in the main hall and taken off their clothes in the *apodyterion*, would enter the cruciform font in the *photisterion* and be baptised by the bishop and a deacon.[96] Single doors in the different rooms pointed the way clearly to the following room, which had a different function in the baptismal liturgy. Leaving the *apodyterion* by a single door and a small rectangular floor, the catechumens entering the *photisterion* immediately faced the basin lowered in the middle of the room. The centric structure of the *photisteria* signaled very clearly the water basin as the destination of the procession which the catechumens had started in the main hall. Catechumens would enter the basin from one side by steps, be baptised by the clerics standing on their right and left, and leave the basin, baptised, by the opposite side. After baptism, the newly baptised would leave the *photisterion* again by a single door and would finally be allowed to enter the main area of the basilica, probably wearing a new white dress, and participate in the Eucharistic meal and the liturgy as real members of the Christian community. There is some indication that the impressive baptistery of the Lechaion

92 Pallas 1990, 774. Sanders compares bathing establishments in Corinth with the form of the baptistery, see Sanders 1999, 474 f.; Caraher 2014, 149 map 8.2. Brandt 2011, 1588, demonstrates the convergence of baptismal terminology with the terminology concerning baths.

93 Pallas 1990, 776, assumes the former martyr shrine to be close to the basilica, but not at the same place.

94 Müller 2012, 87.

95 Description by Caraher 2009. The function of the second font is not clear, Fürst 2008, 174. On the apses in late antique baptisteries, see Fürst 2008, 176.

96 The Traditio Apostolica 21 mentions a presbyter/priest and a deacon. The Didascalia Apostolorum 8, 28 mentions the assistance of deaconesses at the baptism of women. Although the church orders of the 3rd and 4th centuries show different liturgies, Müller 2012, 94, mentions some essential elements of baptism performed in baptisteries. The central act of baptism was a triple immersion/affusion by the clerics, followed by a Trinitarian confession of the baptised (see Didache 7,1–3). The body of the baptised would then be anointed, he/she would be granted the spirit by the laying on of hands by the bishop, and his/her front would be anointed. Fürst 2008, 127–137, gives more details on pre- and post-baptismal rites and on the baptismal act. Fürst 2008, 172, notes the difficulty of correlating archaeological structures to a specific baptismal liturgy.

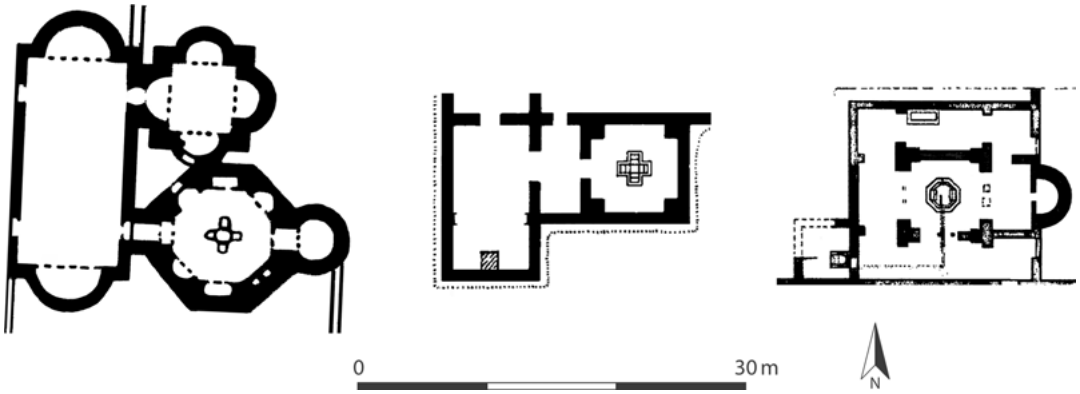

Fig. 5: Corinth, Lechaion basilica, baptistery.

Fig. 6: Corinth, Skutela basilica, baptistery.

Fig. 7: Corinth, Kraneion basilica, baptistery.

basilica predates the basilica[97] and continued to be used even after the main basilica was damaged and abandoned (presumably as a result of the earthquake in AD 551).[98] It seems that a 3rd century pagan nymphaeum near the Lechaion basilica was converted to Christian use in the 6th century and from then on functioned as a kind of architectural 'introduction' to the basilica or different church buildings.[99] William R. Caraher assumes that the nymphaeum might have served 'to advertise the imperial connections of a wealthy local resident, to support the prestige of the ecclesiastical hierarchy, or to serve as a stopping point for travellers along the coastal road on the approach to the church at the Lechaion'.[100] Featuring water prominently, the nymphaeum could have demonstrated to everybody the significance of water as a metaphor of life in Christianity and the importance of its cultic use in baptism, too.

The basilica in Skutela, built in the 6th century AD, was located outside the ancient walls in the northwest of the city; it was much smaller than the Lechaion basilica, but it may have been connected with one of the martyrs of Corinth, too.[101] The basilica likewise had a baptistery (Fig. 4), with a room for catechesis, a passage (*apodyterion*?) and a *photisterion* with an octagonal basin (Fig. 6).[102] The rooms followed each other in an axis directed towards the east. Here again, single central doors leading to the next room would clearly show the catechumens their way to the sacral centre, the octagonal basin. The walls of the *photisterion* form a cross, too.

The Kraneion basilica near the former gate to Kenchreai was also built in the 6th century AD. A baptistery on its north side consisted again of three rooms (Fig. 4) and a *photisterion* with an octagonal basin[103] framed by four pilasters connected by marble bars,[104] underlining the restricted access to the basin and its holyness (Fig. 7). A small apsidal room directed to the east as the apse of the basilica might have served for anointment or shaving of the newly baptised and so might have had a special function in the baptismal liturgy, too.[105]

Three Corinthian basilicas from the 6th century AD (Lechaion, Skutela, Kraneion) each had a baptistery consisting of three rooms and a cruciform baptismal font in each case, suggesting a partial immersion of the converts.[106] The baptisteries served as a kind of ritual entrance build-

97 Rothaus 2000, 96.
98 Pallas 1990, 793.
99 Pallas 1990, 766. Brandt 2011, 1590, points to the growing popularity of baths and nymphaea in the 3rd and 4th centuries.
100 Caraher 2014, 150.
101 Pallas 1990, 776 f.
102 Pallas 1990, 777; Ristow 1998, 156 no. 250.
103 Pallas 1990, 780–786; Ristow 1998, 155 no. 248.
104 Pallas 1990, 785.
105 Pallas 1990, 785.
106 Sanders 2005, 441, assumes total immersion; the depth of the basins rather hints to a partial immersion and affusion.

ings to the churches. They were not part of the main building, but adjacent to it, still separating the not-yet-Christians from the sacred Christian space. All three baptisteries seem to have had a final entrance door to the aisles of the basilicas, giving access to the sacred area directly after baptism. Although they were not part of the main building, the baptisteries had a central function as 'entrance rooms' to the basilicas, representing the passage from non-Christianity to Christianity.[107] In contrast to purification rites, baptism was performed only once; the elaborated procedure of baptism in a separate building emphasised that baptism was understood as a rite de passage, following different steps, and as an initiation ritual into a community which was architecturally defined by the nearby basilica. Water played a central role in this passage, as indicated by the central position of the baptismal basins, which were architecturally staged.[108] But water featured prominently only in the central room, the *photisterion*, and water was not the only element pointing to the renewal of life: the dying and rising with Christ, the transfer under the dominion of Christ, the granting of the Holy Spirit, and the integration into the Christian community were theological effects as important as the purification from sins by immersion into the baptismal font. These theological effects, central for the understanding of baptism, could not easily be reflected by the architecture.

The cross-shaped baptismal fonts, however, recall the central symbol of the Christian gospel, introduced into Corinth by Paul, who preached 'the word of the cross' (1 Cor 1, 18). Converts entering the Corinth baptisteries stepped down into a cruciform font, reflecting the essential soteriological symbol of Christianity: the saving force of the dying of Jesus on the cross was transferred to the converts in baptism (cf. Rom 6, 3; Gal 2, 19). Architecture, myths, and cultic practices are aspects already closely connected in Greek and Roman Corinth, as demonstrated above, and they continue to be connected in Early Christianity, too. Christianity, however, added a theological framework that influenced architectural structures and even the decoration of Christian buildings. As in other places, the Christian baptisteries in Corinth might have been decorated with biblical symbols for life in mosaics and wall paintings.[109] The baptisteries in Corinth were not just functional buildings, but bore a wide range of theological meanings. Like other water places in the city, they were connected with stories of life, death, and transformation, and their architecture, resembling Corinthian baths, helped create a familiar atmosphere.

There may have been multiple reasons for building several basilicas and three baptisteries in Corinth during the 6th century AD.[110] The construction of monumental new churches can be seen at different places across Greece at the time.[111] Richard M. Rothaus interprets the impressive building process in Corinth as a sign of imperial propaganda, but takes a growing power of bishops and clerics into account, too.[112] Caraher sees the monumental Christian architecture as a reflex of local competition between different groups and as a kind of architectural 'conversation', showing that Christianity was an authority not dependent on monumental buildings in the city centre and was locally growing everywhere in the outskirts of the city.[113] In any case, the monumental church buildings around Corinth demonstrate 'the growing power of the local Christian community'.[114] Whereas Rothaus and Caraher are reluctant to relate the size of the

107 There is no information on rituals at the entrances to the baptisteries in Corinth; cf. Day 2018 on the entrances to the baptisteries in Milan and Jerusalem.

108 See, in contrast, Kobusch, this volume.

109 Cf. Jensen 2011. Fürst 2008, 176–187, gives examples.

110 The presence of at least three baptisteries in Corinth during the 6th century AD has not yet been explained satisfactorily. Possibly we have to reckon with more than one bishop at the time. Unfortunately, only three inscriptions dating from the 5th to 7th centuries AD give evidence of bishops in Corinth: Sironen 2018, 202 (a bishop's muleteer). 206 (Eustathios). 210 (Photios).

111 Brown 2018, 147.

112 Rothaus 2000, 95 f.; Caraher 2014, 145 f. Vionis 2017, 145 f. hints at the fact that the private land of rich Christians might have been used to build monumental churches around cities in Late Antiquity.

113 Caraher 2014, 145–147.

114 Vionis 2017, 152.

churches and baptisteries to a growing Christian population,[115] Guy D. R. Sanders still points out 'that the galleries at Lechaion afford as much space to catechumens as to baptised in the aisles below. We know that adults often put off baptism until late in life, but one can also speculate that a large number of Corinthians were late in adopting Christianity. This neglect may have required urgent remedial action in the early 6th century [...]. In the 6th century, the buildings that were erected provided an inordinate amount of space for adult catechumens, suggesting a large population of unbaptised Corinthians'.[116] After several centuries where Christianity played no major role as yet, the situation changed considerably, at least in the 6th century AD. The reason for the large number of converts might be seen in imperial policy, but also in the experience of disastrous natural phenomena in the second quarter of the 6th century AD, such as earthquakes, famine, and epidemics in AD 542.[117] 'With Poseidon, Demeter, and Asclepios unable to avert these disasters, Corinthians may have had cause to reflect on the relative potency of the Christian God. Combined with mounting pressure from Justinian [...] these natural disasters may have persuaded many Corinthians to accept Orthodox Christianity in the mid-6th century'.[118] The size of the baptisteries might at least be due to the fact that baptism in Late Antiquity seems to have been performed only once a year.[119] In Corinth, however, the impact of imperial power on Christian architecture is evident and might be an important explanation for the large number of monumental, but also less monumental church buildings in the area.

Conclusion

Like Christianity itself, baptism underwent different developments during the first Christian centuries. Local interests and aspects seem to have played a role in the way Christ believers practised and understood baptism. In the early years of Christianity, baptism was of great importance in Corinth and practised in different forms, probably somewhere outside with running water. Baptism even seems to have been practised on behalf of the dead, possibly taking up a special Corinthian interest in the well-being of the dead. The later Corinthian baptisteries continued to use the Corinthian context: the Lechaion baptistery was built with a close formal similarity to pagan baths and so demonstrated that baptism was a cleansing act, albeit now not in a physical, but in a spiritual sense. Baptism, the Christian purification and entrance ritual, during the first Christian centuries developed in strong interaction with the local cultic and architectural context of Corinth. The construction of baptisteries, however, built adjacent to the main sacred area of the basilicas and used exclusively for the Christian initiation ritual, does not have a parallel in any of the pagan cults of Corinth, which seem to have featured water basins for regular purification only.[120] The architecture of the baptisteries, albeit adapting pagan architecture, is closely linked to the ritual and theological dimension of baptism which focuses on water as the central element of the Christian initiation ritual. The sequence of rooms pointing to the baptismal basins as the centre of the baptisteries, the staging of the basins and the cross-shaped form of the basins demonstrate this clearly.[121]

115 Rothaus 2000, 96.
116 Sanders 2005, 441.
117 Pallas 1990, 747 f.
118 Sanders 2005, 442.
119 Fürst 2008, 128.
120 The Isis cult might have been an exception, see above.
121 I am most grateful to my colleague Andreas Müller and to my assistant Hi-Cheong Lee for helpful comments.

Illustration Credits

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Fig. 1: Zimmermann, after the American School of Classical Studies in Athens, Corinth Excavations.
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Fig. 3: Zimmermann, after the American School of Classical Studies in Athens, Corinth Excavations.
Fig. 4: Zimmermann, after the American School of Classical Studies in Athens, Corinth Excavations.
Fig. 5: American School of Classical Studies in Athens, Corinth Excavations.
Fig. 6: American School of Classical Studies in Athens, Corinth Excavations.
Fig. 7: American School of Classical Studies in Athens, Corinth Excavations.

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Dylan K. Rogers

7 Aquatic Pasts & the Watery Present: Water and Memory in the Fora of Rome

Abstract: The Forum Romanum in Rome is a space that was constructed on an aquatic landscape – and subsequent built structures there reminded ancient Romans of that landscape, in addition to mythical, historical, and mytho-historical figures and events of the past. This paper demonstrates how the city centre of Rome, replete with numerous monuments that did not actually have running water like subsequent grand fountains of the Imperial period, were the products of the commemorative practices of the Romans, tied directly to sensorial experiences, memory, and identity. The monuments explored here represent the power of the Romans, in addition to their naval victories and mythical past predicated on water. The metaphysical topography of the Forum Romanum provided a space intimately tied to water, which also had the potential to be replicated in other parts of the Empire, tying its inhabitants to the capital.

The city of Rome, the capital of a vast Empire, possessed spaces intimately associated with water in its Forum Romanum and adjacent Imperial Fora. Due in part to its ancient origins, the Forum Romanum became the city centre of Rome, and also provided a model upon which subsequent fora in the city and throughout the Empire were based. The Forum Romanum, however, was built upon an aquatic foundation, both literally and figuratively (Fig. 1). The Romans used the aquatic landscape of the space over time in the way they constructed the built environment there, particularly with monuments tied to water that were connected to mythical or historical figures, although without displaying moving water. The ensemble of the Forum Romanum and the later Imperial Fora demonstrates the ways in which monuments tied to water and water-displays evoke mythical and historical events and figures, allowing for the commemoration of the past and present through water and creating a shared sense of identity.

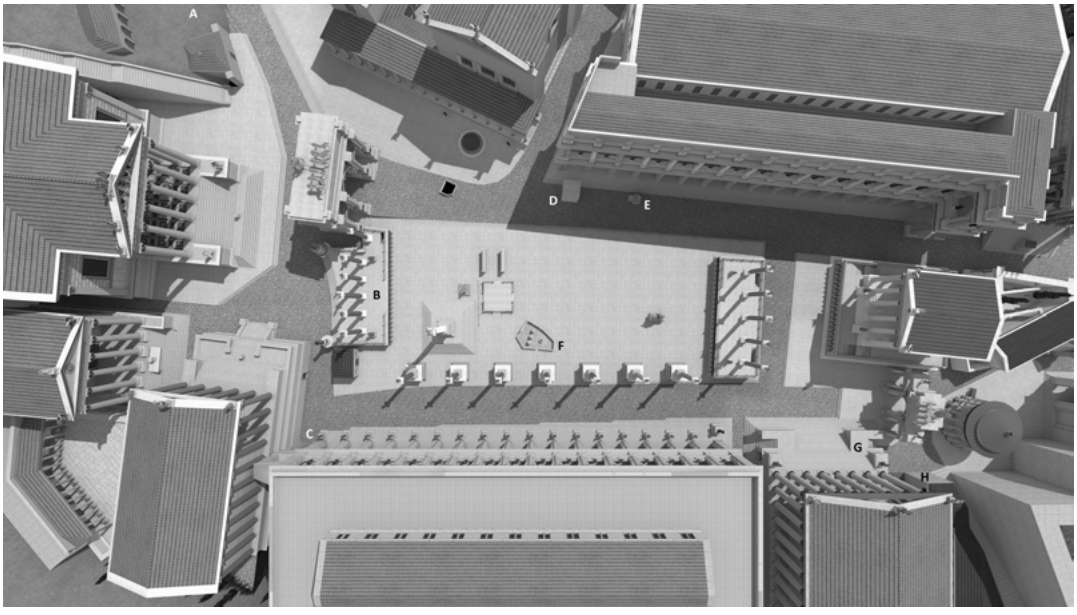

Fig. 1: Rome, plan of the Forum Romanum, ca. AD 320: Tullianum Spring Area (A), Previous Location of *Rostra Augusti* and Rostrate Columns of Augustus (B), Previous Location of Lacus Servilius (C), Temple of Janus (D), Sacellum of Venus Cloacina (E), Lacus Curtius (F), Temple of Castor and Pollux (G), Lacus Iuturnae (H).

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Place and Memory

Perception of space by the five senses is important to form memories. Experiencing the built environment is a dynamic interaction that requires movement. Considering how ancient Romans viewed and physically interacted with religious structures, Richard Jenkyns suggests that humans have a sixth sense: our perception of spatial experience.[1] Indeed, it is our physicality that informs us of what is around us and what we are encountering. The act of walking in and around a space allows us to consider all five senses, as this physical movement 'plays a central role in our relationship with the world around us; it is essential to our experience of place, to the way we see and think, and to our assumptions about identity'.[2] In this vein, modern scholarship has recently turned to considering the role of sensory perception in understanding ancient Roman life, society, and culture.[3]

In our perception and understandings of our surroundings, we can truly understand place and the material world around us. By engaging all of the senses, we are able to create a 'sensory envelope,' in which we seek 'to identify the area around a given location where all of the senses are engaged, thus framing and bounding vignettes and narratives'.[4] Sensory experiences are then tied to notions of place – which can be defined loosely as the area that we perceive and experience with our bodies.[5]

Places, then, are the repositories of memories. Modern scholarship has offered a variety of paradigms to conceptualize memory in the Roman world, including popular, monumental, cultural, and collective memories.[6] No matter how one might conceive of how to read a monument or text, what belies memory is its universal nature, in that all humans make memories. Experience and culture are inextricably tied, especially in how one interacts with a monument to create memory. As people encounter a space, they will not only form their own memories about their experience in that space, but also remember historical or mythical associations of those monuments. In a passage of Cicero's *De finibus*, Marcus Piso, reflecting on a visit to Plato's Academy states:

> *Is it inborn in us or produced by some trick that when we see the places in which we have heard that famous men performed great deeds, we are more moved than by hearing or reading their exploits?* [...] *So great a power of suggestion resides in places that it is no wonder the Art of Memory is based on it.*[7]

Piso stresses the nature of seeing and *interacting* with a monument, which, in turn, brings up its own memories. For example, when ancient Romans went to the Roman Forum and saw the Lacus Iuturnae, they would think of a number of associations, such as Iuturna, the eponymous nymph of the spring, but also the mythical figures of Castor and Pollux who watered their horses at that spot, as we will explore below. Indeed, this is what can be part of 'metaphysical topography', in that each of the places in the forum would have been tied to meaning for a Roman audience.[8]

Finally, memories have the ability to help construct a shared identity for a group. The relationship between a person and the place that architecture occupies has been articulated as the following:

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1 Jenkyns 2013, 1.

2 O'Sullivan 2011, 3.

3 For example, see the edited volume of Betts 2017.

4 Frieman – Gillings 2007, 10.

5 Strang 2006, 149; Hamilakis 2013, 409.

6 For example, see the essays in Galinsky 2014; Galinsky 2017; for critical remarks on the 'mnemotic turn' of modern scholarship in the Roman world, see Grigoropoulos et al. 2017.

7 Cic. fin. 5, 2 (translation by Vasaly 1993); Vasaly 1993, 29; Edwards 1996, 29; Hopkins 2012, 88 f.

8 For the concept of 'metaphysical topography', see Vasaly 1993, 41.

> *space and movement are of central importance in conjunction with the dimension of time. Human memory requires spatial concepts: objects or spaces gain a history of their own only through prolonged, continual use. This is why, in a larger circle of participants, places and their ornamental attributes have a stabilizing effect on the group; they help create a sense of identity.*[9]

Memories are created by individuals through their repeated interaction with a monument, and those memories are made by their perceptions of the structure. The shared experiences of the same monuments then help to create identity, in that members of a community have some sort of shared sense of connection with each other. The aquatic landscape of the Forum Romanum, then, it is argued here, though the mythical, historical, and mytho-historical associations of the monuments there, provided a context for passers-by to consider the multivalent connotations of the structure, thereby creating a shared sense of identity predicated on water.

The Forum Romanum

The city of Rome is connected to water by virtue of its landscape.[10] The great River Tiber dominates the cityscape, carving its course through a surrounding plateau that was once created by a volcano.[11] There is, however, a hydrogeomorphic landscape in Rome beyond the Tiber. As the river changed the landscape to create the seven famed hills, there were lower lying areas of the city, which were prone to being swampy, especially after floods of the Tiber (Fig. 2).[12] In addition, the city was dotted with a number of streams that fed into the river, such as those draining the valleys of the Quirinal and Esquiline Hills, that later became the famed Cloaca Maxima drain.[13] Springs were also abundant throughout Rome, especially in the city centre, including the Fons Cati (Quirinal), the Fons Iuturnae (Forum Romanum), the Tullianum and Aquae Lautulae (Capitoline), the Lupercal (Palatine), and the Fons Camenarum (Caelian).[14] Rome, then, was a place where water flowed in different contexts: a large river, tributary streams of the Tiber, paludial basins, and natural springs.

The site of the Forum Romanum was the location of a swamp that prevented habitation and building. It has been demonstrated by Albert Ammerman that the forum was transformed from a paludial zone to a space that had the ability to be monumentalized by the beginning of the Republic and beyond.[15] It had been previously thought that the forum area had some early habitation, but then the site was converted to a city centre by layering gravel on top, along with the insertion of drains to take away excess water. Ammerman's study of the forum has shown, however, that in order to reclaim the land, a significant amount of earth was moved into the forum, allowing the surface of the forum to lie above the swampy terrain. John Hopkins has argued that, in the period after the reclamation of the forum area, three different levels of the city were present: the areas on the hills associated with domestic spaces; the civic and commercial space of the forum; and the banks of the Tiber, connected to shipping and industry.[16] The new elevation of the Forum, then, allowed it to become the prime nucleus in the urban landscape of Rome.

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9 Egelhaaf-Gaiser 2007, 210.

10 See Campbell 2012, 13–21 for the watery landscape of Rome, which is tied to its origins as a city.

11 Ammerman 2013, 169.

12 Corazza – Lombardi 1995.

13 Richardson 1992, 91 f. ; LTUR I (1993) 288–290 s. v. Cloaca, Cloaca Maxima (H. Bauer).

14 For more on these springs, see: Lanciani 1975, 215–240; Cifani 2008, 307; LTUR I (1993) 216 s. v. Camenae, Camenarum Fons et Lucus (E. Rodríguez-Almeida); LTUR I (1993) 237–239 s. v. Carcer Tullianus (G. De Spirito); LTUR II (1995) 257 f. s. v. Fons Cati (F. Coarelli); LTUR III (1996) 168–170 s. v. Lacus Iuturnae (E. M. Steinby); LTUR III (1996) 186 s. v. Lautolae (C. Morselli); LTUR III (1996) 198 f. s. v. Lupercal (F. Coarelli).

15 Ammerman 1990a; Ammerman 1990b; Ammerman 2013.

16 Hopkins 2014, 54.

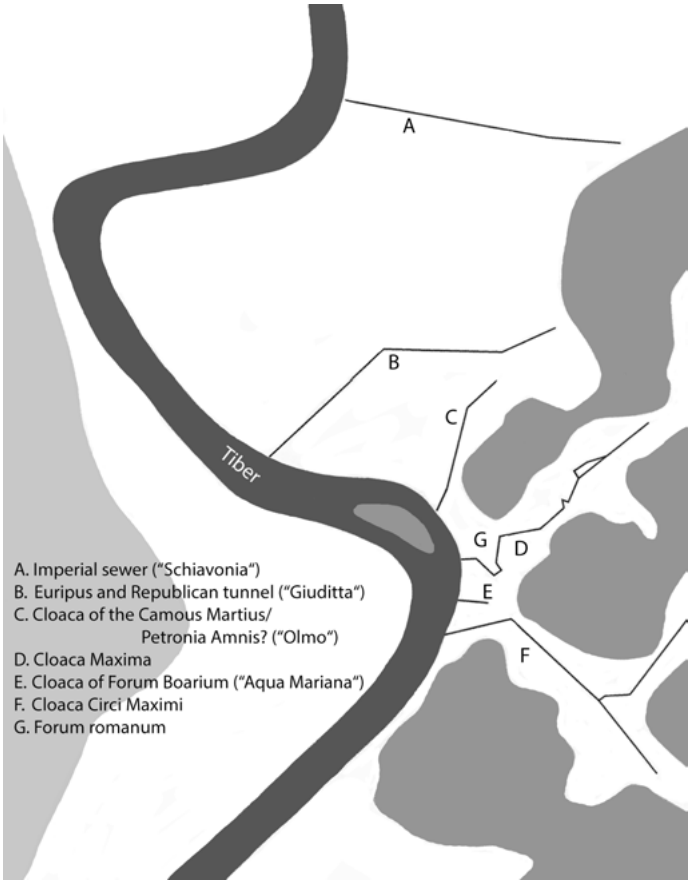

Fig. 2: *Cloacae*, or drains, of Ancient Rome.

The addition of the monumental Cloaca Maxima in the 7th century, reportedly installed by Tarquinius Priscus, permitted the space to stay dry.[17] Built upon the ancient tributary streams of the Tiber, the Cloaca Maxima became monumentalized over time, such as when the drain was lined with stone in the 5th century.[18] In Plautus' day, the Cloaca was still apparently open to the elements, but by the end of the Republic, it was covered over, and it was eventually restored by Agrippa in 33, who added a new lower Gabine stone course. The course of the Cloaca Maxima ran along the ancient Argiletum, later covered by the Forum Transitorium of Nerva, then turned to the east at the base of the Basilica Aemilia, cutting across the forum between the Basilica Iulia and the Temple of Castor and Pollux, proceeding through the Velabrum, and flowing into the Tiber, via the Forum Boarium. The meandering pattern of the Cloaca Maxima contrasts sharply with the more straightforward paths of other drains in the city, and it could be tied to what some scholars have considered to be a 'sacred' past, in that the original stream's course deserved special reverence even into the Empire.[19] Despite having the ability to change the path of the Cloaca Maxima, the Romans kept the ancient course of the drain, perhaps in devotion to its ancient route, as a marker of its past history and associated memories.[20]

With the forum drained, monumentalization of the space could occur, befitting the civic and commercial centre of the city. The creation of the forum, with its many buildings and structures, was not an accident, but the result of planning in conjunction with the new landscape

17 Dion. Hal. Ant. Rom. 3, 67, 4–5.
18 For more on the Cloaca Maxima, see: Tortorici 1991; Gowers 1995; Hopkins 2007; Hopkins 2012.
19 For the 'sacred' nature of the Cloaca Maxima, see Holland 1961, 349 f.
20 Hopkins 2012, 88 f.

freed of standing water.[21] By 480 BC, at the beginning of the Republic, the forum probably contained the Regia, the Temple of Vesta, the Temple of Castor and Pollux, the Curia Hostilia, the Temple of Saturn, and the Comitium.[22] Building continued until almost the beginning of the Imperial period, when Julius Caesar decided to build his own forum to the northeast of the Forum Romanum, initiating a trend continued by his successors in that area.

The (formerly) swampy landscape of the forum basin is, then, the backdrop for the monuments that were installed in the Forum Romanum. The connections that the space has (and had) to water are crucial for our understanding of the choice and placement of the structures in the built environment of the forum. While by the late Republic there was no direct access to water, save for the springs and the flowing Cloaca Maxima, it is the memory of this past that is essential in the construction of the watery landscape of the forum.

The inclusion of monuments tied to water in the previously watery forum stresses the importance of the substance for the Romans throughout the history of this space. When considering the water-related features of the Roman Forum, we must imagine what is happening for the visitor to the space. How are they interacting with the space? Are they remembering the myths and historical events that are tied to the structures? There is a relationship between the actual site and the viewing of the site, which is 'crucial to the cognitive complexities of translating pictures, monuments, and dimensional spaces into intelligible experience'.[23] What results for certain, however, is a blurred line between the past and the present, in what some have termed a 'synchronous, permanent present'.[24] What this means is that those of the present can consider the past in relation to the built environment around them. Thus, monuments have a past crucial in their meaning and importance, not only to those in the past, but also to those in the present, allowing us to graft meaning on to these structures. Indeed, as Adam Rogers argues in this volume, throughout the Roman world, the materiality of water itself impacted urban landscapes, as not only pre-existing waterscapes, but also the Romans' own construction of water-related structures or monuments altered the experience one would have with a space. The Forum Romanum, then, with a number of watery monuments, would have evoked for all those encountering them the sheer importance of water in the urban landscape of Rome's past.

In addition to the actual past aquatic environment of the forum basin, there are a number of monuments within the forum itself that commemorate mythological, historical, or mythohistorical episodes of Rome's past. Three *lacus* (Iuturnae, Curtius, and Servilius), the Sacellum of Venus Cloacina, the *rostra* of the forum, and the Temple of Janus Geminus are presented in the ensuing discussion. For the most part, there are no remains of true water-displays, in that there are no known monuments with moving water, such as the grand fountains known in the Imperial period. The ancient Forum Romanum takes advantage, however, of the inherent meaning of monuments' watery past, whether it is mythical, Regal, or Republican. Many of these structures had been in the forum for generations, which gives them their own pasts and meanings for the passers-by, and would remind visitors of the ties the forum had to water.

The Lacus Iuturnae is probably one of the most well-known monuments of the Forum Romanum connected with water, given that it is a monumentalisation of an actual spring source and celebrates one of the best known of the Roman nymphs. Iuturna was believed to be the sister of Turnus, and she had a cult in Lavinium that was moved to Rome at some point in the latter part of the Regal period. Thus, she had an ancient mythology that was even present in the epic cycle of the *Aeneid*. Her importance was stressed by her cult's placement in the forum, where she is associated with the spring that is located between the Temple of Castor and Pollux and

21 For more on the notion of the fact that the Forum was not an accident, see Hopkins 2014, 52 f.

22 Ammerman 2013, 174. See also the essays in Carandini 2017 on the development of the Forum.

23 Larmour – Spencer 2007, 7.

24 Barkan 1991, 13; Edwards 1996, 29.

Fig. 3: Rome, Forum Romanum, Augustan Puteal and Trajanic Sacellum of the Lacus Iuturnae.

the House of the Vestal Virgins, near the Vicus Tuscus that leads to the Velabrum.[25] Iuturna's source is also known as one of the famed ancient springs of Rome, along with those of the Camenae and Apollo.[26] It is believed that Castor and Pollux watered their horses at the spring associated with Iuturna after the Battle of Lake Regillus in 494 BC, and then again after Pydna in 168 BC.[27] Particularly in relation to the Dioscuri's epiphany in 494 BC, there is yet another connection to water, namely that the battle takes place at a *lake*. In fact, the association to the twins is strengthened by the discovery of a statue of the pair in the forum, which is dated to immediately after Pydna.[28] The Battle of Lake Regillus has been seen as part of the mythology of the birth of the Republic, as it was a pivotal event that led to the success of the new Roman state.[29] Subsequently, the battle is exploited in the Augustan period with Octavian's victory at Actium, in the context of which Vergil describes how the Dioscuri aided Octavian, just as they did the Romans 500 years previously.[30] In the Augustan renovations of the forum, which were well under way, if not nearly complete, by 29 BC, the memories of the Battle of Lake Regillus were easily evoked through the built environment, with Temple of Castor and Pollux next to the Lacus Iuturnae, both of which are directly across from Augustus' Actian Arch.

The ancient and mythological associations of the spring, then, make the space an important one in the built environment of the forum. The first phase of the spring, probably dated to the 2nd century BC, around the time of Pydna, monumentalized the natural spring source, by adding a rectangular basin on top, constructed of *opus incertum* and lined with cocciopesto.[31] With the revival of the cult by Augustus, marble veneer was added to the basin, along with a number of dedications, including a white marble puteal, inscribed with *Iuturnai sacrum* by the *curule aedile*, Marcus Barbatius Pollio.[32] In the time of Trajan, a small *sacellum* was added immediately adjacent to the basin (Fig. 3). By the 4th century AD, the area included the headquarters of the

25 For more on the spring, see: Lanciani 1975, 225 f.; Ammerman 1990a; Corazza – Lombardi 1995, 198 f.
26 Frontin. aqu. 1, 4.
27 Scullard 1981, 64.
28 Clarke 1968; Coarelli 1985, 156; LTUR III (1996) 169 s. v. Lacus Iuturnae (E. M. Steinby).
29 Rebeggiani 2013.
30 Verg. Aen. 8, 678–681. Rebeggiani 2013, 57–67.
31 For the chronology and development of the precinct associated with Iuturna in the Forum Romanum, see the published excavations of the site in Steinby 2012. See also Steinby 2015.
32 CIL 6.36807; Kajava 1989, 37–39.

Fig. 4: Rome, Forum Romanum, Lacus Curtius reconstruction, ca. AD 320.

statio aquarum, the water department of Rome.[33] Not only does the space have mythological (e. g. with Iuturna, and Castor and Pollux) and historical (e. g. the Battles of Lake Regillus and Pydna) associations, but the buildings surrounding the spring are utilized for the supervision of the maintenance of Rome's water supply. Thus, there are multivalent associations a passer-by could make in antiquity when experiencing this complex.

Northwest of the Lacus Iuturnae, in the open space of the forum, between the Basilicas Aemilia and Julia, is the Lacus Curtius. There are at least four distinct phases of the structure: (1) tuff period dated to 184 BC;[34] (2) travertine period dated to 78–74 BC, with the repaving of the forum by Aurelius Cotta; (3) Augustan (ca. 12 BC); (4) Severan, with the new repaving of the forum of AD 203.[35] Still visible today, it is an irregular polygonal monument surrounded by a marble parapet, which is sunk into the pavement of the forum, the result of successive repavings of the area (Fig. 4). Excavation has revealed at least three different layers of pavement, which can help to show the longevity of this monument in this space.[36] In the enclosure is a circular plinth to support a *puteal*, presumably concealing an ancient water source, along with rectangular cuttings on the other side of the enclosure for square altars. In fact, by the time of Augustus, it is known that there was no water flowing to the Lacus Curtius.[37] During the Imperial period, the monument was a place where Romans annually tossed coins for the good health of the emperor on his birthday.[38]

There are at least two different stories that the *lacus* was believed to have commemorated. The first version is a battle between the Romans, led by Romulus, and the Sabines, commanded by Mettius Curtius.[39] In a skirmish near the gate of the Palatine, Mettius fled Romulus and his

33 There are various dedications of the *curatores aquarum et Miniciae* and a statue of *Genius stationis aquarum*. For more on these dedications, see Kajava 1989, along with Rogers 2018b, 11–13 on the water administration of Rome.

34 Liv. 39, 44, 5.

35 LTUR III (1996) 166 f. s. v. Lacus Curtius (C. F. Giuliani).

36 Excavations revealed at least three layers of pavements, including, from bottom to top, cappellaccio, Monteverde tuff, and travertine LTUR III (1996) 166 f. s. v. Lacus Curtius (C. F. Giuliani).

37 Ov. Fast. 6, 403–404.

38 Suet. Aug. 57, 1.

39 Liv. 1, 12, 9–10. 13, 5; Dion. Hal. Ant. Rom. 2, 42, 5–6; Plut. Quaest. Rom. 18, 4. See also: La Regina 1995 and Spencer 2007.

Fig. 5: Rome, Forum Romanum, relief of Mettius Curtius, Lacus Curtius.

men, heading for the marshy forum basin, the valley between the two hills. There, he got stuck, causing the battle to stop to allow for Mettius to free himself. Romulus and his men, however, are subsequently victorious in the battle. This episode is commemorated by a relief plaque found near the Lacus Curtius in the 16th century, which was believed to have somehow decorated the *lacus* proper (Fig. 5).[40] In the second and far better known version, an earthquake or another phenomenon ripped open a hole in the middle of the forum in 362 BC.[41] According to Livy, prophets stated that the chasm must be filled, or the Republic would fall.[42] Despite the Romans' attempts to fill the hole, it was reported that it could only be closed by the 'chief strength of the Roman people'.[43] Marcus Curtius, a young soldier, rode on his horse into the chasm, which promptly closed.

The stories are, on the surface, drastically different. There are similarities, however, between the two that are crucial for the understood meaning behind the monument. Roman superiority is stressed, whether by Romulus' victory over Mettius' men, or the ability for Roman excellence to fill up a threatening chasm in the forum floor. Moreover, both episodes emphasize the presence of water in the forum. We cannot forget that the forum was indeed once a swamp, commemorated not only in the preserved literary and mythological traditions, but also on the relief plaque added to the Lacus Curtius for all to see. There was no running water by the time of Augustus at the *lacus*, but a Roman only needed to imagine the running waters of the Cloaca Maxima, which would have been flowing underneath the *lacus*.[44] Despite the lack of water, the Lacus Curtius was an effective commemoration of the past mytho-historical events that were said to have occurred there. The spot is illustrated by a plaque and a puteal, insinuating that at some point there was flowing water there. In a sense, the structure in the forum prompts the passers-by into 'the present of the urban condition, which allows [them] to communicate not only with the city's past (through its mythology and patrimony), but also with an imaginary future'.[45] While Romans who saw the monument, which commemorates the past, interacted with it in the present, they would also have been stimulated to consider the future, whether of the city itself and how to make the city better, or even of their own lives, perhaps given that the human condition is tied to water for survival.

40 Coarelli 1985, 226–229.
41 Liv. 7, 6, 1–6; Dion. Hal. Ant. Rom. 14, 11, 3–4; Val. Max. 5, 6, 2; Plin. HN. 15, 78; Cass. Dio 30, 1–2.
42 Liv. 7, 6, 1–6.
43 Liv. 7, 6, 2.
44 Spencer 2007, 65.
45 Spencer 2007, 67 f.

The final *lacus* to consider in the Forum Romanum is the Lacus Servilius. We know that this structure stood at the northwest corner of the Basilica Julia, at the end of the Vicus Iugarius, acting as a fountain basin, not a spring source.[46] The name *Servilius* probably derives from a Republican figure who gave his name for the fountain, whether Cn. Servilius Caepio (consul in 141 BC) or a Servilius Caepius, who might have given the structure as a *munus*, or public benefaction, in 125 BC, in connection with the construction of the Aqua Tepula.[47] We know that during the Sullan proscriptions, the heads of senators were displayed in some fashion on the *lacus*.[48] It is reported that Agrippa added a statue of a Hydra to the fountain.[49] In fact, this involvement by Agrippa is not out of the ordinary, because we know he was responsible for a number of water-related projects throughout the city as aedile in 33 BC, when he commissioned the construction of the Aqua Julia (and its incorporation of the Aqua Tepula, the original catalyst for the *lacus*). Further, he added statues to the public fountains throughout the city.[50] The monument survived into the Augustan period, and it was destroyed in the 12 BC fire that consumed the Basilica Julia, but not rebuilt in the subsequent restoration of the Basilica.

It is difficult to evaluate fully the Lacus Servilius, given that it is lost to us. The fact that the fountain was gone by the early Imperial period is also crucial: those in the Empire would have only known of the monument in memory. Perhaps they remembered the eponymous Servilius, the Hydra decoration on top, or the heads of the unlucky senators of Sulla's proscriptions, possibly from stories told to them about the forum's past. We can perhaps read a little more into the fountain through the figure of Agrippa. Because we know that he incorporated the Aqua Tepula into the larger Aqua Julia and that he added a statue to this particular fountain, Agrippa could have potentially been making his own connection to a Republican predecessor. If the Servilius Caepius of 125 gave the fountain as a *munus*, he may have done so as an aedile, just as Agrippa built waterworks during his own aedileship.

Across the forum, in front of the Basilica Aemilia, was the *sacellum* of Venus Cloacina. The figure of Cloacina is believed to be the *numen* of the waters of the Cloaca Maxima, who is later conflated as an aspect of Venus.[51] Pliny the Elder mentions Venus Cloacina when relating the anecdote that when the Romans and Sabines were to fight over the carrying off of maidens, the soldiers purified themselves with myrtle that was growing in the spot later occupied by the *sacellum*, given that Cloacina derives from *cluere* ('to cleanse').[52] The appearance of the small shrine is known from numismatic evidence (Fig. 6).[53] The shrine is circular with an open balustrade, marked by the legend *CLOACIN(A)*. Inside, there are two draped female statues whose right hands are lowered, perhaps supporting *thymiateria*, or incense burners, and their left hands are raised to hold perhaps the leafy branches of myrtle. The structure of the shrine suggested by the depictions on the coins was confirmed by the discovery of marble foundations of a small circular monument (2.40 m in diameter) in front of the Basilica. The foundations go deep into the ground (at least eight courses), suggesting that the shrine was in use for a long period of time.[54]

The meanings behind this particular shrine are manifold. The cult of Cloacina is reported to have been instituted by Titus Tatius, before the traditional 'Regal' period of Rome.[55] In a time

46 Fest. 370.

47 LTUR III (1996) 172 f. s. v. Lacus Restitutus (A. La Regina).

48 Cic. Rosc. Am. 89; Sen. Dial. 1, 3, 7. 8; Firm. Mat. 1, 7, 34.

49 Fest. 370.

50 Plin. HN 36, 24, 121. For more on Agrippa's water-related building activities see: Evans 1982; Roddaz 1984; Albers 2013.

51 Plin. HN 15, 119–120. See also: Liv. 3, 48, 5; Plaut. Curc. 471.

52 Plin. HN 15, 119–120.

53 BMCRR I 577 f. nos. 4242–4254.

54 Richardson 1992, 92; Freyberger – Ertel 2016, 22 f.

55 Cypr. Idol. 4; Aug. Civ. 4, 8. 6, 10, 1; Min. Fel. 25, 8; LTUR III (1996) 290 f. s. v. Muri Aureliani (G. Pisani Sartorio).

Fig. 6: Silver Denarius, 42 BC, the reverse depicts the *Sacellum* of Venus Cloacina.

before the forum basin was drained and the streams of the Cloaca were yet to be canalized, it is easy to understand the desire to establish a cult to the spirit of the water that permeates the volatile landscape. With the archaeological and literary evidence, then, we can discern a cult of *longue durée*, a monument continuously seen throughout the history of the forum and indicative of its mytho-historical past. The *sacellum* was also actually in a long line of other small shrines in front of the Basilica (e. g., the Temple of Janus Geminus, etc.), which marked the space, opening onto the via Sacra, as one of a religious character, but also steeped in the historical past of the city.[56] Further, the shrine was placed over the spot where the Cloaca Maxima turns to the west, past the Basilica Aemilia, to head southwest across the forum. The waters associated with the Cloaca would have been sacred, moving, and purifying, which would easily encourage a cult of a goddess of a literally *purifying* nature.[57] Thus, the shrine of Venus Cloacina would have had a number of associations for a Roman. She was a figure in Roman history before the kings, illustrating the antiquity of the deity. And her cult celebrated the purifying and sacred waters of the great Cloaca, which stresses the aquatic landscape that once reigned in this space that was conquered by the Romans.

The Forum Romanum's watery connections were also emphasized with the construction of various *rostra*. The speaker's platforms could be found in the Roman comitium and the forum. After the naval victory of 338 BC against the Latins at Antium, however, that platform in the forum was decorated with naval beaks (*rostra*) – and so called after them.[58] After the naval victories of the Punic Wars, the *rostra* was further decorated with the beaks of enemy ships. Julius Caesar, however, decided to remove the *rostra* from the forum (connected to the ancient *comitium* that was cleared away in this period), and replace it with a new one, which was finished by Augustus and given a prominent position on the northwest limit of the forum.[59] The *rostra Augusti* had at least five phases: Caesarian (a simple 13.00 m long, 3.50 m high speaker's platform with beaks); Augustan (larger core for two rows of beaks to be added, 23.80 m long, with a marble front balustrade); Flavian; Severan (more ornate decoration added, along with five columns on top, the so-called 'Fünfsäulendenkmal'); and Late Antique.[60] There was also a Diocletianic *rostra* installed on the west side of the forum, which would have been a pendant of a similar form of the Severan period *rostra Augusti*.[61] In addition to the *rostra* proper, there were

56 Freyberger 2012, 49. See also the recent excavations of the Basilica Aemilia: Ertel et al. 2007; Lipps 2011; Freyberger – Ertel 2016.

57 Van Essen 1956; Hopkins 2012, 96 f.

58 Liv. 8, 14, 12; Plin. nat. 34, 20; Richardson 1992, 334 f.; LTUR IV (1999) 212–214 s. v. Rostra (età repubblicana) (F. Coarelli).

59 Coarelli 1985, *passim*; Richardson 1992, 335 f.; Haselberger 2002, 216; LTUR IV (1999) 214–217 s. v. Rostra Augusti (P. Verduchi).

60 LTUR IV (1999) 218 f. s. v. Rostra: 'Fünfsäulendenkmal' (A. Pulte).

61 LTUR IV (1999) 217 f. s. v. Rostra Diocletiani (P. Verduchi).

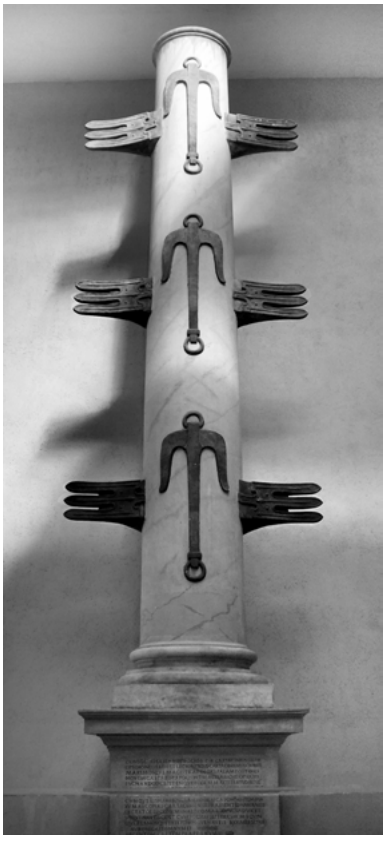

Fig. 7: Rome, Museo della Civiltà Romana, reconstruction of Rostrate Column of Duilius.

rostrated columns – columns with curved ships' rams sticking out perpendicular to the column – marking naval victories from the Republic on, including that of C. Duilius (260 BC victory over the Carthaginians), M. Aemilius Paullus (255 BC), and Augustus (Naulochus in 36 BC and Actium in 31 BC) (Fig. 7).[62]

The Forum Romanum, it seems, was littered with the beaks of enemy ships or models of them. By the Imperial period, there was the Augustan *rostra*, the Augustan rostrated columns, along with the nearby temple *rostra*. When Diocletian later added another *rostra*, the message of Roman naval victory was only made more manifest. First, the long-standing tradition of rostration means that, when Augustus installed his own rostrated columns, he harkened back to the memory of Duilius, whose own column Augustus refurbished, thus marking the restoration an act of *pietas* and the construction of his own column as a way to use the past as an *exemplum*.[63] Augustus' new monument then gains legitimacy from an older, similar monument. The beaks of ships automatically evoke water for the passer-by, in addition to the victory that occurs on the seas. The great number of beaks that were in the forum would have reminded viewers of the long history of the Roman domination of the Mediterranean, prompting them to think back to the victories against a variety of foes, from Latins, Carthaginians, to fellow Romans, as the case was in the civil wars. Further, the *rostra* is also a symbol of the power of the Roman aristocracy, who used the speaker's platforms throughout the Republic and into the Empire as a place to not only to sway fellow citizens, but also to celebrate fellow Romans in funeral orations, such as those of Julius Caesar and Augustus. The *rostra* and their use of beaks as a

62 Richardson 1992, 96 f.; Muth 2012, 11. 24; Roller 2013, 120–126. The most in-depth discussion of these columns is Palombi 1993. For a modern example, the column in the middle of New York City's Columbus Circle, dedicated to Christopher Columbus, is rostrated.

63 Roller 2013, 122 f. explores this relationship more fully.

symbol of naval victory continue the strong associations of the Forum Romanum and an aquatic landscape.

The Temple of Janus Geminus in the forum should be briefly mentioned in relation to another spring, that of the Lautolae. It is believed that this shrine of Janus was located near the southwest corner of the Basilica Aemilia and the Curia.[64] The story goes that in a battle between Titus Tatius and the Sabines, the gates of the Janus *sacellum* opened (perhaps under Juno's influence), a fact which was noticed by Venus.[65] She then persuaded the local nymphs (sometimes called the Ausonian nymphs, but usually termed the Lautolae) to aid in closing the temple doors. The nymphs accomplished this by changing their cool waters into hot, sulphurous waters, which drove away the enemy. There has been a lot of discussion about the exact location of the Temple of Janus in the forum, along with the source of the Lautolae. It should just be noted here, however, that there was at least a literary tradition of associating miraculous waters with the forum area, especially from a mytho-historical past, with historical figures (e. g. Titus Tatius) that are recurring characters in the drama that is the aquatic landscape of the forum.

This survey of water-related structures in the forum, including three *lacus*, two shrines, and the *rostra*, affords the opportunity to comprehend the ubiquity of structures that commemorate water in some respect. We can call structures, naturally, monuments, as they are reminders and memorials of the past, especially the mytho-historical past. Indeed, they can be called 'historiated' fountains, as they celebrate and call to mind a historic event.[66] Memory then plays a crucial role in their interaction with their landscape and their relationships with those viewing them in situ. We only have to remember Piso's exhortation of the *disciplina memoriae*, the 'art of memory', as seeing and interacting with monuments triggers not only personal memories of a monument, but also the constructed past of the structure. Monuments (*monumenta*) are more than the building materials that constitute them, as 'they are intrinsically concerned with the mnemonic processes of remembering and instantiating culture and tradition'.[67] Further, the various monuments within the forum are part of a process of 'intersignification' with each other, in that 'the older and newer monuments produce, in each case, an implicit narrative that carries moral and political weight'.[68] The structures of the forum then recall past events and the present commemorators, with charged meanings for a passer-by of any time period. Thus, with the inclusion of all of these structures in the forum, their patrons called on pedestrians to consider the past water-soaked landscape of the forum itself, along with the aquatic origins of Rome itself, whether from the Tiber, the twins being found along a stream, or the naval supremacy that the Romans demonstrated from the time of the first Punic War. The forum, because of its own ancient origins, creates a 'metaphysical topography' that causes those in the present to have interactions with the monuments that wholly transcend the present, but include the events and myths of that landscape in the past, along with reflecting on the potential of that space in the future.

Under Augustus, the Forum Romanum sees one of the most drastic changes in its use. With the new imperial regime, a new 'controlled access to the past' is created in the forum by Augustus.[69] In part, the power of the emperor and his family was demonstrated through architecture and ornamental programs in the Forum Romanum proper, with his rebuilding of the Basilicas

64 Richardson 1992, 207 f.; Freyberger – Ertel 2016, 23 –26; LTUR III (1996) 92 f. s. v. Ianus Geminus, Aedes (E. Tortorici).

65 Ov. met. 14, 775–804; Macr. Sat. 1, 9, 17–18; Varro ling. 5, 32. See also Meulder 2000 for a discussion of this spring, along with Lanciani 1975, 232 f. and Corazza – Lombardi 1995, 198, the latter of which show that the spring of the Lautolae could be potentially be confused with the other springs on the eastern slopes of the Capitolium, such as the Tullianum and the Aquae Fontinalis.

66 Robinson 2005, 123 uses the term 'historiated springs' not only for the fountains of Corinth, but also for the *lacus* of the Roman Forum.

67 Spencer 2007, 65. See also Feldherr 1998 especially 21–35.

68 Roller 2013, 120.

69 Muth 2012, 24.

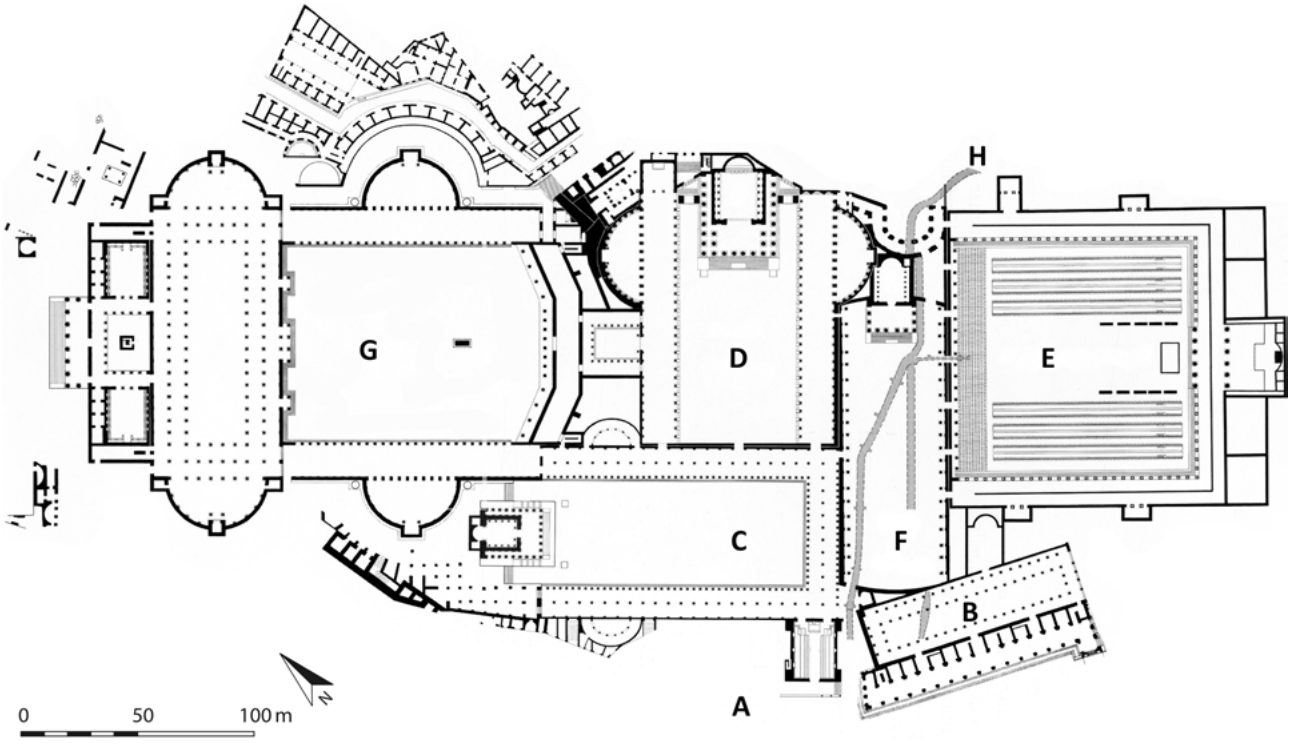

Fig. 8: Rome, Imperial Fora: Forum Romanum (A), Basilica Aemilia (B), Forum Iulium (C), Forum Augustum (D), Templum Pacis (E), Forum Transitorium (F), Forum Traiani (G), Underground Course of the Cloaca Maxima (H).

Aemilia and Julia, the Curia Julia, the *rostra* Julia (later the *rostra* Augusti), the Temples of Concordia, Saturn, and Castor and Pollux, along with the addition of the Arcus Augusti, Temple of Divus Iulius, and the Porticus Gaii et Lucii.[70] Through the new Augustan building programme, the past was celebrated with the restoration of ancient monuments, such as the temples; however, enough was altered and added in the forum to create a dynastic monument for the new emperor. Andrew Wallace-Hadrill argues that for Augustus the Forum Romanum was 'a new creation, carefully 'antiqued' in that specific monuments (e. g. the *sacellum* of Venus Cloacina) were kept, restored, and incorporated into the new space, while others (e. g. the old comitium) were demolished, some to be replaced elsewhere.[71]

Furthermore, with the addition of the Forum Iulium and the Forum Augustum, the urban nodes of Rome were drastically altered, moving the city centre from Forum Romanum to the new Imperial Fora, in effect making the forum a museum, a 'showcase of collective past achievements', but no longer the main urban node of Rome.[72] Many of the monuments of the forum were part of contemporaneous religious praxis, particularly given their inclusion into the new built environment of the Augustan period, but then became part of a larger historical consciousness of the Romans in the Imperial era. The careful inclusion and restorations of ancient monuments that evoke an aquatic past were important for the celebration of the watery nature of the Forum Romanum, but also the commemoration of the emperor and the bounty that he brought.

As one moves to the subsequent Imperial Fora of Rome, with the successive spaces of Julius Caesar, Augustus, the Flavians, Nerva, and Trajan, there is then a marked shift in monuments associated with water (Fig. 8). While there are still mythological associations with monuments related to water, the Imperial Fora employ true water-displays, or fountains.[73] With the influx of water that occurs in the Imperial period, the fora began to exploit actual water sources,

70 For more on these renovations and additions, see Favro 1996, 195–200.

71 Wallace-Hadrill 1993, 51.

72 Favro 1996, 200.

73 For more on the definition of a water-display, see Rogers 2018b, 46 f.

moving beyond mere allusions to an aquatic past, and show water to spectators.[74] The incorporation of water can be subtle (e. g. the Forum Transitorium built over the course of the Cloaca Maxima), demonstrative (e. g. the fountains associated with the podium temples of the Fora of Caesar and Augustus), or truly ostentatious (e. g. the large water basins in the open court of the Templum Pacis).[75] In the end, the Imperial Fora continue the tradition begun in the Forum Romanum of evoking an aquatic past, while actually using water itself to continue crafting an identity tied to water.

The Imperial Fora, in contrast to the Forum Romanum, employ the use of *moving* water, in addition to metaphorical associations with its display. For the Romans, moving water was considered to be free from impurities, and thus moving water could also be used for a variety of purposes, including drinking and religious rituals.[76] While the water-displays of the fora of Caesar and Augustus were small, compact fountains, they still provided water that could be used for drinking, in addition to adding to the aesthetic experience of the space. The Templum Pacis, on the other hand, used truly new ways of displaying water that not only included a large show of moving water, but also effectively integrated the show into a space that acted as a cohesive ensemble for a unique sensorial experience. The patrons of each of the water-displays also provided mytho-historical associations for those passing by. One only needs to think of the marine nature of Venus, born on the sea, in Caesar's forum connected to the Temple of Venus Genetrix, the naval victories of Augustus related to the Temple of Mars Ultor, and the abundance associated with both peace and water (although the two do not need to be mutually exclusive). The use of water-displays in the Imperial Fora then help to set the trend of water use in the Empire, when new aqueducts were constructed throughout the Mediterranean, allowing for new types of water-displays. Yet the Forum Romanum does not have any extant water-displays *per se*. Its watery past, stressed through the water-related structures, acts in tandem with the water features of the Imperial Fora, creating a city centre that is entirely predicated on water.

Conclusions

The built environment of the Forum Romanum, the civic space *par excellence* for the whole Roman world, was literally and figuratively founded on water. As we have seen, the numerous structures built over the centuries capitalized on the water in a variety of ways. Monuments commemorated the aquatic landscape of this part of the city, evoking the paludial history of the forum basin. Other monuments celebrated the naval victories of the Romans throughout history, extolling the virtues of domination of the seas. In other cases, monuments recalled for passers-by either mythical beings that were associated with the area, or historical events tied to water. And one of the underlying themes that ties these monuments together is the power demonstrated by the Romans, either against nature or foe – and certainly in the ability to harness water, as is the case especially in the Imperial period.[77]

The monuments that we explored in the Forum Romanum do not have moving water, as was the case in the Imperial period. Instead, we have a situation here in which the Romans

74 On the increase of water in Rome after the Republic, see Rogers 2018b, 26.

75 On the Forum Iulium fountains located in front of the Temple of Venus Genetrix, see: Ov. ars 1, 81; Plin. nat. 36, 4, 33; Ulrich 1986; Longfellow 2011, 18–20; Delfino 2010; Delfino 2014. On the fountains in front of the Temple of Mars Ultor of the Forum Augustum, see Longfellow 2011, 20 f. On the basins in the Templum Pacis, see La Rocca 2001, 195 f.; Meneghini – Santangeli Valenzani 2007, 61–63; Meneghini 2014, 285; *contra* Macaulay-Lewis 2011, 281, n. 84; Tucci 2017, 58–62.

76 Rogers 2018b, 8.

77 On the power associated with water in the Roman world, see Rogers 2018b, 64–67.

created a space that became the intersection of place and memory – and the notion of water formerly flowing through the space takes on a symbolic value for those using the forum. By celebrating Rome's historical, mythical, and mytho-historical past, the patrons were able to construct a cohesive assemblage of monuments that allowed those in the forum to reflect on the importance of the glorious aquatic past of the city. In a time when water was not as immediately abundant as in later periods, the monuments constructed in the Forum Romanum are successful in their evocation of water, without actually displaying moving water.

The water-related programme of the monuments of the city centre of Rome, it could be argued, then set up a model for other Roman cities throughout the Empire. For example, the fountains of the city of Corinth in Greece have been presented by Betsey Robinson as 'historiated' water-displays, which during the Imperial period evoke the vibrant and robust mythical past of that city.[78] In Rome, however, the monuments of the Forum Romanum are able to provide the stimulus for passers-by to create memories associated with water, despite the lack of flowing water, as was the case in Corinth. The effective and suggestive use of water-related structures in the Forum Romanum helps to establish a foundation there wholly predicated on water, illustrating its importance to the city. Further, with the addition of the Imperial Fora and their new water-displays later, an ensemble of monuments throughout the centre of Rome is created that allows passers-by to associate the space and its structures with water – and its importance to the Roman state, society, and culture. Finally, with the prominence of the structures in the metaphysical topography of the city centre, those experiencing them formed memories that helped to create a shared sense of identity that could go beyond the city of Rome. The mythical and historical events celebrated in the Forum Romanum were part of the Roman ethos and identity – and could be tapped into empire-wide. The experience of these monuments in Rome provided a way in which the importance of water manifested itself in the built environment of the Roman world, whether or not water was actually flowing.

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Fig. 8: After Meneghini – Santangeli Valenzani 2007, Fig. 15.

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78 Robinson 2013. For more on water-displays in fora across the Empire, see Rogers 2018a, 180–183.

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8 Water and Decentring Urbanism in the Roman Period: Urban Materiality, Post-Humanism and Identity

Abstract: In this chapter, the relationship between water and urbanism in the Roman period is examined by looking at the ways in which water formed part of the urban fabric and the implications of this for understanding urban development, urban lives and identities, that decentres approaches to Roman urbanism. Water reminds us that the dualism of 'natural' and 'human-made' components of settlements and landscapes needs to be studied and brought together through meaningful frameworks of analysis. 'Decentring' urbanism draws on different perspectives of urbanism and allows us to move away from the top-down Romanocentric approach to urban studies and look for additional perspectives and experiences. The example of water allows us to explore urbanism by looking at landscape, religion and ritual, and identity and experience. The paper focuses on the towns of Britain in the Roman era, with case studies of Colchester (Camulodunum), St Albans (Verulamium), London (Londinium), Lincoln (Lindum) and Winchester (Venta Belgarum), and reflects on the way in which provinces across the Empire differed in the nature of urban development and urban experience. There was no one Roman world, but many different worlds in the Roman era where there were different identities and experiences.

Introduction

This paper examines water as a component of towns in the Roman period and how we can look at the implications of water forming part of the urban materiality. Water can be used to develop decentred perspectives on these settlements and the experiences of inhabitants. This study draws on completed and ongoing work undertaken by the author on themes connected with urbanism in the Roman period, and the relationship between settlement and water in archaeology, as well as the interconnected themes of identity and experience.[1] The work has included the documentation and analysis of the way in which the water formed part of townscapes and how towns developed and altered the waterscapes of the areas in which they were founded. This alteration and use of landscape included the construction of port and harbour facilities, whose impact went beyond economic function and also had social implications.[2]

The paper addresses the way in which water can be regarded as an integral component of the materiality of towns. In other words, the issue of how human-made and 'natural' elements of towns can be given equal prominence, breaking down dualisms in academic study and thinking about post-humanism, in the analysis of urban composition and what the implications of this is for understanding towns and the urban experience. Water formed part of the landscapes of many of the places where towns were constructed and developed in the Roman period and water continued to form part of the urban fabric. This also meant that the water formed part of the way in which the identity and experience of the town residents were created. Many of the waterscapes in which towns were founded, and formed a part were altered in the Roman period as towns developed, but there is also evidence that some at least of these watery places continued to have a significance that drew on earlier meanings associated with these places. Thinking about water in towns in this way has implications for 'decentring' urbanism, where 'decentring'

1 E. g. Rogers 2011; Rogers 2012a; Rogers 2012b; Rogers 2013; Rogers 2016.
2 E. g. Rogers 2011.

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allows local processes and meanings to be prioritised over the top-down Romanocentric approach. This in turn allows us to address, from a critical perspective, the issue of Romanisation and identity in the Roman period.

Water and city development in urban theory: Roman studies and beyond

Decentring is a term taken from post-colonial theory and reflects the desire within colonial contexts to move away from the top-down hierarchical approach and instead to emphasise local circumstances and experiences. Decentring has geographical implications in placing the emphasis away from the colonial power and instead looking at the impact on regional areas and the unique issues that concern each area. It looks at the combination of local agency and colonial influences. Decentring, however, also allows us to ask different questions of the data. It deprioritises the themes that we tend to focus on, and the questions that we ask of the material, and instead allows us to interpret the data from different perspectives and intellectual frameworks.

Developments within post-colonial studies argue that non-Western forms of urban settlement should not be regarded as inferior to Western forms of urban development. There is also a questioning of the way in which urban settlements are placed in hierarchies of importance with many non-Western or early Western urban sites described as proto-urban rather than urban; Western cities are also seen as superior to non-Western settlements. Tim Edensor and Mark Jayne have argued that we need to decentralise the way in which we approach urban studies.[3] This means that we need to move urban theory away from a preoccupation with Western urbanism. This is not only about treating non-Western settlements equally, but also thinking about how non-Western sites can be investigated from different, non-Western perspectives, and how these themes can also help us to see Western sites in a different light. These different perspectives can relate to the development and function of urban settlements, the organisation and use of urban space, the construction and use of buildings and the lives and experiences of residents. Non-Western perspectives can contribute to an exciting variety of ways of thinking about urbanism and urban spaces. Within archaeology, this decentring of urban studies is even more crucial because of the way in which Western perspectives have conventionally dominated in urban investigations globally, despite there being a huge range of different settlement sites. This is important for thinking about the Roman world, where there were many different types of urban sites across the Empire; they need to be investigated in ways that do not prioritise the Romanocentric perspectives.

Swati Chattopadhyay has argued that the 'West' dominates urban theory and concepts of urbanism are also linked into Western concepts of capitalism and colonialism.[4] Other types of urbanism are seen as 'beyond the West', but still shaped by comparison with the West. She argues that there is an inability to move beyond the limitations of the Western preoccupation in urban studies and this is especially the case in the study of colonial cities, such as in India. Across the social sciences there has also been recognition of the need to look at the origins of the theoretical discussions and frameworks that have developed within academia in Western contexts. Raewyn Connell,[5] for example, has argued that we need to involve other cultural traditions from across the world in the development of theory. Western theory has also been critiqued for placing too much emphasis on representing the modern world from economic and rational

3 Edensor – Jayne 2012.
4 Chattopadhyay 2012.
5 Connell 2007.

perspectives. The philosopher Bruno Latour,[6] for instance, has emphasised that the concept of 'modern' is problematic, since humans continue to act in many ways that would not be regarded as 'modern'. We can also be more ambitious in the way in which we think about the past, where we also need to be careful in the way in which we project our perceptions of rationality and civilisation onto the past.

One of the key areas that has formed a part of development of post-processual archaeology in Roman studies is that of post-colonialism and the critique of Romanisation. This post-colonial perspective placed an emphasis on critiquing the top-down approach in Roman studies, where the elite Roman perspective had tended to be prioritised. In urban studies, these developments have seen a rise in interest in the relationship between pre-existing peoples and the Roman incomers and the affect this had on urban development.[7] Important studies, including of individual cities and comparative investigations, have been undertaken across the Empire, looking at the complexity of urban origins and development and emphasising the need to look at local circumstances as well as wider themes.[8] The urban landscapes and their settings, however, have tended to continue to be treated in fairly conventional ways, including the way in which they have prioritised the Roman perspective in their development.

Across the area of the vast Roman Empire, cities and other settlements existed or developed within different environments and landscapes, and, as such, had different relationships with water. This materiality of urbanism, including water forming part of towns, needs to be understood from the perspective of the people that developed and lived in the settlements and how they experienced them. The theme of urbanism and urban origins in the Roman Empire, especially in the context of provincial expansion, is an area that has tended to be tackled from the perspective of the Roman conquerors and is dominated by the analysis of military activity and the conversion of pre-existing settlements. The relationship between water and urbanism provides an example with which we can develop post-colonial perspectives on urbanism and identity in the Roman period.

Urbanism, urban origins and function, are tackled from the perspective of hierarchies and civilisation as well as the economy, globalisation and networks. We see early on in the development of archaeology an interest in the origins of urbanism and attempts to understand patterns in urban development but the issues are tackled from one perspective. These studies were written within the context of the development of urban studies as a field of interest, all looking with interest to explain and understand urbanism, especially as a result of industrialisation and 20th century economic changes. The archaeologist Vere Gordon Childe devised a model of urban development involving ten categorising points that he regarded as defining urbanism.[9] These points included such factors as monumental buildings, the production of a surplus and the undertaking of trade activities. These categorisations emphasised the concept of settlement hierarchies where larger cities were regarded as more important than smaller settlements. Karl Wittfogel, in his work 'Oriental Despotism',[10] argued for the central role of water in the development of early civilisations. He emphasised the concept of the 'hydraulic society' and 'hydraulic despotism' whereby water was used as a form of power. He argued that the control of water supply and irrigation systems led to the creation of a social or governmental structure in these early civilisations, such as in Mesopotamia, India and China.

In the Roman Empire, the differing terrain saw varying levels of accessibility to water across the provinces. This meant that cities could have very different relationships with water. In Britain there is evidence that there could be problems with flooding from rivers and wetlands, and

6 Latour 1993.
7 E. g. Creighton 2006; Revell 2009.
8 E. g. Mladenović 2012; Raja 2012; Haeussler 2013; Reddé – Van Andringa 2015.
9 Childe 1950.
10 Wittfogel 1957.

we know that this was also the case for Rome itself. Other areas, such as in the Near East and Asia Minor, were much drier and each settlement will have had its own relationship with water and nature. This meant that each town would have had a different experience of water, which will also have included anxieties associated with too much or too little water in their vicinity. With each town, however, we can approach the relationship between the urban fabric and water from similar terms, bringing material and nature together to examine urbanism in a holistic manner.

Studies such as these prioritised a very hierarchical view of urbanism, where cities are regarded as settlements at the top of the hierarchy and are regarded as the most civilised form of settlement. Analyses of these settlements also have a tendency to draw on Western concepts of urbanism, which can create a biased perspective of urbanism and settlement archaeology.

These archaeological studies of urbanism can also be seen as part of a much wider range of urban studies across the disciplines, especially in geography and sociology. The Chicago School of Urban Research, founded in the 1920s, is often seen to have been the most influential in shaping the development of interest in the study of cities and their modern history. One of the early influential publications was Robert Park, Ernest Burgess and Roderick McKenzie's volume 'The City', in 1925, which contained this first chapter by Park, 'The City: Suggestions for the Investigation of Human Behavior in the Urban Environment'. This work represented a style and approach to studying the city that created a homogenous, static and fixed framework for understanding cities.[11] The early studies originating from the Chicago School often sought to define and characterise the nature of urbanism, but in so doing created a specific view of the city based on the Western perspective and also one that emphasised city hierarchies based on the presence of features regarded as representing urbanism. Park wrote that he saw cities as 'the natural habitat of the civilized man'.[12] We can see these perspectives in Louis Wirth 1938 and Lewis Mumford's 1961 work.[13] Mumford saw cities as synonymous with civilisation, and linked with this was also a strong influence from modern concepts of capitalism.

The influences from these traditions, however, also encouraged other perspectives that sought to engage with urbanism, and the experience of urban spaces, differently. French scholars, such as Guy Debord of the situationist movement, developed a perspective of studying urbanism which came to be known as psychogeography.[14] It sought to avoid Western capitalist perspectives of urbanism and think more about cities as lived spaces. Such approaches have also had some influences on archaeological approaches to place and landscape.

In more recent years, there has been a massive expansion in the range of themes examined in urban studies, especially through the influences of post-modernism and post-colonialism. These influences have seen attempt to move away from the focus on hierarchies and defining characteristics of urbanism, and instead to look at the human experience within settlements and the way in which human activity constituted these settlements. We can see this across disciplines such as geography, sociology and cultural studies with work that examines cultural perceptions of cities,[15] food and identity, and sensory experiences of cities.[16]

Roman archaeology has never been separate from the influences of developments in other areas of archaeology or influences from other disciplines. We can see this in the way in which themes developed in Roman period urban studies and especially in the study of the processes of conquest and urban development in provincial contexts such as Britain. The majority of accounts relating to urban development in Britain, and other provinces, have tended to be con-

11 Cf. Latham et al. 2009, 2.
12 Park 1952, 14.
13 Wirth 1938; Mumford 1961.
14 Debord 1967.
15 E. g. Highmore 2005.
16 E. g. Edensor 2017.

cerned with the narrative of conquest and the consolidation of power and control.[17] Urban development is seen within the context of rational military, economic and geographical concerns with less concern over the people living in the area or the impact of the towns on the landscape. As a consequence, urban development in the Roman period was often divorced from the pre-existing uses of the landscape.

More recent developments in archaeological theory have seen more critical perspectives on issues relating to identity, landscape and materiality. In particular, there has been an emphasis on bringing the different perspectives and approaches from processual and post-processual archaeology together into a more symmetrical arrangement so as to create a more balanced approach.[18] This symmetrical archaeology allows different methodologies and types of material to come together and creates a fuller and more holistic interpretation of the past. This might mean, for example, examining social perspectives of landscape, but also physical, economic, and geographical perspectives and methodologies of landscape. In bringing these different perspectives together, we also need to think about the different ways in which they did interact. In particular, it is important to think about how modern ontologies, the ways of seeing and organising our world, have influenced how we approach the archaeology of the past;[19] and also whether we can access past ontologies where inhabitants saw and thought about the world differently. Connected with this task is thinking about the relationship between the 'human-made' and 'non-human' world and how they came together in a way that influences lives and experiences. The study of buildings and settlements is crucial in urban archaeology, for example, but they cannot be separated from the wider landscape in which they were constructed, and so it is necessary to give similar attention to 'natural' or 'non-human' components of these settlements.

This emphasis on the role of the 'natural' or 'non-human' within archaeology has encouraged the advancement of the concept of post-humanism within archaeological studies.[20] In post-humanism, it is argued that both human and non-human components of the world should be given equal value in studies of the past, such as in landscape and settlement studies, since all of them had an impact on human lives and experiences.[21] This relationship between human and non-human is also complex because it has been argued that any human involvement or relationship with an unaltered component of the landscape, for example, means that these features cannot be regarded as entirely natural.[22] The issue of how we understand landscape is also complex, with the term itself reflecting an entirely specific way of viewing and thinking about land, generated in the era of the post-medieval and early modern West. In studying towns, we can think about not only the built structures and people, but also other components, including water. We can think about how the water formed part of these settlements and the impact it had and has on our understanding of the meaning of these sites. This is not only in terms of water supply, such as pipes and aqueducts, but all features of water. Looking at water also helps us address the issue of past ontologies, how water formed part of past experiences.

This recognition of the need to move away from this Western dominance within urban studies is also linked with post-colonial influences and rethinking the role of the subaltern. These developments argue that non-Western forms of urban settlement should not be regarded as inferior to Western forms of urban development. There is also a questioning of the way in which urban settlements are placed in hierarchies of importance with many non-Western or early Western urban sites described as proto-urban rather than urban; Western cities are also seen as

17 E. g. Wacher 1995.
18 Witmore 2007; Webmoor –Witmore 2008; Olsen et al. 2012.
19 DeLanda 2016.
20 E. g. Harris – Cipolla 2017.
21 E. g. Webmoor – Witmore 2008; Olsen et al. 2012.
22 E. g. Bradley 2000.

superior to non-Western settlements. Tim Edensor and Mark Jayne have argued that we need to decentralise the way in which we approach urban studies.[23] This means that we need to move urban theory away from a preoccupation with Western urbanism. This is not only about treating non-Western settlements equally, but also thinking about how non-Western sites can be investigated from different, non-Western perspectives, and how these themes can also help us to see Western sites in a different light. These different perspectives can relate to the development and function of urban settlements, the organisation and use of urban space, the construction and use of buildings and the lives and experiences of residents. Non-Western perspectives can contribute to an exciting variety of ways of thinking about urbanism and urban spaces. Within archaeology, this decentring of urban studies is even more crucial because of the way in which Western perspectives have conventionally dominated in urban investigations globally, despite there being a huge range of different settlement sites. This is important for thinking about the Roman world, where there were many different types of urban sites across the Empire; they need to be investigated in ways that do not prioritise the Romanocentric perspectives.

Focusing on Britain, the towns in the Roman period tend to be studied and categorised from the perspective of their legal title and status, which had an impact on the nature of their foundation and development. This categorisation of towns was consolidated by early scholars working on the epigraphic, documentary and archaeological material in order to produce some of the first narratives on urban development in Roman provincial contexts.[24] This perspective and narrative on urban development has been immensely influential on approaches to provincial archaeology and urbanism, as can be seen in the majority of later publications on Roman Britain.[25] Martin Millett's 1990 book 'The Romanization of Britain' continued,[26] but built on, this narrative by emphasising the need to study the pre-Roman context in which each town developed, and the local agency in urban development through interaction with the Roman incomers. This approach has continued to be influential, as can be seen in later publications on urban development.[27] Later work sought to move away from the Roman-orientated narrative in looking at urban origins by thinking critically about urban biographies and landscapes.[28] The *colonia* in Britain were founded from fortresses and they are usually regarded as the most Roman form of cities, followed by the *civitas*-capitals, which were often located in the context of pre-existing *oppida*, but could also involve the construction of a fort. The study of towns in Britain has, as a consequence, tended to focus on whether there was a fort associated with the town foundation or not and how these forts influenced the development and nature of the town. This narrative has tended to dominate despite attempts to move towards post-colonial perspectives.

Across the archaeological discipline there is increasing interest in the need to bring social and scientific perspectives of landscape together. In the context of Roman urban studies, however, landscapes have continued to be tackled in fairly conventional ways, which is why there has been increasing dissatisfaction with post-colonialism and critiques of Romanisation, because they continue to prioritise the Roman perspective. Other ways of looking at landscape, however, can help us assess urban development and the materiality of urbanism differently. This is where we can think about not only different perceptions of landscape, but differing ways of reconstructing past landscapes. Post-colonialism helps us to emphasise that we need to look at urban development from a range of perspectives and not simply from that of the top-down analysis. Breaking down dualisms in approaches to archaeological interpretation allows us to bring together different perspectives, including the social and physical implications of water in urban contexts.

23 Edensor – Jayne 2012.
24 E. g. Haverfield 1912.
25 E. g. Frere 1967; Salway 1981; Hurst 1988; Webster 1988.
26 Millett 1990.
27 E. g. Creighton 2006.
28 See Rogers 2016.

Urban infrastructure and post-humanism: water as part of the urban fabric

The previous section outlined the way in which studies on urbanism and urban development have tended to be influenced by particular traditions of thinking about urbanism and questions that we ask of the material. Water forms an integral part of urbanism, not just in terms of water supply and drainage, but also the landscape setting and other environmental factors. This section will examine these elements of towns. All watery components will have played a role in influencing urban agency, including how water was encountered, avoided, crossed, obtained and utilised. Where water is not readily available, the demand for water forms a constant impact on human behaviour and action. Water plays a major role in urban lives. Water also forms a non-human presence through human attitudes to, and perceptions of water and beliefs associated with it; water is as much cultural in significance as being of practical necessity. Water formed part of the materiality of towns and how it had an impact on the experience of inhabitants and the development of the settlements. From the perspective of post-humanism, we can treat water as an integral component of towns, just as non-natural components such as buildings. Different ontologies also mean that the meaning of water, and its significance in the landscape, would have been regarded differently than is the case today. This means that we can use the topic of water and urbanism to think about how we can decentre our approach to the study of urbanism and as a consequence also think about issues connected with identity and urbanism.

In studies of Roman period urbanism and water, the theme that has received the most study relates to water supply. This theme includes the study of aqueducts and other sources of supply, such as wells, and also other components of water distribution and drainage, including pipes, lavatories and bathhouses[29] (Fig. 1). These are all important elements of towns that need to be examined and documented. The difficulty is that these installations and other features tend to be prioritised over wider meaning relating to water and they also tend to be interpreted from the modern perspective of economy, rationality and functionality. The water also formed part of different ontologies and these components of towns may well have been experienced and inter-

Fig. 1: Leicester (Ratae Corieltavorum), excavated remains of the 2nd century Roman era bathhouse alongside the standing section known as the Jewry Wall.

29 E. g. Wikander 2000; Wilson 2000; Koloski-Ostrow 2001.

preted differently by different groups in the towns. Bathhouses may have been used differently, and not simply in a way that reflects Romanisation,[30] and aqueducts drew water from meaningful locations. In an interesting paper, Peter Ellis[31] discussed the potential religious implications on local people in conquered areas of Roman aqueducts drawing water from springs and suggested that they could be a sign of domination. More studies addressing the complexities and meanings in the use of water in the past remain needed. Although aqueducts have received much study in the past,[32] their religious implications as addressed by Ellis have still only been given minimal attention. The way in which towns in the Roman period interacted with ritually-imbued watery landscapes and local identities is another useful example of the relationship between water and power, which will be explored here through the examination of a few sites.

With post-humanism, we can consider water as an integral component of the landscape, and this landscape also become part of towns as they developed and influenced urban agency. Urban development in Britain in the Roman period tends to be seen within the context of military conquest and the establishment of a network of forts which later became towns. Some towns were also associated with pre-existing *oppida* which are often treated in the same way as towns. The problem is that these *oppida*, such as at Colchester (Camulodunum) in Essex, perhaps Camulodunon in the Iron Age, and St Albans (Verulamium) in Hertfordshire, possibly Verlamion in the Iron Age, remain poorly understood and do not easily fall into what might be regarded as the category of an urban settlement. This suggests that we perhaps need to think about these sites in a way that is not preoccupied with Western and modern notions of urbanism. It is also important to consider the fact that the military forts were not founded in deserted landscapes, but were situated in places that already had meaning, history and significance. The water in the landscape formed an important component by which we can examine this.

The relationship between towns and water is not only in the form of rivers and waterfronts, which has key economic significance, but the full relationship between settlement and water can be much more complex. The water can include rivers, streams, lakes, pools, springs, wetlands, islands, puddles, wells, pipes and other forms of supply and water collection and even containers. The distinction between 'natural' and 'artificial' is not straightforward, because the human involvement in all these features breaks down these divisions. The post-human perspective, moreover, ensures that we examine this relationship from not only the human perspective, but also the non-human.

The rationalisation of the landscape led to its secularisation and the neglect of landscape as cosmology and mythical geography,[33] but by breaking down the dualisms between rational/scientific and social approaches to landscape, we can develop more holistic perspectives on how landscapes were used, experienced and imagined.

We can document the way in which waterscapes formed part of the urban fabric and how these waterscapes were altered through urban development. Urban development involved interaction with wetlands. At the town of Winchester (Venta Belgarum), for example, there is good archaeological evidence for a large-scale programme of wetland drainage and land reclamation within the floodplain of the Itchen as the town expanded off the island. Excavations in an area of the town known as the Brooks produced evidence of a substantial drainage system with large timber drains to remove the water and make it suitable for building.[34] There was also evidence of the large-scale dumping of material to build up the land and make it suitable for construction (Fig. 2).

30 Cf. DeLaine 1999; Fagan 1999; Kosso – Scott 2009; Revell 2009.
31 Ellis 1997.
32 E. g. Ashby 1935; Hodge 1991; Hodge 1992; Aicher 1995;.
33 Cf. Darby 1973; Cosgrove 1984; Bender 2001, 3; Johnson 2007.
34 Zant 1993.

Fig. 2: Winchester (Venta Belgarum), diverted River Itchen, diversion originating in the Roman period.

Rivers and islands also formed part of urban development. The development of London (Londinium) as a town in the Roman period, for example, saw a lot of river canalisation and the construction of revetments, because of the large number of rivers and streams that existed in the area where the town was founded. The main area of the town was constructed on the north side of the Thames where there were a number of smaller rivers and streams flowing into it, including the Walbrook and the Fleet.[35] Excavations in the Walbrook area have located the course of the Walbrook together with evidence of a series of superimposed revetments, each cutting the silted or backfilled channel of its predecessor.[36] The first revetment dated to the second half of the 1st century AD and the preserved remains provided some good evidence of the way in which the revetments were constructed. The evidence consisted of two rows of vertical timbers set in pairs driven into the underlying deposits with horizontal planks set on edge between them and additional planks secured against the outside face.[37] There was also a large dump of clay behind the revetment, representing consolidation of the ground and the riverbank. The second revetment, probably dating to the 2nd century, consisted of large timbers at least 1.7 m long and 0.3 m square, driven their full length into the surface of the bank. Horizontal planks varying from 0.15–0.38 m wide were fixed to these timbers with nails. A platform connected with this revetment was constructed of heavy wooden planks on a foundation of densely packed vertically driven piles.[38]

On the south side of the Thames at Southwark, settlement developed in a low-lying area where there were a number of islets of raised land with river channels flowing between them.

35 E. g. Maloney – de Moulins 1990; Wilmott 1991.
36 Grimes 1968; Shepherd 1998.
37 Shepherd 1998, 40.
38 Shepherd 1998, 41.

During the Roman period, this area was gradually transformed and this involved the construction of revetments and the canalisation of river channels.[39] Excavations of sections of channels have revealed that there were often multiple phases of revetments connected with them. Along the watercourse known as the Southwark Street Channel excavations have produced evidence of two phases of revetment dating to the 1st and 2nd centuries AD, the first of post-and-wattle and the second of post-and-plank construction. The ground level behind them was often raised, and their function was probably to consolidate the channel banks and prevent erosion of the islands.[40] These actions taken to control and alter waterways will have been significant events, each forming an important element of the river biography and the development of the urban space. Repair work and the building of new installations will have represented continued commitment to the land as well as the attempt to maintain dominance over it.

Another aspect of land use in these urban contexts was the construction of waterfront installations, such as ports and harbours. Port and harbour structures were often created to exploit rivers and seas and to move people and goods more easily. In so doing, they also altered the landscape in major ways and changed the way in which people encountered and interacted with the water. The theme of ports and harbours is a popular area of research across the Roman Empire, but their study conventionally focuses on the themes of trade and transport.[41] They can, however, also be tied into the way in which waterscapes and the wider landscape were used, exploited and altered. Archaeological evidence at London included remains of sections of timber box quays which were filled in with dumped material, constructed from the AD 60s onwards.[42] This reshaping of the riverfront into port facilities formed part of the wider landscape transformation as the town developed in London.[43] The construction of the port, as well as the bridge across the Thames and the treatment of the smaller rivers, were all ways in which water formed part of the materiality of the town. This relationship with water, however, was not as straightforward as simply having purely economic or rational implications, as the next section will examine.

Water and decentring urban agency

The waterscapes of towns were acted on and utilised by residents, but the water also had other impacts on human action and experience. Breaking down dualisms within archaeological theory allows us to bring perspectives to bear on the meaning and significance of the relationship between towns and water together. That means we can consider the practical implications of water, as part of the urban fabric, on urban agency, but we can also think about the role water had in the meaning of places and the impact water had on human behaviour from social and cultural perspectives. We can approach this impact of water through the way in which water was also associated with religious activity and so already meaningful before the foundation of the towns in the Roman period. It seems likely that the foundation of many of these towns also played a role in the creation or consolidation of group identities, as reflected in the town names, although it is unclear to what extent people felt like they belonged to these groups or whether it was more imposed. Identity, moreover, can also be influenced by places, landscapes and environments, as well as different ontologies and ways of experiencing beyond the brute matter of settlement structures.

39 Cowan et al. 2009.
40 Graham 1988; Yule – Hinton 1988, 16.
41 Milne 1985; Jones 2009.
42 Brigham 1998; Milne 1985; Swift 2008.
43 Rogers 2011.

Many of the towns that developed in Britain in the Roman period were associated with landscapes that we can already see were important and meaningful as reflected in evidence relating to water. Evidence for Iron Age settlement associated with water that appears to go beyond what would be considered today practical motives is at the site of the Roman town of Verulamium (near modern St Albans), established at the end of the AD 40s. An Iron Age *oppidum* and then Roman town was closely integrated with the watery setting here. There were monumental earthworks which appear to have deliberately focused on and incorporated the River Ver and its floodplain. The earthworks date mainly to the 1st century BC and early 1st century AD,[44] but there may well have been an earlier focus of activity here, perhaps as a meeting place, before they were constructed.[45] A large enclosure with evidence for coin production may have been a political focus and it was located within the floodplain next to the river.[46] This location would seem to suggest that the religious meaning attached to the water was an important part of the power of the site and the contribution of facets of identity of those residing there. There was a timber causeway across the river, from which objects appear to have been deposited.[47] This also led up to an area of probable elite burial at Folly Lane represented by burial mounds,[48] suggesting that this site was of high status, despite its close association with marshland. The Roman town was placed over the central enclosure within the floodplain, so it continued to incorporate this watery area in a prominent way. Placing the town here may have been a deliberate act relating to the power and control of this meaning-laden place.[49] Alternatively, the local elite may have contributed towards the development of the town here, because it continued to add meaning to and venerate the site. Tacitus[50] mentions that the town was a *municipium* at an early date, and if this was indeed the case, it was clearly of great importance, perhaps reflecting the power and significance attached to the area before the conquest. The construction of the town would have led to the negotiation of new identities and power relations.

Wetlands also saw religious veneration and appear to have played an important part in local identities and power relations. Wetlands, neither water nor land, were the interface between land and water and the world and the underworld. Excavated sites in Britain, such as Flag Fen in Peterborough[51] and Fiskerton in Lincolnshire,[52] have demonstrated that wetlands were foci for ritual deposition. One useful example of a large wetland area is the Fenland in East Anglia. Analysis of the quantities of objects ritually deposited in the Fenland of prehistoric and Roman date show that there was a very high concentration here compared with surrounding areas.[53] Over 200 hoards and single items of Roman date have been documented as having been deposited here. Bronze items included statuettes and other religious regalia, as well as bronze vessel hoards.[54] There were also hoards of pewter vessels and coins.[55] The Roman date deposits seem to have been continuing a tradition from prehistory and most of the items were deposited within rivers, streams and marshes. There was also a high concentration of deposited items around the fen-edge,[56] suggesting that the whole fenland landscape was recognised as special and bounded through religious activity. A number of Roman period shrines were also

44 Thompson 2005, 27–32.
45 Haselgrove 2007, 509.
46 Haselgrove – Millett 1997, 284.
47 Anthony 1970; Niblett 2005, 64 f.
48 Niblett 1999.
49 Cf. Millett 1990.
50 Tac. ann. 14, 33 (translation by Jackson 1937).
51 Coombs 1992; Pryor 2001.
52 Field – Parker Pearson 2003.
53 Rogers 2007.
54 E. g. Babington 1883; Taylor 1985, 31.
55 E. g. Liversidge 1959, 7; Poulton – Scott 1993; Denham et al. 1995, 178.
56 Babington 1883, 87; Evans 1984; Gurney 1986, 92; Evans – Hodder 2006.

Fig. 3: Lincoln (Lindum), Brayford Pool at Lincoln in the low-lying part of the town.

constructed along the fen-edge, a transition zone marking the boundary between the 'treacherous wild Fenland' and rich drier upland[57] and still greatly susceptible to flooding,[58] further emphasising the special nature of this area and the influencing aspects of the identity of the local inhabitants. Examples of shrines here include Haddenham on the south-west fen-edge[59] and Deeping St James on the western fen-edge.[60] Offerings across the Fenland landscape may suggest the belief of deities within the wetland setting.

North of the Lincolnshire Fens is the city of Lincoln. The Roman era town at Lincoln (Lindum) was preceded by a fortress on the same site, founded at the end of the AD 50s or beginning of the AD 60s. The conversion to a town then took place at the beginning of the AD 70s. The settlements were located on a spot where water formed an important focus in the pre-existing activities and settlement: a marshy location next to the River Witham at the point at which a large natural body of water also formed, known as the Brayford Pool (Fig. 3). There is increasing knowledge of Iron Age activity here, with some timber structures being excavated on what would once have been an island within the Brayford Pool;[61] the size of the pool is now greatly reduced due to land reclamation (Fig. 4). Very little is known about the nature of the structures on this small island, or the activities associated with them, but the wet conditions here might indicate that a farmstead is unlikely, and instead there may have been some kind of religious and political function here. This watery location certainly appears to have attracted much religious activity, with objects deposited into the Witham and downstream at Fiskerton and then on to the Fenland. A triple-ditched linear earthwork lay to the north of the town site and the Brayford Pool. The definite function and date of this earthwork is still not certain, but a later Iron Age date is perhaps most likely; what excavations there have been along the ditch have found pottery of the 2nd and 1st centuries BC.[62] Although it may have functioned as some kind of stock control or barrier, it appears to have been directing attention, perhaps encouraging

57 Taylor 1985, 46.
58 Bromwich 1970.
59 Evans – Hodder 2006.
60 Hayes – Lane 1992, 135.
61 Darling – Jones 1988.
62 Jones – Stocker 2003, 30 f.

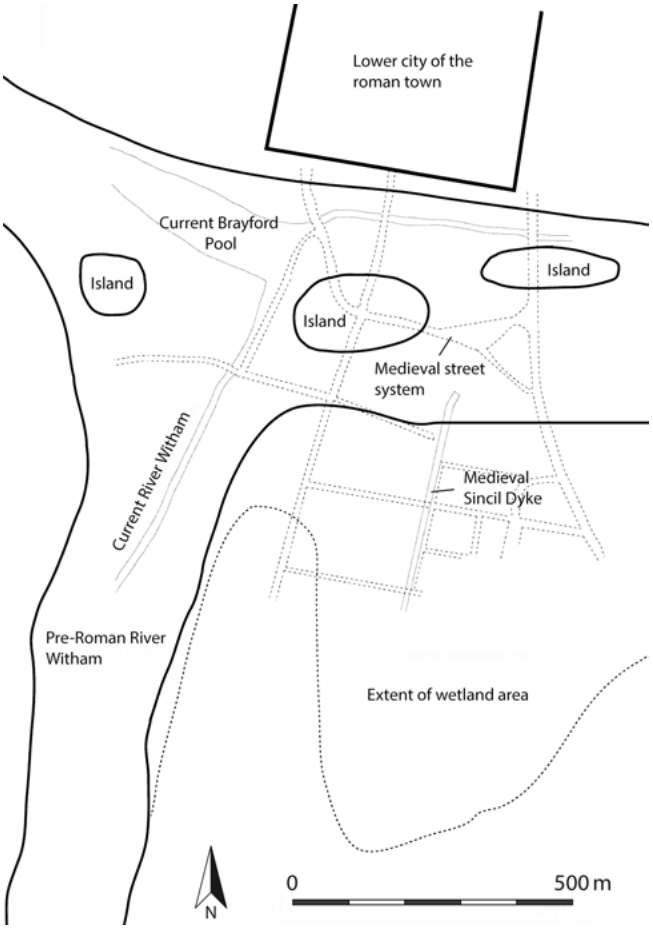

Fig. 4: Lincoln (Lindum), drawing of the Brayford Pool area in the Pre-Roman and Early Roman periods with a larger River Witham and islands which have now been lost due to reclamation.

movement, towards the watery area, defining religious space and framing the ceremonial.[63] It may even have controlled access to this site.

There have been suggestions that there was some kind of Iron Age enclosure beneath the Roman fortress.[64] But apart from a well which may have had pre-Roman origins, and was later incorporated into the site of the forum-basilica, there is still limited evidence for this. Further excavation would be needed beneath the fortress, but chance finds from the wider area do indicate that there was more settlement in the area. Part of the fortress was constructed over the 'Jurassic Way', an ancient route way which follows the line of the Jurassic limestone ridge through Northamptonshire to Lincolnshire,[65] which might support the idea of a pre-existing site here and the desire to make a physical and symbolic impact in the conquest. Importantly, the city archaeologist for Lincoln has made the observation that the area of the Roman town had many disadvantages from the point of view of establishing settlement, including flooding and difficulties of drainage and supply.[66] This supports the idea that the fortress, and then town, was placed here for reasons relating more to the domination of pre-existing sites of importance, often with symbolic and religious meanings. It is possible that the Romans recognised the highly charged religious nature of the site and the power attached to it and so placed a fortress here. It may also relate to desires to control the water, as had also occurred in Rome. After foundation,

63 Jones – Stocker 2003, 30 f.
64 Gilmour 2007, 231.
65 Gilmour 2007, 231.
66 Jones 2002, 25.

parts of the wetlands were reclaimed and a section of the river was canalised,[67] making a large impact on the way in which the area would have been experienced. The local people, especially perhaps the elite, need not necessarily have been against the town if it continued to develop and add to the importance of the site. The watery context remained an important component of the identity of the inhabitants and the experience of the place.

The town at Winchester, established in the late AD 60s or AD 70s, was constructed with its western half overlapping the earthworks of the Iron Age *oppidum* known as Oram's Arbour alongside the River Itchen, probably dating to the 2nd century BC, but there are also traces of Iron Age activity closer to the river itself.[68] Neither the Oram's Arbour nor the early Roman town had defences on the eastern side facing the river, suggesting that the floodplain and river were integral parts of the settlement plans and identities of the occupants. The public buildings of the Roman town were constructed on a tufa island within the floodplain of the Itchen, which demanded considerable land reclamation.[69] The river itself was redirected around the new town, transforming this place through representations of power. There certainly seem to have been more considerations taken regarding the town location here than simply those relating to practicality or economic benefits. The process of town construction would have dramatically altered this area, which it is possible to see as a deliberate act of control and demonstration of power.

Returning to London, we have seen how the landscape was used and altered as the town developed, which will have had an impact on human agency and interaction with the place. Studies of the development of Roman London have always focused on whether there was a military presence in the initial stages of settlement here or whether the town developed firstly as a commercial venture that then later gained prominence and importance. In fact, it seems likely that there was both military and non-military input here during the course of the early stages of development of the town, since even if there was no immediate establishment of a fort or fortress, it does appear that there was a small fort established early in the life of the settlement as identified through excavations at the Plantation Place site.[70] Despite the uncertainty about the very early stages of settlement at London, it does seem clear that the landscape continued to have an impact on the residents as the town developed and grew. The many rivers and streams that formed part of the waterscape had an impact on human activity and this includes actions associated with religious belief and associated with meanings attached to elements of the waterscape.

The Walbrook stream, which now lies below street level, ran through the town, effectively creating an east and west split. Excavations along the side of where the Walbrook would have flowed in the Roman period have, over the years, identified this zone as quite a focus for religious activity, including a number of temples or shrines, including a mithraeum, and some activities indicated by unusual objects found in the vicinity, including cult pots.[71] The low-lying and watery nature of the location meant that the mithraeum structure was subject to flooding and there were a number of phases of repair and reconstructing.[72] This concentration of activity may suggest that this area was religiously important, and this is indicated further by the collection of objects, especially metalwork, uncovered along the river. Much of this material is well preserved because of the wet nature of the deposits. The nature of the deposits suggested that some of it at least was the result of dredging or the movement of material from the river at some point in the past, indicating that the objects may once have been within the river itself. Ralph

67 Jones 2002, 21–24.
68 Qualmann et al. 2004.
69 Zant 1993, 3.
70 Dunwoodie et al. 2015.
71 Bird 1996; Shepherd 1998; Hill – Rowsome 2011; Wardle 2011.
72 Shepherd 1998.

Fig. 5: Museum of London, recreated kitchen of a Roman era house from Londinium containing knives and other metalwork uncovered from the Walbrook stream.

Merrifield[73] undertook at number of studies of this metalwork, which included a large number of knives and other tools as well as pins and other items. His studies indicated that many of the objects had been deposited in good condition, and some may not even have been used at all, and some appear to have been deliberately bent before deposition. He argued that many of the objects were deposited for reasons relating to ritual or magic, and the location of the stream was an integral component of this activity. Many knives and other metal items are on display in the Museum of London but rarely do the displays acknowledge the complex use lives or multiple meanings of these objects (Fig. 5).

Merrifield's analysis of the objects and their deposition in this watery area of the town shows that the water formed an integral part of the town here and influenced human action and experience of the settlement. The meanings attached to the water formed part of human behaviour, and, as such, the water cannot be separated from other components of the town. The religious or magic activity also tells us about beliefs and also identities within the town. The activity is likely to indicate recognition of the religious importance of the stream and wider location, which continued through the life of the town. The activity is perhaps most likely to have been undertaken by local people that came to live and work in the town, but it may also have been done by incomers from outside Britain that felt the need to recognise the meanings attached to this watery area within the town.

73 Merrifield 1987; Merrifield 1995; Merrifield – Hall 2008.

Conclusions: Water and Roman Era Worlds

This paper examined water as a component of urban settlement in the Roman period. It explored the way in which water formed part of the materiality of the settlements and the implications and meaning of the water in these contexts. Rather than focusing on the conventional themes of economics, functionality and rationality, the chapter demonstrated that there is more potential in the significance of the water. From a post-humanist perspective, it is possible to treat water as an integral component of the settlements, one which had an impact on human experience, as well as humans acting on the water. The paper examined the way in which water had an impact on the significance and meaning on the sites in which towns developed, how water was used in the towns and how the watery landscapes were developed and transformed as the towns developed. The paper also emphasised this water can be used to develop new perspectives on urbanism and consider the way in which urban development in the Roman period can be approached from a decentred perspective. As such, it emphasised the potential of these settlements to help to access different experiences and identities across the Roman Empire beyond the Roman top-down perspective. The evidence relating to water allows us to decentre our understanding of urbanism and the different experiences people had of water allows us to think in terms of Roman era worlds rather than the Roman world.

Illustration Credits

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Fig. 4: drawing by Adam Rogers, after Steane et al. 2001, fig. 1, 3.
Fig. 5: photo by Adam Rogers.

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Margit Dahm-Kruse

9 Water and Urban Structures in the Narrative Worlds of Courtly Novels – Aesthetic and Symbolic Functions

Abstract: Medieval poets used water as a complex metaphor for a wide range of purposes. Through examples taken from the 13th-century novels 'Herzog Ernst' and Konrad Fleck's 'Flore und Blanscheflur', the contribution will show that literary texts often refer to the broad symbolic and especially religious implications given to the element of water. Both epics contain elaborated descriptions of waterworks as central elements within different urban structures and architectures. These depictions of water refer to biblical images like the Garden of Eden or the Heavenly Jerusalem and therefore transport specific spiritual concepts of meaning. At the same time, a particular aesthetic and representative impact is given to them. The visualisation of artful controlled water turns out to be a highly suitable pattern to signify technological skills, power, and cultural refinement. The poetical significance of these waterworks lies in the creation of an intriguing interaction of this worldly claim of validity and the 'proper' Christian meaning of water.

Water with its potential to connect epistemic, symbolic, and metaphysical meaning is of high significance in medieval literary texts. By drawing on examples from courtly novels of the 13th century, this essay will show how descriptions of water and waterworks create poetical meaning on various levels. The fictional texts will not be read as an epistemological approach to the existential, geo-historical or economic significance of water which might be reflected in the literary medium, but rather as documents of the rich symbolic meaning and aesthetic functions given to descriptions and depictions of water.

Medieval culture in general displays a high affinity to symbolic and allegorical interpretations of the material world. Like all of the natural elements, water is not only regarded as a natural phenomenon, but also as a religious symbol. Even more than the other natural elements, water lends itself to symbolic usage. It is closely related to several spiritual concepts of meaning – first, and above all, it represents the transtemporal idea of spiritual purification which leads to the great significance of water in Christian liturgy in general and in baptism in particular,[1] but also numerous other religious concepts, such as the water of life. As James Smith outlines in his recent study, in religious writing water is often used as a metaphor to come to terms with elusive Christian concepts such as the purity of the soul or the divine grace and wisdom.[2] Water is also used to represent sophisticated fields of knowledge and theological concepts. Bernhard of Clairvaux, for example, used the imagery of water to describe the spread of spirituality in the human mind; furthermore, the Transubstantiation determines a close connection between water and the blood of Christ.[3] At the same time, the functional significance of water in many different areas of human life builds up several correlations with its symbolic meaning. This simultaneity of metaphysical and epistemic meaning, or of abstractness and materiality, can particularly be seen within the realm of hygiene as a physical as well as spiritual matter.

1 Cf. Huber-Rebenich et al. 2017, 10.

2 Cf. Smith 2018; Smith 2017.

3 Cf. Miller 1986, 138–140. N. Miller presents in detail the complex imagery of water in several biblical passages, as well as in the theological discourse of the 13th century. A broad range of literary references to the symbolic meaning of water as water of life is collected by Classen 2011.

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These symbolic or spiritual meanings, however, are not restricted to sacred contexts, but also play a significant role in secular writings.[4] Even genuinely literary or fictional texts frequently made use of religious motifs and concepts of meanings.

According to the thematic frame of this volume, the main focus of this essay will be on the thematic connection of water and urban structures within medieval works of fiction. Therefore, I will analyse literary descriptions of waterworks and water supplies connected to urban landscapes and architectures. It can be shown that there is more to the extensive depictions of artful waterworks than just being a random element within the general descriptions of cityscapes or single buildings; they relate, rather, to particular Christian meanings. Water is part of the iconographic programmes of the Heavenly Jerusalem and the Earthly Paradise to which literary representations of cities, palaces, and palace gardens often refer. At the same time, the fictional texts mirror the representative impact of artfully designed waterworks.[5] The artificially controlled element of water is a highly suitable motif for the symbolic representation of power, authority, and cultural refinement, as well as for the ambivalent configuration of the Orient.

Water in a perfect cityscape – the false Jerusalem in Herzog Ernst B

In the courtly literature of the 12th and 13th centuries, the main focus is on aristocratic protagonists and on the court as the main place of action. Due to this setting, extensive descriptions of cities are rare. If cities are mentioned in the narrative worlds of courtly novels, their presentations are mostly brief and focused on their material or architectural features, while the social structures or the economic, cultural, and political complexity of cities are seldom reflected. The descriptions are, in most cases, limited to certain topical elements, such as the fortification by walls, gates, towers and moats, as well as the sovereign's residence. Water is certainly a typical feature of these short depictions, since the cities are almost always surrounded by moats or natural waterways, but further elaborations on the importance of water in urban surroundings are rarely found.

Against this background, the significance of the first text example taken from the courtly novel 'Herzog Ernst' becomes apparent, as it goes far beyond these typical patterns. This novel contains not only one of the most elaborated representations of a city from the entire courtly literature, but also an extensive description of water within an urban landscape.

This anonymous narrative, dating back to the middle of the 12th century, was one of the most popular and widespread novels of the German Middle Ages. It is handed down in ten different versions dating from the 12th to the 16th century which testify to the enormous and long-lasting interest in this text. I will refer to version B as the oldest complete one.[6]

The novel is divided into two parts. The first part tells of the rise and fall of the Bavarian Duke Ernst, who in the first instance enjoys a high reputation with the German emperor Otto, but becomes disgraced through defamation. The emperor attacks Ernst's Bavarian homeland; neither the empress' nor the German lords' intervention can dissuade him from his unjust furor

4 Until well into the late Middle Ages, literacy and literary production were closely linked to ecclesiastical institutions and their personnel. Accordingly, sacred and secular writings were not dichotomously separated fields.

5 The particular potential of water-art to overtop the known and to create something unprecedented is mentioned in von Reden – Wieland 2015, 22.

6 The oldest version A from the 12th century has only survived in three fragments that altogether contain about 10 % of the entire text. B, commonly dated to the early 13th century, is considered to be very closely related to version A (cf. Bumke 2000, 413). An overview of the different versions is given by Behr 2011, 61–63 and Stock 2002, 152–158.

against Ernst.[7] After a failed attempt to assassinate the Emperor and six years of war, Ernst flees with a small group of followers with the intention of travelling to Jerusalem. There he hopes to gain restitution and redemption by joining the crusades – due to the historical background, a not uncommon pattern in 13th century novels.

However, the journey does not lead Ernst and his men directly to their final destination Jerusalem. They get caught in a terrible sea storm and after an odyssey of several months they arrive at the coast of a foreign Eastern country named Grippia, where the second part of the novel takes place.[8]

At the beginning of this adventurous tale of the Orient, there is a long episode that takes place in a large and magnificent city.[9] This episode constitutes the largest part of the novel and is clearly distinguished from the spatio-temporal structure of the rest of the text. In more than 600 verses the city is praised in superlative terms as a masterpiece of Oriental art of building. The approaching men first notice the strong external walls made of coloured marble, the golden battlements decorated with precious stones, and the particular glow of the city:

do gesâhen si an den stunden	*Dort erblickten sie nun*
ein hêrlîche burc stân,[10]	*eine herrliche Stadt,*
diu was al umbevân	*die ganz und gar von einer*
mit einer guoten miure.	*großen und starken Mauer umgeben war*
diu was harte tiure	*die sehr kostbar*
von edelem marmelsteine.	*und aus edlem Marmor war.*
[...]	
ouch wâren die zinnen	*auch waren die Zinnen*
beide ûzen und innen	*sowohl außen wie innen*
meisterlîch gezieret,	*kunstvoll verziert,*
mit golde wol gevieret	*mit Gold geschmückt*
und mit edelem gesteine,	*und auch mit*
beide grôz und kleine,	*großen und kleinen Edelsteinen;*
allez meisterlîch geworht.	*es war alles kunstvoll gearbeitet.*
[...]	
(corrupted) die veste,	[...] *die Stadt,*
der schîn vil verre gleste.	*deren Glanz weithin leuchtete.*[11]

The colossal fortification, however, seems to be without function since the gates are open, and the men, to their astonishment, find the city completely empty:

7 The question of possible references to historical events is extensively discussed by Neudeck 2003.

8 In premodern literary texts, the symbolic potential of water is often used to mark moments of transgression. When protagonists of medieval novels cross rivers or seas, these waters are more than geographical markers for the spatial localization of the narrative. Water here functions primarily as a topical means of representing the transgression of spatial, as well as semantic boundaries. Voyaging across a body of water and entrusting oneself to the unpredictability of the sea is also a universal metaphor signifying contingency and human subjection to fate or to divine control. This explains why the protagonists of medieval epics so often experience storms at sea which keep them from their original destination and lead them to unknown places.

How the tradition of associating water with divine workings, unfolded in ancient myths, shapes the display of aquatic landscapes in the Fora of Rome can be seen in the contribution of Dylan Rogers in this volume.

9 It has to be mentioned that in 'Herzog Ernst' Grippia appears only as the name of the country, while the city itself is unnamed. Nevertheless, in research papers Grippia is generally used to term the city as well as the country.

10 The Middle High German term *burc* is used to signify a fortress as well as a city. The term *stat* is established only from the 12th century on and late into the 13th century *burc* is still used in many epics as a synonym for city. Cf. Ennen 1980, 13–19.

11 The middle high German text is quoted from the following edition: Sowinski 1979, here V. 2212–2250 (Translations by M. D.-K.).

Diu burctor wâren ûf getân.	*Die Stadttore standen offen.*
dô sâhen die küenen man	*Da sahen die tapferen Männer*
nieman an den zinnen,	*niemanden auf den Zinnen,*
weder ûze noch innen.	*weder außen noch innen.*[12]
[...]	[...]
dô sie in die burc drungen,	*Als sie in die Stadt drangen,*
dô was dâ nieman innen.	*da war niemand dort drinnen.*[13]

This first description of the city clearly alludes to the biblical motif of the Heavenly Jerusalem.[14] In the revelation of John, the Heavenly Jerusalem coming down to earth at the end of times is described as a glorious city whose square is limpid gold and that is surrounded by strong external walls decorated with precious stones of several colours.[15] The Heavenly city is surrounded by great walls that do not serve the purpose of fortification, because the gates always stay open,[16] therefore Grippia's open gates mark a very strong allusion to the biblical pattern. A very significant reference to the Heavenly Jerusalem is also given with Grippia's special shine that reminds one of the divine light in the likeness of crystal or precious stones which emanates from the Heavenly City.[17]

The Heavenly or New Jerusalem is an omnipresent paradigm with several overlying theological, allegoric-symbolical, and historical meanings. It is the central eschatological symbol in the Christian Middle Ages,[18] at the same time representing the *ecclesia* and therefore the community of believers.[19] It is the prototype of allegorical meaning and fourfold exegesis, and it is closely connected with medieval concepts of paradise represented not only by the Garden of Eden, but also by the Heavenly City.[20] In any case, the Heavenly Jerusalem is of great significance for the iconographic and also the literary tradition in the Middle Ages.[21] The iconographic model of the Heavenly Jerusalem underlies the description of cities in many texts from religious as well as secular contexts. Thus, the 'Herzog Ernst' is not the only example that makes use of this religious pattern and its specific aesthetic impact.

In 'Herzog Ernst', the arrival at the heavenly-seeming city of Grippia appears in the first instance as a rescue, even as salvation after the terrible months at sea. The nearly starved men step into the beautiful city and after a while they find a splendid banqueting table within a courtyard.[22] They help themselves to food and afterwards they return to their ships. But despite the Christian allusions and despite the beauty of the city and the lifesaving food it provides, it is obvious that Grippia is not an altogether graceful place: the emptiness of the city is suspicious from the beginning, and Ernst's men are constantly expecting to be attacked. However, it is precisely this danger which promotes the enormous seductive power of the city: even though the men, now provided with food, have returned safely back to their ships, the duke, fascinated

12 'Herzog Ernst', ed. Sowinski 1979, V. 2311–2314.

13 'Herzog Ernst', ed. Sowinski 1979, V. 2362 f.

14 This reference is already highlighted by Bowden 2012, 23.

15 Apc 21, 10–21. All Bible verses relate to the following edition of the Biblia Sacra Vulgata: Weber – Gryson 2007.

16 Apc 21, 25.

17 Apc 21, 11; 21, 23–24.

18 See, for example, Stoltmann 2008, 375; Hengel 2000, 251.

19 'Vornehmlich die Stadt, das himmlische Jerusalem, ist eine Metapher, die immer wieder in der Literatur den Gottesstaat und die Kirche vertritt. Kirche – Stadt – Gottesstaat erscheinen bis weit in das 13. Jahrhundert unter gemeinsamen Anschauungsformen' (Bandmann 1951, 85). See also Angenendt 2005, 311.

20 Kugler 1986, 84–87. 110–112; Miller 1986, 148.

21 Lilley 2004, 300 f.

22 Ernst considers the dishes and drinks to be God-given, intended to save the men from death, but also to test their self-control. He allows his men to eat and drink, but not to take anything of the gold and the precious objects around them. When the story progresses, it becomes clear that the banquet was provided for the wedding of Grippia's king which was going to take place that day, so there was nothing divine about it at all.

by Grippia's overwhelming beauty, decides to go back and to take a closer look at the splendid cityscape:

mich lustet vil sêre	*Ich habe große Lust*
daz ich hin wider kêre	*noch einmal zurückzukehren*
und die burc baz besehe,	*und die Stadt genauer anzusehen;*
swaz halt mir dar inne geschehe:	*was mir auch dort geschehen möge:*
sie ist sô rehte wol getân.	*sie ist so schön gestaltet.*[23]

So, the protagonist succumbs to the aesthetic temptation of the city, regardless of potential danger. Accompanied just by his closest follower Wetzel, Ernst starts a second, much more extended expedition through the city. Upon his return, Grippia's exorbitant splendour, artistry, and technical refinement is described in yet more detail. Ernst and his companion are advancing further and further into Grippia's centre. They see a number of palaces and step into pompously decorated halls; nearly everything is made from marble and gold and covered with jewels and an almost unreal glow is emanating from these objects. The whole description intends to convey overwhelming visual impressions: 'The description of the city [...] is a visual tour de force, and the reader or listener is encouraged to gaze with Ernst upon its wonders'.[24]

On their tour, the men also enter the royal palace, which proves to be the highlight of Grippia's pomp and splendour and where they discover an artful water supply. In the royal courtyard, they discover two springs, one of them cold, the other warm:

sie sâhen zwêne brunnen	*Sie sahen zwei Quellen*
die ûz dem hove runnen,	*die aus dem Hof rannen,*
der ein was warm, der ander kalt.	*die eine warm, die andere kalt.*
mit listen sô was daz gestalt	*Kunstfertig war es so eingerichtet,*
daz sie vil schône schuzzen	*dass sie beide an der gleichen Stelle*
und reiniclîche duzzen	*sehr schön und klar*
mit ein ander an ein stat.	*nebeneinander dahinflossen.*
dâ bî stuont ein schoene bat:	*Daneben stand ein schönes Badehaus:*
daz was algemeine	*das war ganz*
von grünem marmelsteine	*mit grünen Marmorsteinen*
wol gewelbet und überzogen,	*überwölbt und verkleidet*
gevest mit starken swibogen.	*und mit starken Schwibbögen gestützt.*
wie möhte daz zierlicher sîn?	*Wie könnte es schöner sein?*
zwô bütten rôt guldîn	*Zwei rotgoldene Badewannen*
die stuonden in liehtem schîne.	*standen im Lichtglanz.*
zwô rôre silberîne,	*Zwei silberne Rohre,*
geworht mit grôzen fuogen,	*die sehr kunstvoll gefertigt waren,*
die daz wazzer dar în truogen.	*trugen das Wasser hinein.*
mit listen sô was daz getân.	*Dies war sehr kunstvoll ausgeführt.*[25]

The two symmetrically flowing wells supply a beautiful bathhouse made of green marble where the water runs through pipes of pure silver. The bathhouse contains two golden bathtubs that can be filled just as desired with cold and warm water. The narrator emphasizes repeatedly the great artistry of this construction. But the wells not only supply water to the bathhouse, they also serve to keep the city clean. The water is channelled through the entire city and, when required, can be used to clean the marble streets. Dirt and filth have no chance in Grippia and the narrator states with amazement that the streets are glittering like snow and that there is probably no other city in the entire world of likewise beauty and splendour:

23 'Herzog Ernst', ed. Sowinski 1979, V. 2485–2489.

24 Bowden 2012, 20.

25 'Herzog Ernst', ed. Sowinski 1979, V. 2655–2673.

ez was ouch geleitet,	*Es wurde auch weitergeleitet*
über al die burc gebreitet:	*und durch die ganze Stadt geführt.*
daz geschach mit sinne.	*Das geschah mit gutem Bedacht:*
die strâzen dar inne	*Die Straßen in der Stadt,*
beide grôz und kleine	*die großen wie die kleinen,*
wârn von marmelsteine,	*waren aus Marmorsteinen,*
sumlîche grüene als ein gras.	*manche so grün wie das Gras.*
so in der burc erhaben was	*Wenn man in der Stadt aufgestanden war*
und man dâ schône wolde hân,	*und dort Sauberkeit wünschte,*
sô liez man daz wazzer sân	*so ließ man sogleich das Wasser*
über al die burc gên.	*durch die ganze Stadt fließen.*
sô mohte dâ niht bestên	*So konnte dort weder Staub*
weder daz hor noch der mist.	*noch Unrat bleiben.*
in einer vil kurzen frist	*In kürzester Zeit*
sô wart die burc vil reine.	*wurde die ganze Stadt gereinigt.*
ich waene burc deheine	*Ich glaube, daß es auf der ganzen Erde*
ûf erden ie sô rîch gestê:	*keine so prächtige Stadt gibt:*
ir strâzen glizzen sô der snê.	*Ihre Straßen glitzern wie der Schnee.*[26]

These springs rising symbolically from the royal courtyard and therefore from the heart of the city, form another analogy to the Heavenly Jerusalem. The picture inventory of John's revelation contains a river rising from the midst of the Heavenly city, carrying the water of life from the lamb's throne to the entire city.[27]

Through the image of the Heavenly Jerusalem, the city of Grippia is equipped with religious meaning in the first instance, but the Christian pattern is undermined as the story progresses and Grippia's inhabitants return. The Grippians are hybrid beings with crane-heads atop their well-shaped and well-dressed human bodies.[28] They have abducted a Christian princess from India who, to her horror, shall be forced to marry Grippia's King. Of course the Duke decides to free the princess. A tremendous slaughter starts and many Grippians lose their lives, but unfortunately the Indian princess and most of Ernst's men, who had rushed back to the city to help the duke, die, too.

But the initially heavenly-seeming city is not only called into question by the appearance of its cruel and heathen inhabitants and the devastating battles. The perfect cityscape itself turns out to be a doubtful or ambivalent place through the strong seductive power it has on the succumbing protagonist. This becomes apparent in the scene where the Duke discovers the water supply and the bathhouse mentioned above. The protagonist's behaviour in this scene becomes slightly strange. Even though his companion urges him to hurry up, because he is afraid Grippia's inhabitants could return at any moment, Ernst insists on the two of them taking off their clothes and bathing extensively in the golden bathtubs. Afterwards, they walk to the royal bedchamber and lie down in a magnificent bed – which is prepared for the wedding night of Grippia's king – and there, they rest for a while.

26 'Herzog Ernst', ed. Sowinski 1979, V. 2681–2698.

27 Apc 22, 1–2.

28 The appearance of Cyclopes, Skiapodes, Antipodes or other kinds of so-called 'Wundervölker' or *monstra* is a quite common pattern, not only in several medieval novels, but also in medieval *mappae mundi*. For example, the Ebstorf Map (around 1300) or the Hereford Map (end of the 13th century) depict different kinds of monstrous races more or less everywhere outside Europe. Medieval 'knowledge' of *monstra* is based on an encyclopaedic tradition from Antiquity, especially on Plinius' *Naturalis historia* and the antique *Physiologus* (cf. Haupt 2006, 79 f.; Szklenar 1966, 182). While there is consensus about these origins in general, the source of the crane-men as a particular and also unique type of Eastern *monstrum* remains unclear. Lecouteux presented an old legend found in a letter of Petrus Damiani (1007–1072) as a possible source (cf. Lecouteux 1981, 100–102), while Haupt considered the crane-men to be a variety of the Cynocephali as a more frequently mentioned sort of *monstrum* (cf. Haupt 2008, 167 f.). For an overview of the research on the crane-men, see Bowden 2012, 24–26.

This bathing-scene is the climax of Ernst's succumbing to the temptation of the aesthetically perfect city. Besides the obvious homoerotic allusions, the pleasure in the luxurious bathhouse leads to his failure to flee the city in time before the Grippian's return. The entire second course through the city refers to the Augustinian discourse of *vana curiositas*,[29] the lust of the eyes that contradicts spiritual self-knowledge and the knowledge of God. The heavenly-seeming city turns out to be profoundly worldly, it is a masterwork of worldly technical skills designed for worldly pleasures, and there is nothing spiritual about it at all: 'It is a city designed, it seems, for physical pleasure, of which Ernst and Wetzel partake. The un-spiritual nature of the city is further stressed by the emphasis on the fact it is man-made and displays the utmost in what appears to be human mechanical skill'.[30] With the bathing-scene at the latest, Ernst is finally captivated by his worldly desires, evoked by the extraordinary attraction of the city. It is certainly not the water of life that springs from Grippia's center and the bath in no way refers to any kind of spiritual purification,[31] Grippia's water only serves the purpose of physical enjoyment.

The city of Grippia, in contrast to the Christian allusion, turns out to be an epitome not of divine glory, but of profoundly earthly splendour misleading the protagonist and distracting him from his restitution. The artful water supply and the luxury bathhouse are central elements in the display of splendour at a heathen place that is diametrically opposed to the sacred Jerusalem as a place of salvation

This strong semantic and also aesthetic opposition becomes even more apparent when Ernst, as the story progresses, finally reaches Jerusalem as the original goal of his journey and the earthly symbol for the eternal divine grace to be fulfilled in the Heavenly City. The city of Jerusalem is described only in a few verses mentioning Ernst making sacrifices at the Christian sanctuaries. Compared to the overwhelming beauty and sensuous temptation in the city of Grippia, Jerusalem as a place of salvation is completely restricted to its spiritual significance, while its material, aesthetic, and spatial qualities are not mentioned at all.

But even though the visual and sensuous enjoyments of the beautiful city and its splendid waterworks are called into question, Grippia's attraction is intensely unfolded before it is negated. The presentation of the initially empty city with its impressive architecture, precious materials and its water supply creates an almost utopian aesthetic sphere. The urban site offers the protagonist an intense aesthetic perception for which there is neither time nor space in any other part of the entire novel.

Waterworks as a signum of sovereignty – the Babylonian tower in 'Flore und Blanscheflur'

Another extensive description of water technology in connection with urban architecture can be found in Konrad Fleck's courtly novel 'Flore und Blanscheflur', written around 1220. The story of 'Flore und Blanscheflur' was a popular narrative which was widespread in the European literature of the 12th and 13th centuries.[32]

29 This is, for example, pointed out by Baisch 2012, 77.

30 Bowden 2012, 21.

31 On this point M. Stock differs, who considers the bath as a symbolical purification that prepares the protagonist's restitution and re-integration, which take place in a later episode (cf. Stock 2002, 203–205).

32 The Middle High German 'Flore und Blanscheflur' is based on a French novel, even though the concrete underlying version is unknown (cf. Putzo 2015, 2–11). Konrad Fleck expanded the French text substantially, from about 3,000 to more than 8,000 verses, whereby a large part of these extensions is attributable to extensive descriptions of several works of art and splendid buildings. These complex ekphrastic text passages have enjoyed increasing interest in recent research, because they play a significant role for the discussion of courtly love as unfolded in the novel; see, for example, Dahm-Kruse 2016; Egidi 2005; Waltenberger 2003; Wandhoff 2006.

The story is about the exceptional love between Flore, son of a Moorish king, and Blanscheflur, daughter of a Christian slave. Their love has to prevail against much resistance, until it is concluded with Flore's Christian conversion, their marriage, and the restitution of Christian rule in Spain. 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. That way, Flore and Blanscheflur become the origin of the renewal of the Holy Roman Empire.

But before this outstandingly happy ending, Flore's mother, who does not approve of her son's love for a Christian slave, sells Blanscheflur to the court of the Babylonian Emperor, the Amiral, in order to separate the lovers. Flore therefore embarks on the exhausting journey to Babylon to free Blanscheflur. The episode which takes place in Babylon contains an extensive description of a monumental tower belonging to the Amiral's palace. This Babylonian monument is characterized by a maximum of artistry and technical skills. In its enormous dimensions, the indestructible tower mirrors the absolute power of the Emperor, to whom 70 kingdoms are subject. Inside, the tower is magnificently decorated in immeasurable splendour. Besides a highly impressive great hall, the tower contains 70 bowers, whose floor pavements, walls and ceilings are decorated over-abundantly with gold, precious stones, and paintings. The description of the tower represents the Amiral's hubris by drawing an analogy to the biblical Tower of Babel. Special attention within the description of the tower is paid to a highly artful water supply. At the base of the tower, a spring is located, from where water is conducted through silver-lined pillars which are as high as the tower itself, so that clear and cold water is always available:

in dem turne unden,	*Am Fuße des Turmes*
dâ ist ein schoene brunne,	*ist eine schöne Quelle,*
baz dan ich gesagen kunde,	*kunstvoller, als ich es ausdrücken kann,*
mit listen geleitet wol	*wird sie durch einen Pfeiler geleitet,*
in einen phîler, der ist hol,	*der hohl ist und*
dem turne ebenhôch.	*so hoch wie der Turm.*
ein schoener silberîn nôch	*Schönes Silberwerk ist*
ist vermûret dar inne,	*darinnen vermauert,*
daz der brunne rinne	*so dass die Quelle*
durch daz silber alsô klâr	*klar durch das Silber fließt*
und kalt belîbe über jâr.[33]	*und das ganze Jahr über kühl bleibt.*

Furthermore, it is explained in the elaborate description, that the water runs through an artful piping system made of marble which supplies all bowers with clear water. At the very top of the tower, a large fountain figure is installed. It represents a man from whose mouth the water runs before being carried to the piping system. Of course, the impressive hydraulic system behind this water supply is not explained in detail. In fact, the narrator repeatedly expresses his astonishment at this seemingly magical technical performance.[34]

Water is also a crucial element of a daily ritual the Amiral has established: in each of his 70 bowers live three women who are there to please him with their beauty, and from whom he chooses a new wife each year. Two of these women – one of them is Blanscheflur – have to bring fresh water from the precious water supply to the Amiral's bed every morning and evening.

The artful water supply stands at the centre of the tower description. Its sophistication is a *pars pro toto* for the unlimited technical possibilities available to the Amiral because of his enormous power and economic opportunities. The artful and also artificial water supply which

33 The text is quoted from 'Flore und Blanscheflur', ed. Putzo 2015, here verses 4224–4234 (translation M. D.-K.).
34 When A. Classen reads the water supply in the Babylonian tower as a document of standard 'bathroom technology [...] amongst the highest social classes' (Classen 2017, 473), he downplays the obvious remarks characterizing the water supply as absolutely outstanding and extraordinary.

is there to please the Amiral's aesthetic demands symbolizes the sovereign's omnipotence, which extends even to the natural element of water. Thus, the literary description mirrors the prestigious potential of water constructions and waterworks. In their simultaneity of luxury, technical skills, and aesthetic impact, they are an effective means for self-ennoblement and the exhibition of power.[35] The fountain figure sitting on top of the tower clearly embodies the absolute power of the Amiral, who reigns over 70 kingdoms, the city of Babylon, the tower, and also over the natural element of water.

Water in the Garden of Eden – the false Paradise in 'Flore und Blanscheflur'

Besides descriptions of waterworks and water supplies in the context of city and palace architectures, water is a substantial part of descriptions of gardens, which frequently feature in the narrative worlds of courtly novels. These gardens are commonly located close to cities or palaces, but they are also clearly separated from their surroundings. As culturally shaped natural spaces, they embody a tension between the natural and the cultural sphere.[36] Just like the description of cities with their allusions to the Heavenly Jerusalem, these garden-descriptions often make references to Christian symbolism. The presentations of gardens in medieval novels make use of the ancient concept of the *locus amoenus* and its typical elements. Its basic features are a green meadow, trees, and a spring or a creek; furthermore elements like lovely birdsong or a delightful smell often appear.[37] In medieval narrative contexts, the pattern of the *locus amoenus* refers to the biblical Garden of Eden and thus also to the specific symbolic meaning of water in the garden of Paradise.[38] According to the first book of Moses, there is a spring in the middle of the Garden of Eden that provides water for the garden and which divides into four streams that constitute the rivers of Paradise.[39] A broad spectrum of symbolic meaning has been given to Eden's waters in the Christian tradition. It can be read as an allegory for the water of life, for God's grace and wisdom, and for the purity of the soul.

At the same time, the imagery around the *locus amoenus* alludes to the *hortus conclusus* as a symbol for St Mary's virginity, a common motif in the medieval iconographic tradition.[40] This concept originates from the allegorical interpretation of a passage from the Song of Songs, where the bride is called a closed garden, and a sealed spring which relates to St Mary in medieval Bible exegesis.[41]

In courtly novels, the *amoenus* gardens are a favourite setting for love encounters and love affairs. The imagery of the closed garden with its allusions to Paradise is commonly used by medieval authors to elevate courtly or worldly love to a higher spiritual meaning.[42] But the

35 Cf. von Reden – Wieland 2015, 16 f. Similarly H.-R. Meier, who describes the substantial representative effect of waterworks in connection with palace architecture through the example of the palaces of the Hauteville dynasty in Palermo (cf. Meier 2017, esp. 605).

36 The connection of natural and artificial components, especially in urban aquatic landscapes, is reflected in the contribution of Adam Rogers in this volume.

37 The ancient spatial topos of the *locus amoenus*, even if transformed in some ways, remained the main pattern in medieval descriptions of nature. The use of fixed attributes evokes a set of established implications, but that does not lead to homogenous readings; the concrete concepts of meaning depend on the specific context (cf. Thoss 1972, 17–20. 153–155).

38 Miller refers to the close connection between the Garden of Eden and the *locus amoenus* within medieval literary and pictorial presentations of gardens (cf. Miller 1986, 137 f.).

39 Gn 2, 8–14.

40 Cf. Miller 1986, 151.

41 Sg 4, 12.

42 U. Ernst highlights the strong correlation between gardens and conceptions of paradise in medieval novels (cf. Ernst 2007, 167 f.).

Christian allusions can also function to emphasize problematic aspects of worldly love, as they point to the insoluble opposition of divine and carnal love as a fundamental conflict in courtly literature.

In this way, the gardens in courtly literature often prove to be ambivalent spaces, as the actions taking place there can contradict religious and social norms. A popular example is Gottfried's von Straßburg well known courtly novel 'Tristan', in which the protagonists' exceptional, but also adulterous and sinful love is exhibited in such an *amoenus* garden.[43]

An especially spectacular description of a garden can also be found in Konrad Fleck's 'Flore und Blanscheflur', which features a beautiful garden as part of the Amiral's residence. This garden is equipped with the typical attributes of the *locus amoenus* and the narrator makes an explicit reference to the Garden of Eden when he describes the Amrial's garden as being like Paradise. At the same time, it is clearly highlighted that this garden is neither a real natural, nor a paradisiacal space, but a splendid construction brought into being through the Amiral's power.[44] He commanded the buying and planting of the valuable trees and he ordered an enormous wall to be built around the garden so that nobody could get inside without his permission.[45]

The analogy to Paradise is countered even more by the actions taking place in the garden.[46] The garden provides the setting for the annual election of the Amiral's new bride – as mentioned above, he chooses a new bride each year. All women living in the Amiral's tower have to take part in the election, even though none of them is particularly keen to become the wife of the powerful ruler, because this election means their certain death. In his exaggerated possessive thinking, the Amiral does not tolerate the possibility of another man having one of his ex-wives, so they are killed once the one-year period of their marriage is over. The election itself follows an artfully staged rite in which water once again plays an important role. Under a tree with blood-red blossoms, all the women have to step across a spring with crystal-clear water. This water possesses a remarkable ability. If one of the candidates is not a virgin, the water turns red – which results in her being immediately put to death. If her virginity is intact, the water stays pure and clear as before:

ein brunne springet dar under,	*Eine Quelle entspringt darunter,*
der ist sô wunderlîcher tugent	*die ist von so wundersamer Art,*
daz irz kûme gelouben mugent,	*dass ihr es kaum glauben werdet,*
wan ez wundert ouch uns.	*denn es wundert auch mich.*
ze allen zîten ist sîn runs	*Zu allen Zeiten ist ihr Wasser*
lûter als ein kristalle.	*klarer als ein Kristall.*
dar über müezent sie alle,	*Darüber müssen sie alle,*
sô man sie versuochen wil,	*wenn man sie prüfen will,*
ir sî lützel oder vil,	*es seien wenige oder viele,*
schrîten her und aber hin.	*hin und her schreiten.*
ist einiu danne under in,	*Ist eine unter ihnen,*
diu man hât gewunnen,	*die bereits gewonnen wurde,*
sô wirt der runs von dem brunnen	*so wird das Wasser der Quelle*

43 See, for example, Ernst about 'Tristan' and other courtly novels that stage a garden as place of love-fulfillment: 'Insofern die Liebesbeziehung vorehelicher oder ehebrecherischer Art ist, stellt sie eine sexuelle Transgression dar, die in die Idylle und Utopie des Gartens einen Normenkonflikt trägt' (Ernst 2007, 178).

44 M. Waltenberger points to the 'artifiziell konzentrierte[n] Veredelung von Natur' as part of the problematic setting (Waltenberger 2003, 31).

45 H. Wandhoff explains through another example that the works of art in 'Flore und Blanscheflur' figure wrong conceptions of love and eternity. The heathen figures take the man-made image for the real, they take the 'Abbild für das Urbild' (Wandhoff 2006, 75). This applies especially to the Amiral, who believes his artificial Garden Eden to be a real paradise.

46 Of course, the Paradise pattern has already been undermined by the localization in Babylon as a counter-model to Christian Paradise and to the Heavenly Jerusalem.

zestunt rehte rôt.	*sofort ganz rot.*
swer diu ist, diu muoz den tôt	*Wer diese auch ist, sie muss*
kiesen in kurzer vrist.	*sofort den Tod erleiden.*
sweliu aber maget ist,	*Welche aber Jungfrau ist,*
von der wirt nieman gewar	*bei der wird man es nicht erleben,*
daz er werde missevar	*dass es eine andere Färbung annimmt*
niuwan lûter als ein glas,	*als die klaren Glases,*
der selben varwe als er was.[47]	*die gleiche Farbe, die es zuvor hatte.*

The symbolic potential of water as a signifier for purity, i. e. virginity, which derives from the Christian iconographic tradition, is here perverted by using water as a medium to test the contestant's virginity. At the same time this water test resembles medieval ordeals which made use of a special metaphysical evidence assigned to the natural elements.[48] The pure water that unmasks the culprit in the ordeal here reliably brands the fallen women unworthy of marriage and thus becomes part of the Amiral's ways of exerting his power and control.

In this novel, the imagery of the *locus amoenus* as a common place for the fulfilment of love in courtly literature is used to create a stark contrast to the cruel ritual established by the Oriental despot, whose garden is anything but a paradisiacal place. The element of water with its aesthetical impact and vast symbolic implications of purity is at the centre of this discourse. At the same time, the element of water, which is forced to serve the ritual of the Emperor, becomes once again a symbol of absolute power.

The elaborate descriptions of waterworks in the Babylonian palace and garden and in the city of Grippia are part of ekphrastic text passages, thus extensive descriptions of artworks or architectures that evoke an intense visualization of these artful objects or places.[49] Such rhetorical representations of cultural artefacts are not only a common element in medieval novels because they exhibit artistic mastery, they also invite reflections on particular concepts of meaning.[50] The intense visualization of artful waterworks is, apart from its strong aesthetic appeal, an effective motif to signify outstanding technological and cultural competence. At the same time, these descriptions refer to Biblical images and evoke a reflection on the underlying religious meanings.

It is furthermore no coincidence that these extensive descriptions of artfully controlled water are located in the Oriental sphere. Such representations of exceptional artistry are symbols for the dialectic of medieval images of the East, and portray a form of 'pre-modern Orientalism'.[51] In medieval literary contexts, the East often figures as an epitome of the foreign space

47 'Flore und Blanscheflur', ed. Putzo 2015, verses 4462–4482 (translation by M. D.-K.).

48 In the medieval theological discourse, ordeals were disputed, and from the fourth Lateran Council (1215) onwards, it was even forbidden for clerics to take part in them. Nevertheless, the practice of ordeals is still mentioned in legal texts like the 'Sachsenspiegel' or the 'Schwabenspiegel' (both 13th century) (cf. Becker 2003, 1594 f.). Regardless of their concrete significance in legal practice, in literary texts ordeals were a very popular motif; several novels, short stories, and plays testify to their potential for a broad range of poetical usages.

49 Wandhoff does not consider the city of Grippia to be an ekphrasis in the strict sense (cf. Wandhoff 2003, 223). Wandhoff refers to a modern understanding of ekphrasis that distinguishes between the ekphrasis in the proper sense, as a description of a piece of visual art, from the ekphrasis in the broader sense as a rhetorical strategy to evoke an intense visualization of any kind of object (cf. Wandhoff 2003, 21–23). But this division is not really suitable for the description of Grippia. First, architecture in this idealized form is part of visual arts, and, more importantly, the description of the empty city in its sheer materiality leads to a perception that takes the city as a whole to be a work of art.

50 Cf. Wandhoff 2003, 5–7.

51 Edward Said's extensive study 'Orientalism' (Said 1978) is commonly seen as the founding text of the academic field of post-colonial studies. The main hypothesis is the assumption that Western images of the Orient are based much more on cultural, especially literary, conceptions than on factual experiences. This mental construction is often influenced by fantastic or romantic imaginings of the East which mirror much more the cultural longings of the West than the reality of Eastern cultures. Furthermore, the Western conception of the Orient is predominantly based on a negative discourse that connects the East with marks like violence, injustice, and decadence. Therefore, the East is

and the 'other'. Its depictions commonly display a dialectical tension of extremely positive, as well as extremely negative attributes. On the one hand, the Eastern space is often associated with cultural, technological, and economic superiority. In medieval novels, the Orient often functions as a kind of projection screen for the own longing for technical and cultural refinement, and as a draft of the marvellous. On the other hand, these texts also depict negative stereotypes by characterizing the non-Christian Oriental peoples and rulers as extraordinarily violent and cruel. This can be seen in the example of the Grippians with their merger of human parts with monstrous attributes. They figure a strong opposition of outstanding cultural refinement of the one part and absolute strangeness of the other. Similarly, the Amiral, who is incredible rich and powerful and embodies a perfect courtly lifestyle, is, at the same time, a remarkably misogynous despot.[52]

The specific narrative presentation of urban structures and their waterworks contributes to this ambiguous conception of the East: a well-known Christian picture inventory is used that evokes specific allusions. But these pictures are transferred into a negative context that contradicts their proper Christian semantic content. The notions of the Heavenly Jerusalem or the Garden of Eden are linked to heathen spheres and therefore they are somehow doubtful what becomes apparent at the latest when the stories progress: Neither Grippia nor Babylon, despite their seemingly paradisiacal beauty, become places of fulfilment, but turn out to be diametrically opposed to the connected Christian conceptions.

The presentation of water is a crucial feature within this poetical strategy. The waterworks with their appearance of the magical and the remarkably functionalized spring are essential parts of the ekphrastic descriptions of the cityscape, the palace, and the palace garden. In first instance, the artfully controlled water is an epitome of cultural competence and refinement, and its highly aesthetic appeal is extensively presented in all of the given examples. But this aesthetic claim of validity is contradictory when combined with genuine Christian implications.[53] The artful, but therefore also artificial mastery over the element of water conflicts with its divine nature and spiritual meaning.

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used to oppose the cultural self-image of the West as a civilized, liberal, and enlightened sphere. Said's assumptions were strongly influenced by Michel Foucault's discourse theory and by Foucault's thesis that every nation and every culture needs the distinction from some (however defined) 'other' to define itself. In other words, the Orient is created as a sort of cultural counter-model to sharpen the Western self-definition. Said's study is based on the analysis of a broad and heterogeneous text corpus containing literary texts, scientific, theological and philosophical studies, and newspaper articles dating from the 18th to the 20th centuries, while medieval texts were – according to the focus on colonialism – of small importance. But in medieval literature, the question of cultural self-construction by defining a mostly inferior 'other' is of great significance, too. In the Middle Ages, images of the foreign Orient are even more based on literary constructions than in modern times. Besides famous travel narratives like that of Jean de Mandeville, the 'Herzog Ernst' with its large Orient tale is one of the most discussed examples for a pre-modern debate on Orientalism. See, for example, the extensive chapter in Klein 2014, 233–301.

52 Of course, in 12th and 13th century literature such pejorative conceptions of the East and its non-Christian inhabitants are associated with the historical background of the Crusades. In 'Herzog Ernst', this context is made explicit by the protagonist's intention to join the Crusades. When the story progresses, Ernst actually reaches his original goal, Jerusalem, and proves himself as a successful *miles christi*. The relevance of contemporary crusade-patterns for the 'Herzog Ernst' are focussed on by Goerlitz, who describes the 'punktuelle[n] Partizipation des mittelhochdeutschen Epos an einem auch später noch verbreiteten Diskurs über die Heiden, der für Kreuzzugsaufrufer, Kreuzzugsberichte sowie theologische Abhandlungen kennzeichnend ist' (Goerlitz 2009, 77).

53 The descriptions of the waterworks in both novels share an ambivalent perspective on their artificial conception. This can be seen in the repeated explanation that they are made with *list*. Even though the Middle High German term *list* does not have the present meaning of betrayal, but of mental and technical skills, it is not exclusively a positive term. It refers to a critical discourse on art, especially non-Christian art, where the self-authorization to be a creator and the technical mastery over nature remain suspicious. See also Schnyder, who points out that the numerous 'Künstliche Paradiese' in medieval novels own a somewhat paradisiacal quality, but always remain in opposition to the true Christian paradise: 'Es sind Kunst-Produkte, die die imaginative Leerstelle des christlich-religiösen Paradieses füllen, sich davon aber durch die ausgestellte Artifizialität, die oft auch magische (und pharmakologische) Mittel mit einschließt, absetzen' (Schnyder 2010, 74).

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Sophie Bouffier

10 Syracusan Water Networks in Antiquity

Abstract: During a long period, until the beginning of the 21st century, a lack of interest about the hydraulics in ancient Sicilian towns prevailed: archaeologists and historians felt more concerned by the traditional topics of Classical Archaeology. Nowadays, as environmental research has been booming, some specific cases have begun to be studied, like Syracusan aqueducts which were known almost exclusively from Francesco Saverio Cavallari and Adolf Holm's monograph in 1883. Using recent results, the paper will focus on the topics of the Galermi Aqueduct, investigated by a French team of Aix-Marseille University, and some parts of other channels, studied by local teams of Syracusan speleologists and engineers, inside the Epipolai shelf and the Achradine district. The people of Syracuse, maybe under the rule of the Deinomenids and then Hieron II, had been equipped with pipelines of drinking water as early as the 5th century BC and had increased them all through their history to cater for the needs of the fast-growing town, either for drinking water or craftsmanship.

Introduction

During the last few years, and in the context of current environmental debates, there has been a renewal of interest about ancient societies' behaviour concerning this vital substance, water. This revival has prompted the reopening of several dossiers, such as that of the water networks in the ancient city of Syracuse. For a long time, it was not a central theme of archaeological research, although Greek philosophers such as Platon[1] and Aristotle[2] pointed out the need to provide water to the community: according to them, the Greek city must have water in quantity – to avoid scarcity – and quality – to maintain the good health of its inhabitants. As early as the 5th century BC, Hippocrates and his school described people's health and environmental conditions and advised local physicians to consider this reality that changed depending on places. As Elisabeth Gruber argued in her paper about Danubian populations in the Middle Ages,[3] one could think that Greek governments faced the necessity of managing water resources and supplying the population, both with drinking water and staple foods. One might have thought that the Greeks had designed their cities taking into account the water resources of the chosen site and ensuring that the basic needs of the population were satisfied. Actually,[4] it is not a relevant factor as some Greek towns are settled on sites that lacked water. The aim was to choose a site naturally easy to fortify and the issue was above all to prevent the Mediterranean torrential rains from destroying the urban structures.[5] So, one of the main concerns of the local authorities was first to drain and channel the waters and store them for redistribution. The search for drinking water was left to the care of individuals. Greek governments seem to have realized the importance of the issue as the city became more structured

1 Pl. Leg. 5, 747d.
2 Aristot. Pol. 1330 b.
3 See Gruber, this volume.
4 I have developed these aspects in previous papers: Bouffier 2014; Bouffier – Brunet forthcoming.
5 See for example the city of Locri Epizephyrii: Elia 2019.

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and organized. The progressive establishment of community rules also applies to water resources, because water is conceived as a resource to which every citizen has the right of access and which cannot be bought or exchanged, unlike other products. Some political regimes, such as the Greek tyrants, understood the challenge for their visibility and sustainability and developed great hydraulic programmes, as we shall see in this paper about the city of Syracuse.

Syracuse, founded by the Corinthians in the second half of the 8th century BC, on the island of Ortygia and the nearby mainland of Achradina, grew rapidly, to the point of expanding inland, where it built secondary colonies as far as the southern coast of Sicily. At the beginning of the 5th century BC, the tyrant of Gela, the Deinomenid Gelon, seized the city and transferred his capital there, wishing to transform it into a megalopolis. To this end, he initiated a policy of concentrating eastern Sicilian populations in the city of Syracuse and launched an urban extension programme designed to welcome these people and to provide the necessary community services for their welfare. His successors continued this policy and the city evolved during periods of autocratic regimes and civil and foreign wars.[6] It reached its definitive territorial control in the late 5th century BC, when the tyrant Dionysius the Elder surrounded the entire Epipolai plateau with a fortification of more than 21 km in perimeter, which was, nevertheless, a long way from the experience of intensive urbanization.[7] Between the beginning of the 5th century BC and the final Roman conquest in 212 BC, the urban space expanded from an area of 50/60 ha to over 1,800 ha, although probably only 250 ha were densely occupied. The population boom that resulted from the original Syracusan synoecism and enrichment of the city necessarily forced the authorities to take into account the question of water supply and to consider a comprehensive plan for water management. The various governments, whether the Deinomenid tyranny or successive powers, also had to monitor this issue closely.

Originally, the city had an easily accessible low depth water table and several sources inside Ortygia,[8] and in particular an abundant source, Arethusa, which gave rise to an exceptional myth.[9] Individual and public wells also supplied the population. On the mainland, a dozen sources have been identified on the perimeter of the Epipolai plateau,[10] resulting from the geological configuration of the substrate, such as the sources of Tonnara, Targia, Acqua Colombe; it is a significant number, but in the current state of research, their use in ancient times has not been confirmed. Furthermore, they are rather distant from the settlement. Historiography, from the 16th century AD, reported the presence of ancient aqueducts, more or less known with certainty:[11] the aqueducts of Ninfeo, the Paradiso, Tremilia, within the urban space, and the most impressive, the Galermi Aqueduct of nearly 30 km in length. Authors from the Dominican Father Tommaso Fazello[12] to contemporary times have questioned the actions of the various leaders of the city of Syracuse. Most scholars and historians have attributed these aqueducts to the Greeks,

6 Finally, on the various phases of the urban network: Basile 2012; Guzzardi 2011.

7 Literary sources differ from the archaeological documentation provided by Dieter Mertens and the German Archaeological Institute in Rome regarding the perimeter of the fortification of Epipolai plateau. According to Strabo, the fortification reached the length of 180 stadiums or 33 km (Str. 6, 2, 4). According to Mertens, it should be evaluated at 21 km. But these figures reflect only the intramural territory. One should also consider the entire area of influence of the city. According to Pietro Griffo, who gives an estimate a little higher than that of Julius Beloch, Syracuse would have included an area of 4300 km^2 with a population of 240,000 people of which only 1/3 lived in the town proper: about 80,000/100,000 in the 5th century BC; in the 3rd century BC under Hieron II, the city would have counted 150,000/200,00 inhabitants.

8 Bouffier 1987; Bouffier 1992.

9 Bouffier 2019.

10 Arena et al. 2018, 7 f.; Aureli et al. 2005, 8–10; Aureli et al. 1989.

11 Cf. the state of the art, in Bouffier 2000; Bouffier et al. 2018, 303–305.

12 Fazello 1558; Bouffier et al. 2018.

especially Gelon, considered the great architect of the Syracusan expansion and the extension of the ancient city. The existence of hydraulic works is confirmed by the historian Thucydides in the account of the siege of the city by the Athenians in 415 BC: *Meanwhile the Athenians destroyed their pipes which ran underground into the city and supplied it with drinking water*.[13]

Nevertheless, some discordant voices wanted to see traces of the Romans in the lineage of the important known works in the peninsula.[14]

Today, new work has allowed us to know more about these important amenities. A team from Aix-Marseille University launched an interdisciplinary and diachronic programme on the most emblematic of the aqueducts of the ancient city, the Galermi, which covers a distance of nearly 28 km from the Hyblaean Mountains to the ancient city, where, nowadays, it flows into the Ninfeo of the Greek theatre. Meanwhile, a local team, consisting of a geologist, a hydraulic engineer and a speleologist, explored the known galleries in the limestone substrate of the Syracusan plateau to map the area.[15] This article will explain this new research to contextualize the developments of Syracuse and to situate them in the policies of its leaders during Antiquity. In addition to this chronological and political context, which will allow us to identify potential users, it will be necessary to examine the processes of construction and technical maintenance of these aqueducts, and their function. We should also have to calculate how much water they could provide to ancient consumers. Finally, we will be able to state their technical specifications that reflect scientific knowledge and specific skills. Unfortunately, the answers depend on the available documentation, which is more or less reliable. The more crucial problem is the date of these pipes, which we do not know for sure: it forces us to be cautious and adopt a topographical and technical structure of our paper. We will be able to understand the context of their construction only after examination of their peculiar characteristics.

The aqueducts inside the city wall

Within the ancient city, several aqueducts were documented from the testimony of Fazello: in the southern part of the Epipolai plateau, and in a north to south direction, those of Tremilia, Ninfeo and Paradiso; in the north, Targiuni, Targia, Bosco and Targeta.[16] Investigations by Francesco Saverio Cavallari, Cristoforo Cavallari and Adolf Holm emphasized three of them:[17] Paradiso, Ninfeo and Tremilia (Fig. 1), but they were largely lost after the rapid growth of urbanization from the 1960s. I will analyse only them, even if a lot of small pipes have been identified within the city, without any connection actually with public monuments or urban settlement. The easiest to link to the urban centre are the aqueducts of Ninfeo and Paradiso.

13 Thuc. 6, 100: *Οἱ δὲ Ἀθηναῖοι τούς τε ὀχετοὺς αὐτῶν, οἳ ἐς τὴν πόλιν ὑπονομηδὸν ποτοῦ ὕδατος ἠγμένοι ἦσαν, διέφθειραν* (translation by Smith 1959). <http://www.perseus.tufts.edu/hopper/text?doc=Thuc.+6.100&fromdoc=Perseus%3Atext%3A1999.01.0199> (25. 05. 2018).

14 Wilson 2000.

15 Arena et al. 2018.

16 Fazello 1558, 83.

17 Cavallari – Holm 1883, 95–142. pls. 2. 6. 7. 9. 15.

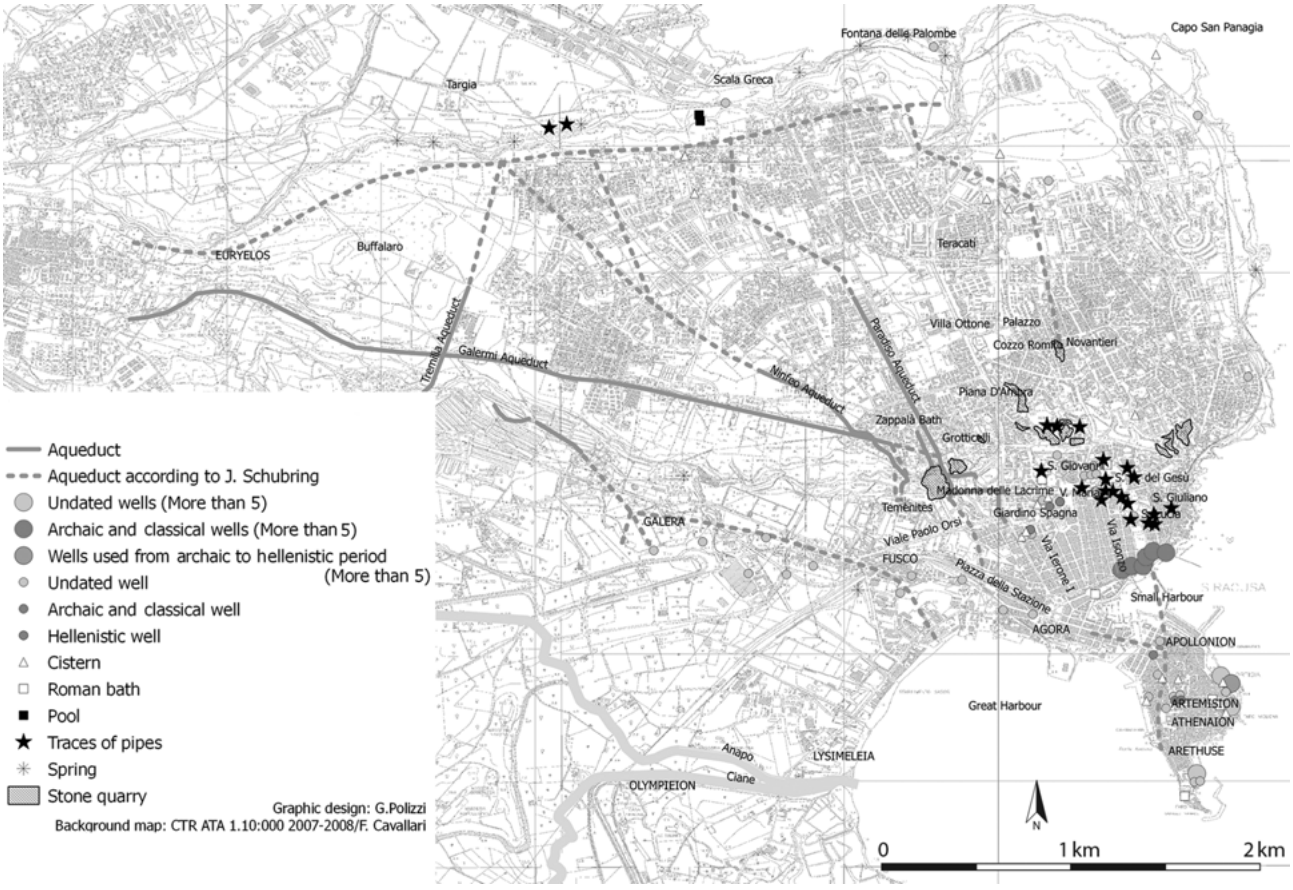

Fig. 1: Map of the Syracusan aqueducts.

The Ninfeo aqueduct

The Ninfeo aqueduct, of a known length of 1,385 m, flows from the north into the Ninfeo fountain located on the upstream terrace of the Greek theatre in the north-east part of the ancient neighbourhood of Neapolis (Fig. 2).[18] It was dug into the limestone plateau and was available, at the time of Cavallari and Holm, by vertical inspection shafts up to 30 m deep. Cavallari and Holm calculated its slope to be about 0.7 %.[19] Recent explorations[20] have confirmed this information, in particular the irregular layout of the aqueduct, while the other two known aqueducts in the city, the Paradiso and Tremilia, follow a rectilinear path. This peculiarity is difficult to explain, given the homogeneity of the limestone substrate[21] at the Epipolai plateau. It can be an archaic specificity, which shows the technical difficulties in carrying out the work, reaching sometimes a depth of 30 m. As we show in the case of the Galermi aqueduct, the workers dug from one shaft to one another and in the same direction to be sure to meet. It is just possible that the Ninfeo had to serve different places, and perhaps, buildings which have completely disappeared today. Nevertheless, as it supplies the so-called Ninfeo, which was created, in its current form, as early as the 3rd century BC, we can propose that it was part of a larger urbanistic programme, which included the construction of the monumental fountain and the theatre below. As first phase of the theatre is dated to the 5th century BC, and the present state of the monument dates back to the Hellenistic era, the Ninfeo aqueduct can date back to either one

18 Cic. Verr. 4, 53.
19 Cavallari – Holm 1883, 124 f.
20 Besides our team's work, see the survey of the Syracusan speleologist group: Arena et al. 2018.
21 Arena et al. 2018, 8 f.

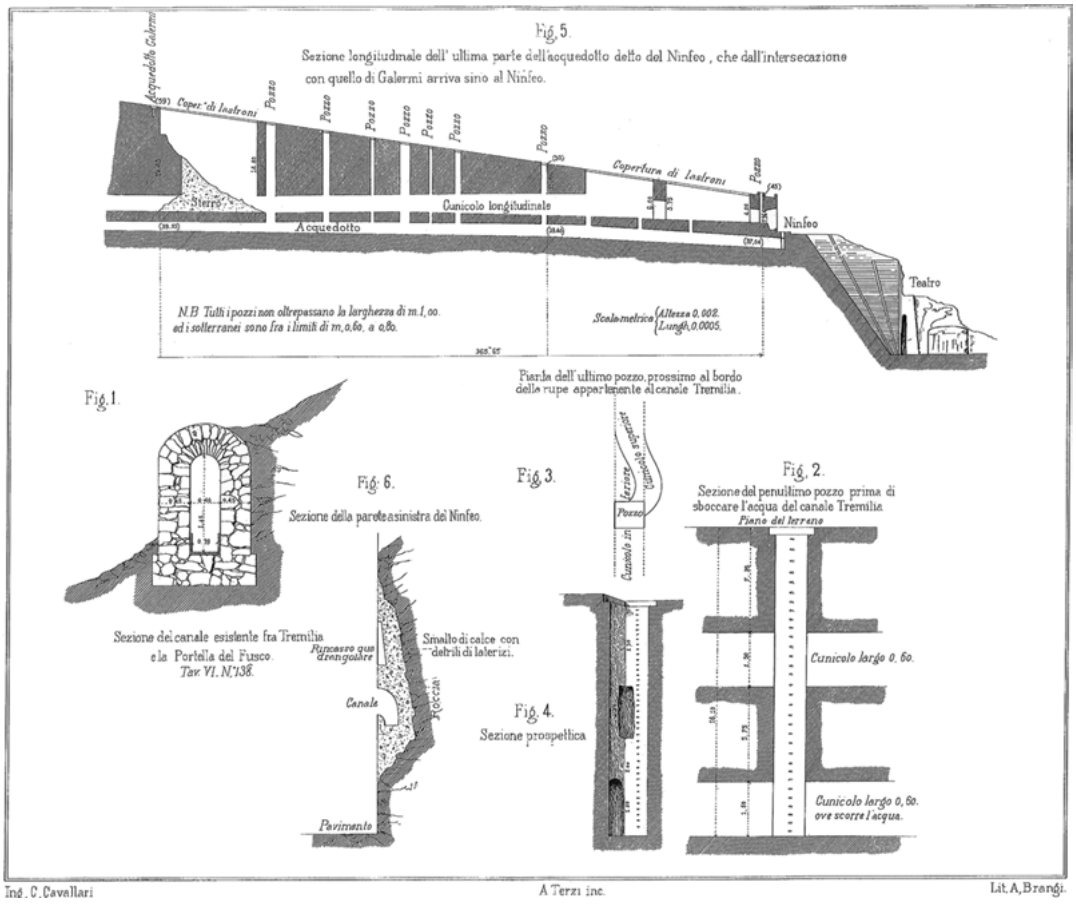

Fig. 2: Syracuse, section of Ninfeo Aqueduct.

of these periods. In the first case, it could have been conceived in the general project following the politics of the Deinomenids and was intended to supply the growing population in the new districts of the town below. In the second one, it could have been one of the components of the great project of King Hiero II in this part of Syracuse.

The Paradiso aqueduct

The Paradiso aqueduct, which takes its name from the homonymous quarry in which it terminates, of a known length of about 3000 m today, also presents a north/south direction and vertical inspection shafts of a depth of 4 m downstream to almost 30 m upstream, but the intermediate distance can vary from 14 to 30 m.[22] The rectangular inspection shafts were enclosed by large slabs of limestone, some of which have been incised with the Greek letter Λ. At the level of the Paradiso latomia, the aqueduct splits into several branches to supply various sectors. The main pipe feeds a tank near the amphitheatre (the so-called Roman pool of San Nicolò) and heads towards the amphitheatre, where it supplies a recently identified fountain.[23] Another ramification goes eastward and towards the domestic and artisanal districts of Neapolis, and perhaps the fountain in Piazza della Vittoria. Cavallari and Holm had calculated its incline at 0.6 %. With the state of the art in this aqueduct, we have no idea of its date, nor its potential customers nor its

22 Cavallari – Holm 1883, 125 f.; Guzzardi 2000; Messina 2009; Arena et al. 2018, 8.
23 Arena et al. 2018, 8.

urban function. We can just suggest that it was able to supply the mainland quarters of Achradine and Tyche.

The aqueduct Tremilia

The third aqueduct, Tremilia, is offset relative to the other two and is not directed towards the ancient city, which raises several questions about the topography of Syracuse, and the allocation and function of this hydraulic equipment. It is known over a distance of more than 800 m.[24] Installed in the western part of the Syracusan plateau, it also adopts a north/south orientation and has vertical inspection shafts with a depth varying from 14 m to about 34 m,[25] which follow one another at approximately 38 m intervals. The inspection shafts are enclosed in strong slabs of limestone. The angle of its slope poses a problem, because from what Cavallari and Holm had determined, the slope would be only 0.03 %, which would cause big flow problems. We can note the incongruity of the direction of the aqueduct, that travels outside of the plateau and down to the plain of Syracuse, where no habitat has been identified so far. It is unlikely that it was used for irrigation of the plateau, as I have suggested in the past,[26] since its exceptional depth was difficult to reach from the surface and we do not know of an example of a similar irrigation technique in a Sicilian environment. However, we should question the possible presence of a suburban neighbourhood such as archaeological research has begun to identify in some ancient cities of Sicily.[27]

A technological and stylistic relationship

The similarity of the three aqueducts was revealed from the first field studies.[28] They exploit the slope of the Epipolai plateau towards the south in more or less the same direction, feed from the depths of the limestone layer, at the junction of the clay substrate, have no waterproofing coating, thus allowing the percolation of water through the rock. The typology of galleries is approximately rectangular and has variable dimensions that allow, most of the time, for a man to stand upright, but recent research has also highlighted in the Tremilia Aqueduct, extremely reduced galleries and different depths that show, it seems, digging and fitting errors, made necessary by the need to ensure the smooth flow of water.

A double gallery

Moreover, the first publications had highlighted the presence of a double gallery: ‘Questi tre acquedotti offrono la particolarità di avere ognuno due gallerie, una sovrapposta all’altra e sul medesimo asse [...] La galleria superiore (specialmente quella dell’acquedotto del Paradiso) è profonda metri 23 circa sotto il piano di campagna, e poco distante dall’altra ove scorre l’acqua:

24 Cavallari – Holm 1883, 123 f. It was recently investigated by the Syracusan speleologist group: Arena et al. 2018, 9–13.

25 But these dimensions are based on the current level of the inspection shaft and not on the original part. We must therefore take into account a certain thickness of sediments impossible to evaluate without an archaeological dig.

26 Bouffier 1987, 685.

27 About Himera, Vassallo 2005, 66.

28 Schubring 1865; Cavallari – Holm 1883, 127 f.

esse indistintamente sono in comunicazione con i pozzi, i quali, attraversando quello superiore, vanno a comunicare con l'altra sottostante, però sempre sull'asse di esse'. This description by Cavallari and Holm[29] was adopted and repeated by historiography which sought the causes without providing convincing ones. The first two editors suggested that the upper gallery served the maintenance and repair workers, who could travel along the aqueduct without harming the quality of the water flowing into the lower gallery. Renate Tölle Kastenbein gave a hypothetical reading which has a consensus of opinion, proposing that the upper gallery allowed the soil pressure on the runoff gallery to be limited, particularly seismic movements that could damage the pipe.[30] Sicily is a particularly sensitive zone from this point of view, as shown by the traces of post antiquity earthquakes on the Galermi Aqueduct.

Marks of digging?

First editors noticed that two of these aqueducts, Ninfeo and Paradiso, showed some Greek incised letters: one lambda on some blocks of the Ninfeo wells[31] and one alpha in the Paradiso aqueduct.[32] According to Julius Schubring, these letters represent either the name or the number of the aqueduct, the abbreviation of the name of the architect, or the date of construction of the installation. According to Cavallari and Holm, they characterize the channel. We also know that these quarry marks appear frequently on blocks at the exit of the quarry and can correspond to the work carried out by the worker, or to the control of the foreman or the worksite manager, or to the owner of the block, or to the name of the magistrate in charge of the equipment.[33] In the Castello Eurialo, Mertens observed these quarry marks on blocks.[34] In some Greek aqueducts that have been investigated elsewhere in the Aegean world, Greek letters have been interpreted as marks of the work of a particular mason, maybe in order to claim payment, as in Megara[35] and Samos.[36] These marks are the only epigraphic clues for dating the water installations, which thus seem to have been realized during the Greek period.

The fact that we have observed two different letters in two aqueducts encourages us to favour the hypothesis that they refer to the characterization of the aqueduct: lambda could be an abbreviation of the ancient name of Ninfeo, while alpha would be that of Paradiso, names unknown to us for now. None of them evokes the terminology of hydraulics: we would have expected the letter omicron for *ochetos*, a term used by Thucydides to refer to the underground pipeline, upsilon for *hydragogion*, a pipe or any other compound from the root *hydor*, water. Another interpretation is to read the alpha and lambda as the initial anthroponym of the sponsor or the aqueduct project manager without being able to explain more. Finally, the letters could refer to a layout number: Paradiso would be the first aqueduct on the inventory, and the Ninfeo the eleventh; we would then have to identify the other ten and integrate them into a coherent system, established in the same urban project. The few sections identified in the urban space until now[37] could enter into this capillary network. If this reading is correct, one must assume the existence of a genuine water project, which could be precisely that of a centralized government designing a global policy of major urban works.

29 Cavallari – Holm 1883, 127.
30 Tölle-Kastenbein 1990, 72–74; Wilson 2000.
31 Schubring 1865.
32 Cavallari – Holm 1883.
33 Frontin. Aq. 105–113.
34 Beste et al. 2015.
35 Avgerinou 2019, 44.
36 Kienast 1995, 193 f.
37 Arena e al. 2018, 13–17.

The Galermi Aqueduct, testimony of a gigantic programme

The best-known aqueduct today is the Galermi, first because it has survived centuries to meet the different needs of the Syracusan population: drinking water supplier in ancient times, hydropower for flour mills in modern times, and for a power plant in the 20th century, and today an instrument for irrigation (Fig. 4).[38] It is in an exceptional state of preservation. Furthermore, our team has conducted excavations, topographic, architectural, photogrammetric and 3D surveys since 2012 there.[39] To identify the ancient parts, we focused our attention on the first few kilometres of the aqueduct, dug into the limestone of the Hyblaean Mountains, because these are the best preserved sections of the development. On the plain, frequent landslides have forced successive users of the aqueduct to rework the pipeline, to strengthen or even move it, sometimes by a few metres. The last part of the aqueduct, near the theatre, was diverted to feed the Nymphaeum theatre in the 19th and 20th centuries. Its original layout and its technical configuration are no longer known today.

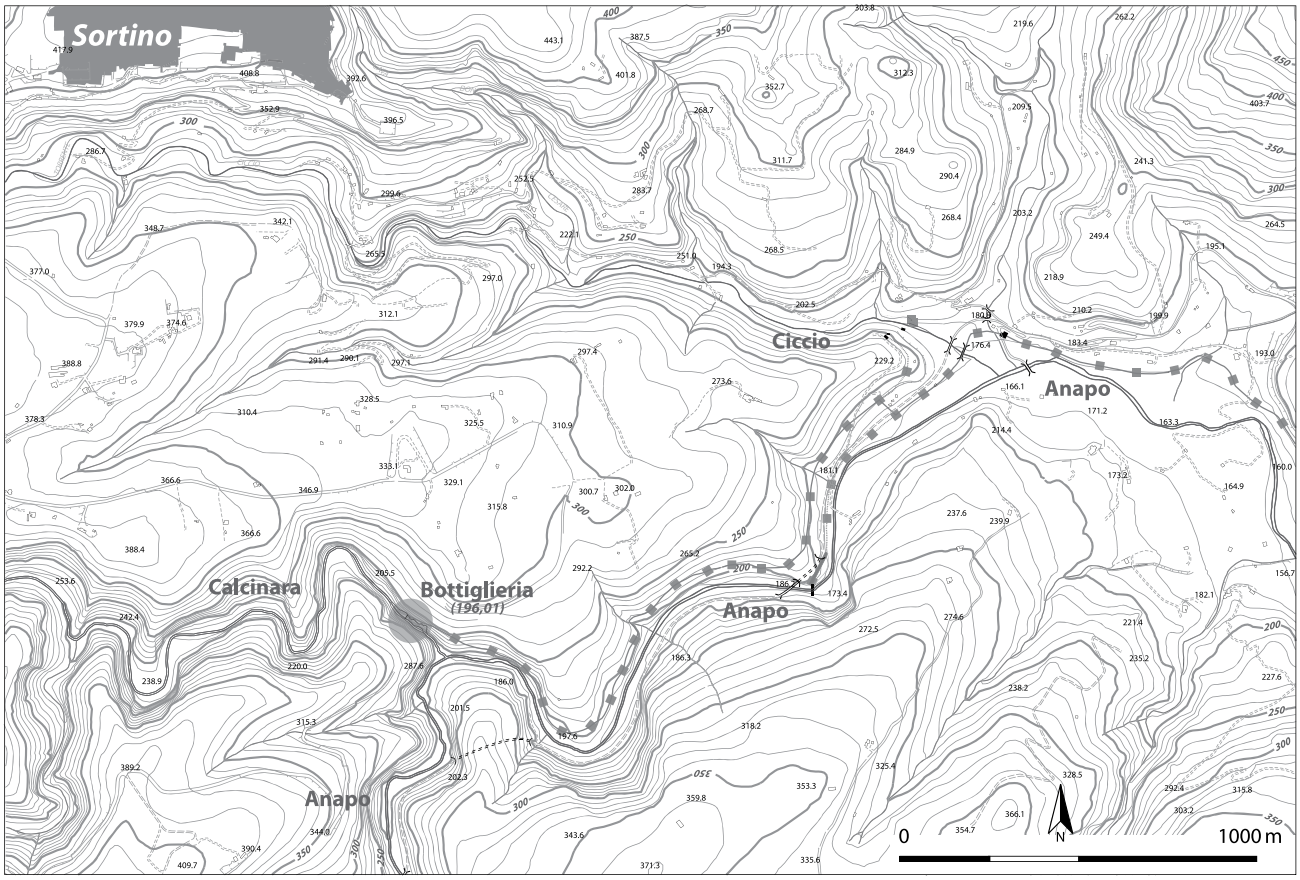

Fig. 3: Syracuse, ancient catchments of the Galermi aqueduct.

38 Besset – Bouffier 2017; Bouffier – Wateau forthcoming.
39 Bouffier 2018; Bouffier et al. 2018; Bouffier et al. 2019.

Several catchments in the Hyblaean Hills

The Galermi's source is in several parts of the Hyblaean Mountains, located in the hinterland (Fig. 3). This vast limestone massif serves as a reservoir for the entire region, giving rise to a river system that feeds the coastal plain from Syracuse to Cape Passero and the southern coast to Camarina, west of the headland. In our case, the Anapo river is fed by several tributaries that the ancients exploited by installing at least two catchments, installed in two tributaries of the river, the Calcinara and Ciccio, over 25 km from the ancient city.

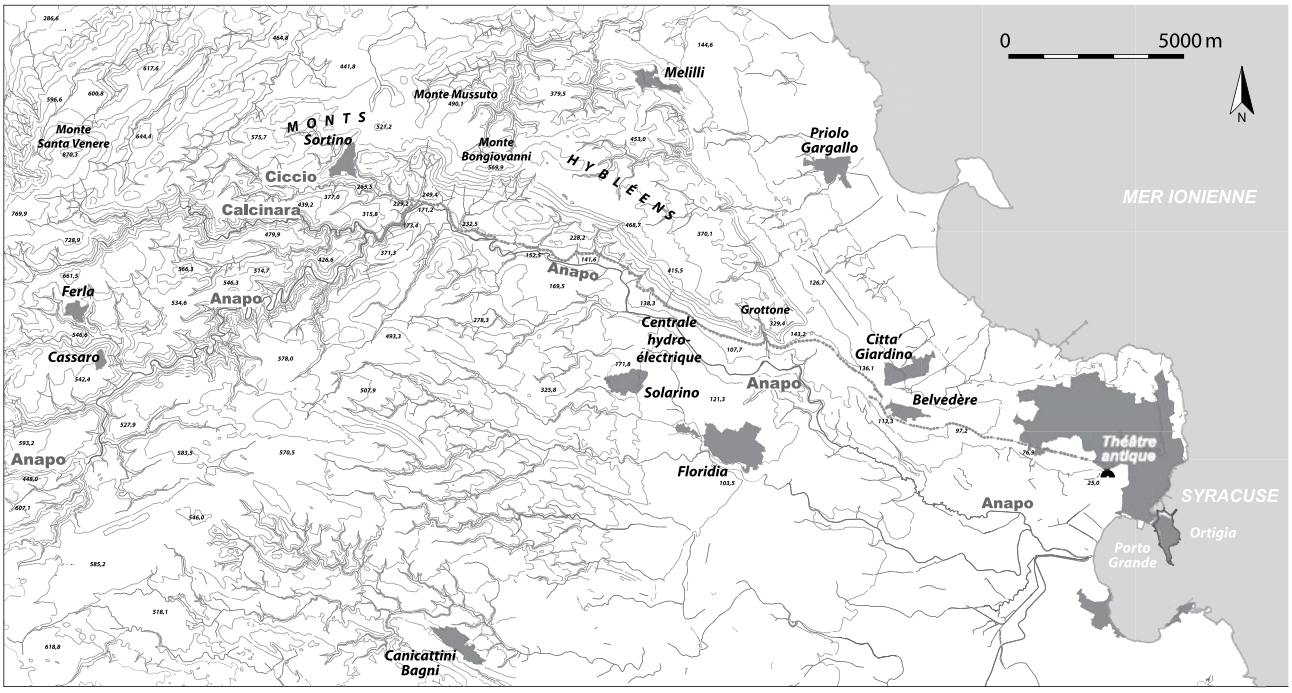

Fig. 4: Syracuse, map of the Galermi aqueduct.

The Ciccio catchment

In a bend of the Ciccio or Torrente Santa Sofia, the ancient designers opened a first gallery of 2.35 m high and 0.60 m wide (Fig. 5). The topography of the catchment had both the advantage of receiving the entire flow of the river and the disadvantage of being directly accessible to the waste carried by the river in the case of flooding: so they protected it from the intrusion of bodies likely to clog the pipeline by using gratings, of which only the centre plates of the hinges remain.

A trapezoidal niche pediment, of paramount importance for dating and the interest that the designers or the aqueduct users gave it, was dug at the top of the catchment (Fig. 6): it is similar to the ones we can observe in the Archaeological Park of Neapolis in Syracuse. An inscription was incised on it, but it is barely legible today. Perhaps we can decipher some letters: ι (iota), ε (epsilon), ω (omega) and maybe an isolated end of the line δ (delta). Their place on the line encourages a reading of 'hiero' which could refer to the sponsor: Hieron, either a dedication 'I am devoted to' or 'with'. The name of who it is dedicated to is unfortunately unreadable, unless the delta is one of the marks.

The gallery's horizontal inspection shafts punctuate the cliff at more or less regular intervals (every 15 m approximately) (Fig. 5, F1, F3, F5). They are of virtually identical dimensions with a height varying from 1.85 to 2.05 m, with a width varying from 1.15 to 1.40 m, and an average depth of 2.30 to 2.90 m. At a later, or even modern, period, new inspection shafts were built with far less care (F2, F4, F7).

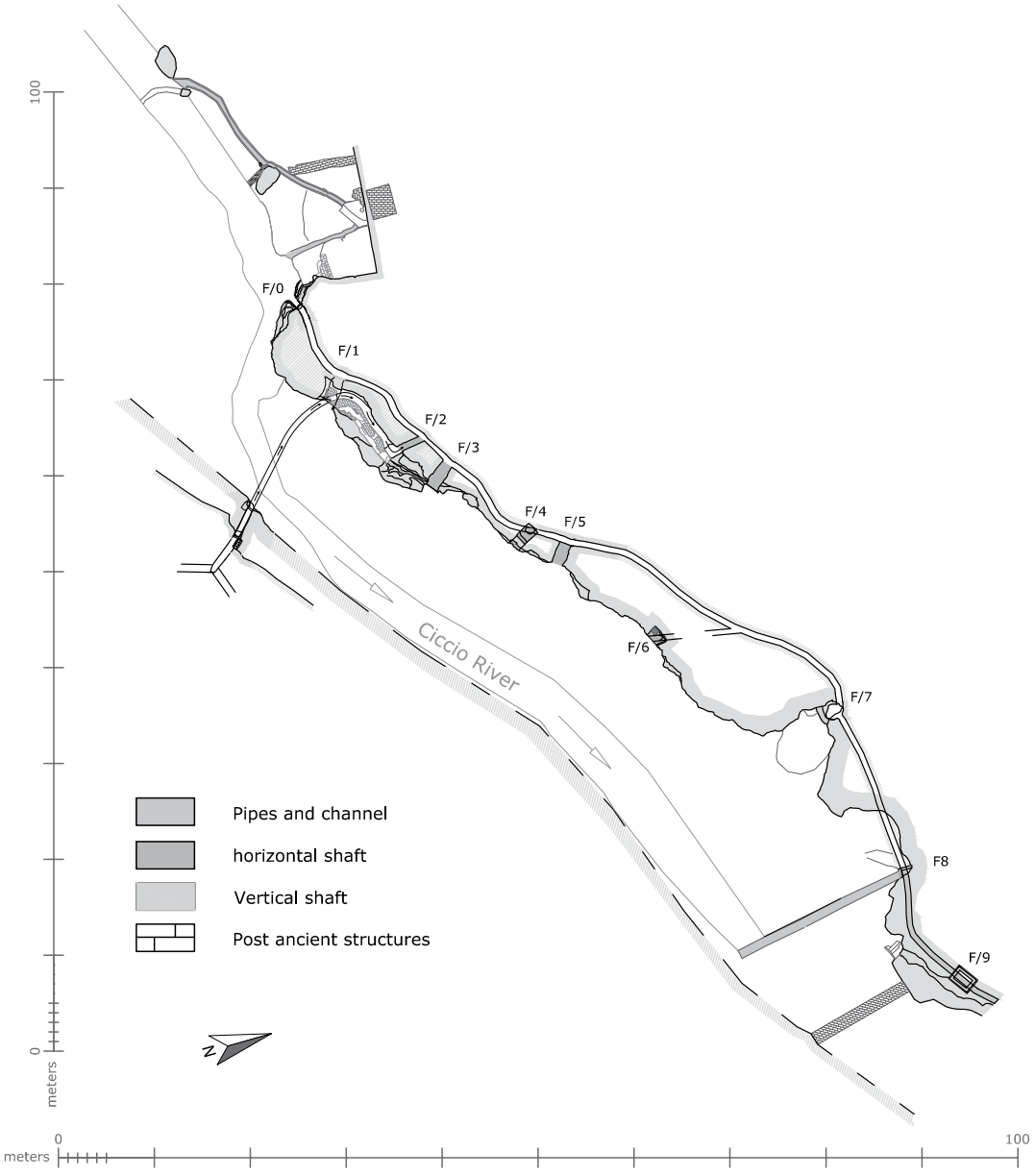

Fig. 5: Syracuse, map of the Ciccio branch (Galermi aqueduct).

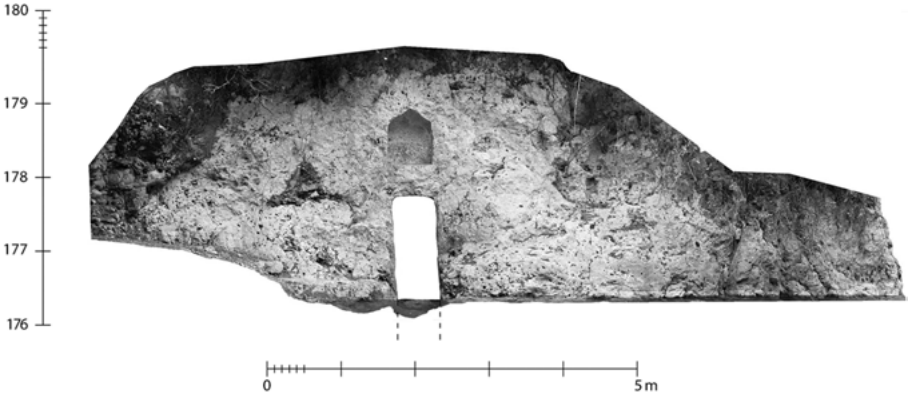

Fig. 6: Syracuse, the Ciccio catchment of Galermi aqueduct (photogrammetry elevation).

However, this first catchment had a certain number of disadvantages. First, it was at an altimetry too close to the river, and despite the project managers having installed gratings or a barrier, whose existence is shown by the vertical grooves built into the inspection shafts (Fig. 5, F1), the gallery must have been too often flooded during floods and thus carried materials likely to block circulation and impair the quality of the water. Second, it could not have provided a sufficient amount of water. Indeed, the Ciccio is a torrential type river, with an irregular flow. There was an attempt to increase the quantities of water carried by the aqueduct, by adding a supplementary catchment (Fig. 5, F6), but it seems that this was not enough.

The Bottiglieria catchment: an elaborate system

The ancients then installed a second catchment, that of Bottiglieria, a perennial karstic river, of much better quality and abundant flow. They exploited a height difference in the current and created a reservoir by installing an artificial dam that today has disappeared under layers of calcareous concretions, common in this river with the evocative name of Calcinara, that which carries lime (Fig. 7). At a height of 3.50/5 m and a width of 9 m, this dam created a reservoir of about 20 m in length for the same width approximately as the dam, that is a surface of about

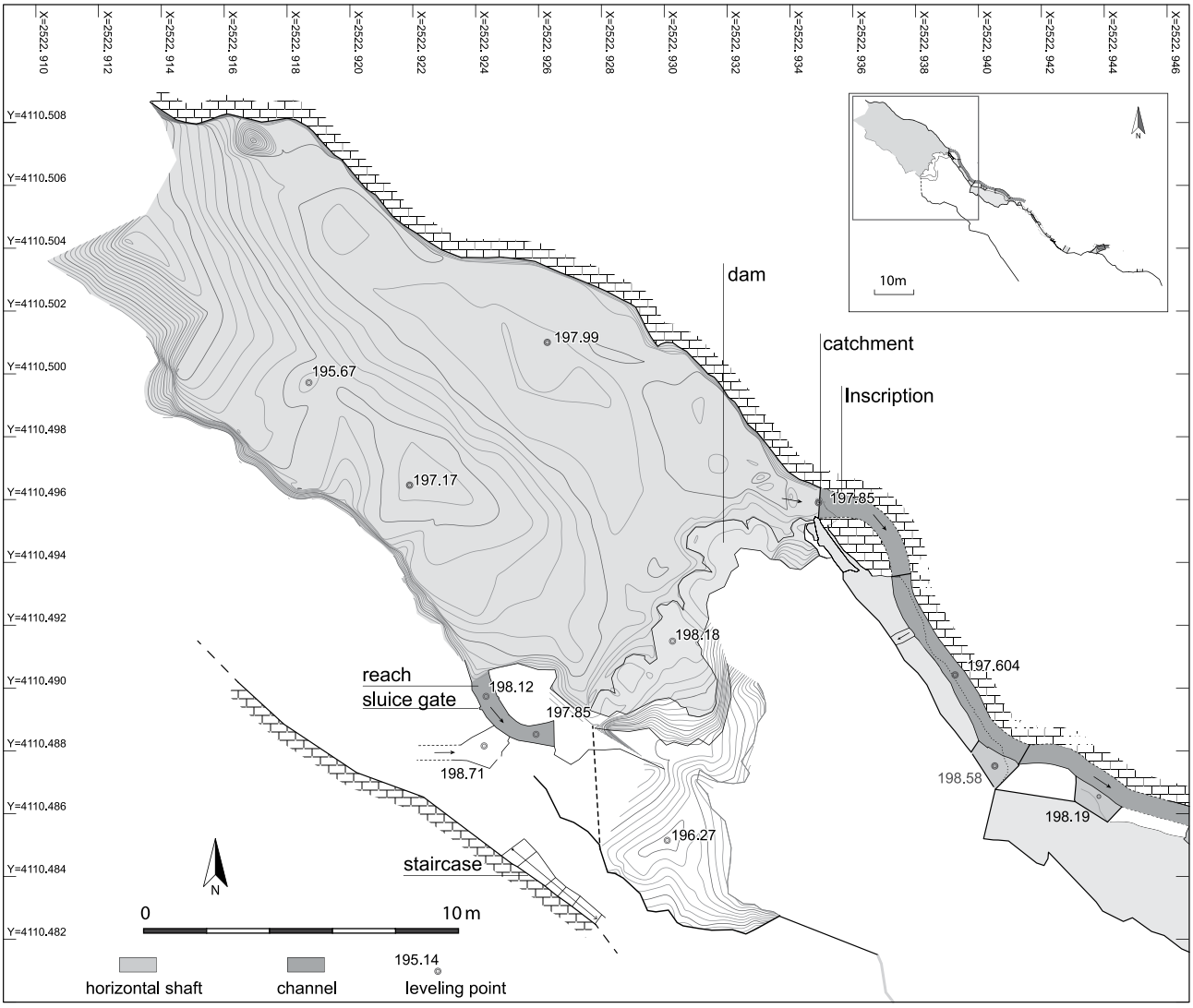

Fig. 7: Syracuse, map of the Bottiglieria catchment.

180 m^2, but we are unable to measure its capacity in the absence of reliable estimates of the river's capabilities in ancient times. On the north cliff of the river, the aqueduct's designers developed a catchment gallery dug out of the limestone, of a roughly rectangular shape (height 2.20 m, width 0.90 m), and to which a channel arranged at the bottom of the retainment area brought water. On the opposite side, a branching structure with a valve for opening or closing the dam to maintain the desired water level and carry out the necessary maintenance operations was installed.

The route of the Galermi aqueduct: a good knowledge of local geology

The aqueduct then followed a zig-zag path along the cliff, alongside, first, the Calcinara, then alongside the Anapo, before exiting the gorges of the hinterland to enter the coastal plain. It thus travelled partly through the limestone rocks of the Hyblaean Mountains, Mount Climiti and the Epipolai plateau of Syracuse. For the remainder, it crossed alluvial and sedimentary loose ground, which suffered landslides, necessitating repairs throughout its history. It was formed in several ways, depending on the ground it passed through: it could be wholly or partly rupestrian; but could also be dug as an open trench and present diverse types of coverage (either semi-circular arches, or horizontal slabs). The aqueduct's dimensions also vary, depending where it is sited: they are usually the height of a man, around 1.70/1.90 m, but can be several metres high, as under Mount Climiti, where the channel seems to have exploited a geological fault between two limestone layers. Its width varies from 0.40 to 1.35 m. But on average, a section has a width of 0.70 m, with a height of 1.80 m.

The digging technology

At irregular intervals, it is pierced with inspection shafts: first horizontal, in the cliff of Calcinara-Anapo; these were opened from the watercourse. They are located at variable heights (from 3 to about 20 m), and have dimensions ranging from 1.45 to 1.65 m in width, from 1.20 to 1.50 m in height, from 0.80 to 1.50 m in depth. In addition to the horizontal inspection shafts, the aqueduct is accessible by vertical inspection shafts, more or less rectangular (1.40/1.80 m), circular or trapezoidal, which differ according to the period, and follow one another at irregular intervals, from 25 to 35 m in distance (Fig. 8). First used to dig the gallery, they were then used for maintenance of the aqueduct. In the cliffs of the Hyblaean Mountains, inspection shafts are found to be both vertical and horizontal. This dual opening is due to the difficulty in digging the original gallery. The vertical inspection shaft was used to direct the orientation of the gallery with *dioptra*, while the horizontal inspection shaft allowed not only the evacuation of sizeable quantities of waste with the slightest effort, but also ensured the necessary ventilation to provide oxygen to the men assigned to digging the gallery.

The zig-zag path of the aqueduct testifies to the digging methods used by the builders of the structure (Fig. 8). To assure work teams linked together and to not risk piercing towards the exterior of the cliff, workers dug from one window to another, always working towards the interior of the rock mass. The anomalies identified in the gallery attest to the presence of many errors and failures by the teams in linking together that reflect both digging difficulties and differences in the pace of the workers. Many cavities, already found in other aqueducts, are seen in the walls: they housed oil lamps used to illuminate the gallery during its excavation and later, during maintenance of the aqueduct.

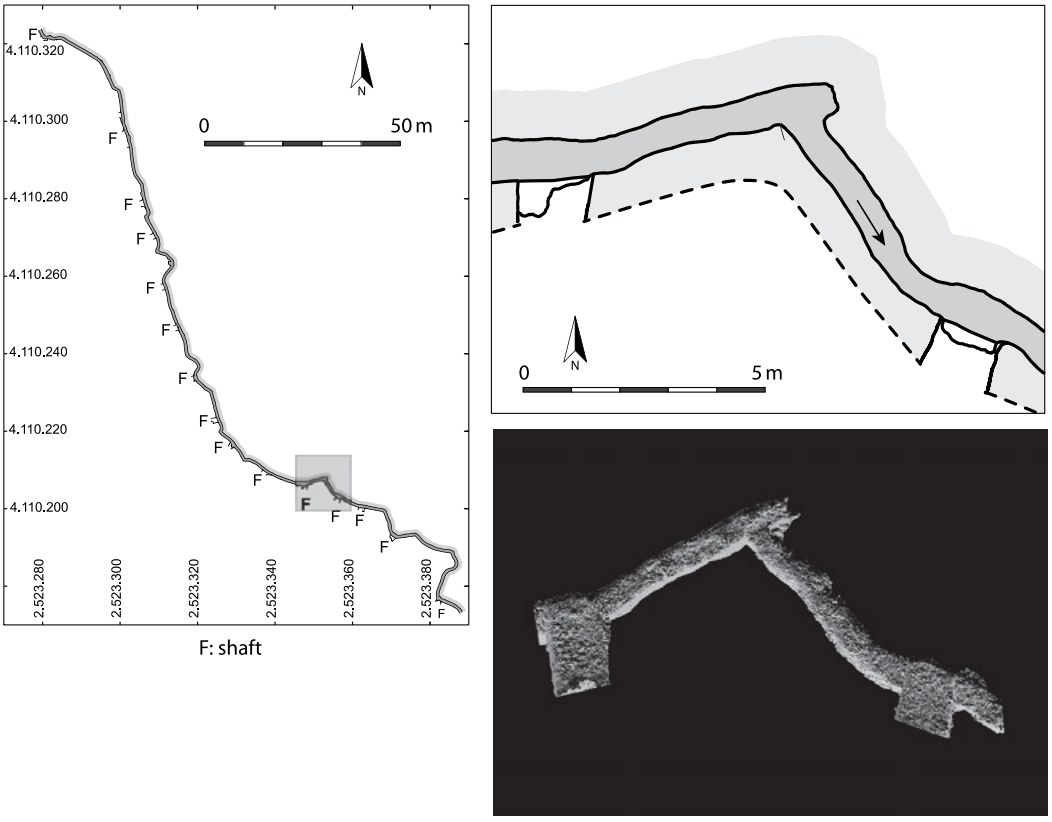

Fig. 8: Syracuse, error of layout in the Bottiglieria branch (by 3D survey).

In Bottiglieria, the aqueduct begins at 198 m above sea level and its outlet in the Nymphaeum is at 57 m. The slope calculated by Cavallari is 0.5 %, which was confirmed by our calculations, but with large variations depending on the location. For example, in the locality of Grottone, its slope varies from −0.87 % to 1.1 % with no logical sequential continuity; while we saw an even more pronounced slope in the Bottiglieria (over 5 %).

A project built in several periods

These technical features of the work show an ancient arrangement: a completely underground route, zigzag galleries, no siphon and a path that follows the contours of the plains and valleys by following a regular slope to promote the proper flow to the city. It is reasonable to return quite far back in time to the creation of this extraordinary aqueduct in the Greek world. But the two catchments do not appear to be contemporary and epigraphic evidence unearthed in their galleries seems to emphasize this.

The inscription of Ciccio, mentioned above, which was damaged by successive coatings that local people applied in the niche, appears to date back at least to the Hellenistic period, if not earlier. At about 50 m from the catchment, the stretch of the Bottiglieria passes through an almost rectangular chamber, with an area of about 3.70 m^2 (Fig. 9). On the south wall, there is a sort of shelf. It is not known if it belonged to the original phase and was a bench, or if it is the remnant of the original level of the area before the hydraulic gallery cut into it. On the northwest wall of the room is carved the relief of a door, surmounted by an architrave more or less trapezoidal, moulded, whose jambs were delimited by a painted red background. Inside the relief, a carved cartridge contains two suspension holes for supporting a *pinax* which would hold an inscription or a lost image, or both. The chronology of this relief can be traced back to

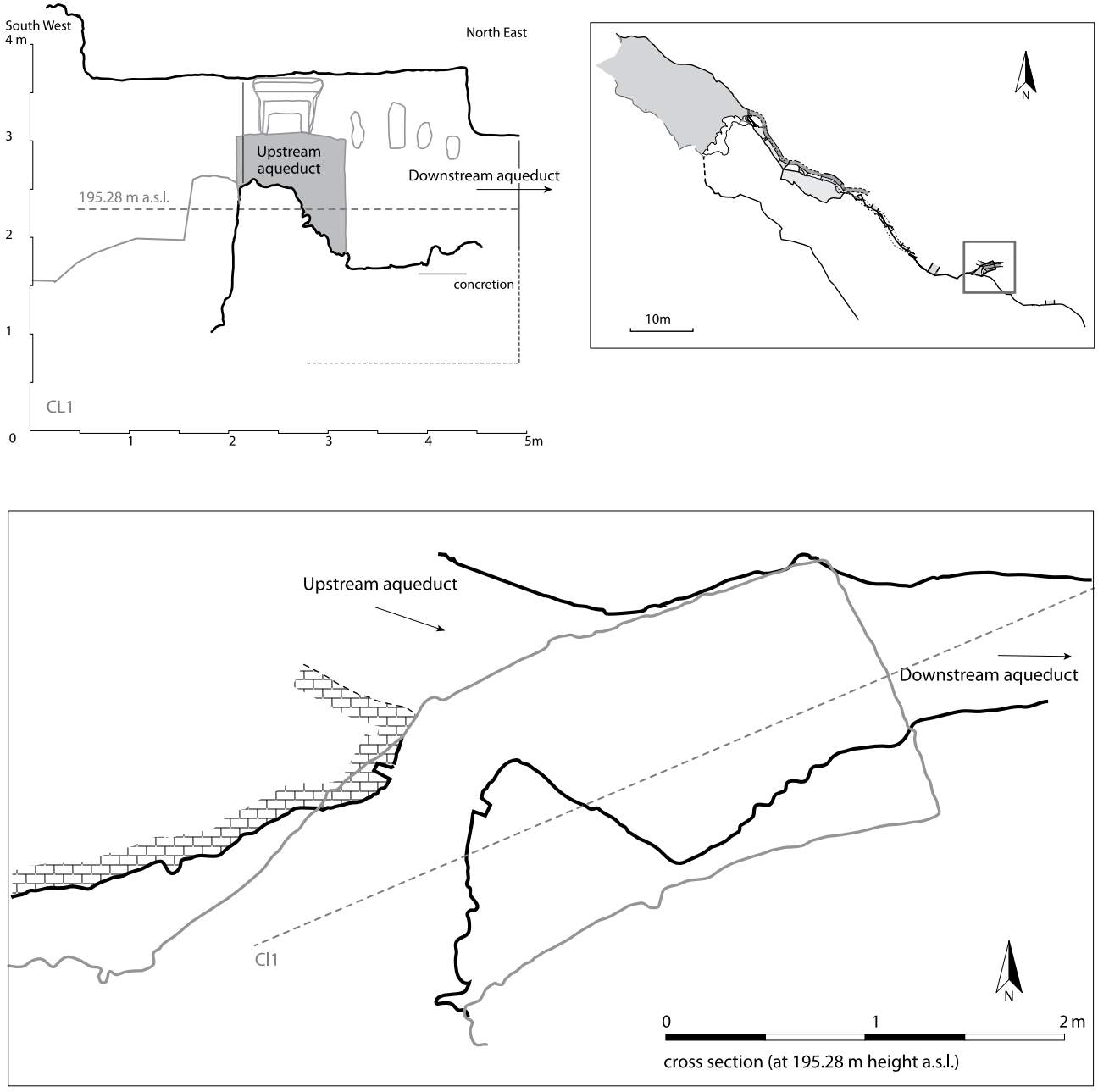

Fig. 9: Syracuse, map and section of the Bottiglieria chamber.

the late 5th century BC, but when compared to reliefs built in regional sites (particularly in the Archaeological Park of Neapolis), it most likely dates back to the Hellenistic period, which allows us to date the aqueduct at the earliest to this era.[40]

Moreover, in this same section of Calcinara, inside the horizontal inspection shafts, at least three hollow reliefs or incised frames have been identified, comparable to *tabulae ansatae,* the dovetail panels that were intended to bear *pinakes* or inscriptions that have now disappeared (Fig. 10). *The tabulae ansatae* are known in Sicily, especially in the southeastern triangle of Sicily, where they bear inscriptions: for example, at Buscemi, close to the aqueduct.[41] They are

40 The function of this small room is far from clear. On this subject, see Bouffier et al. 2018, 313–315; Bouffier 2018, 44–47; Bouffier et al. 2019, 83 f.

41 Manganaro 1992, no. 4. fig. 13.

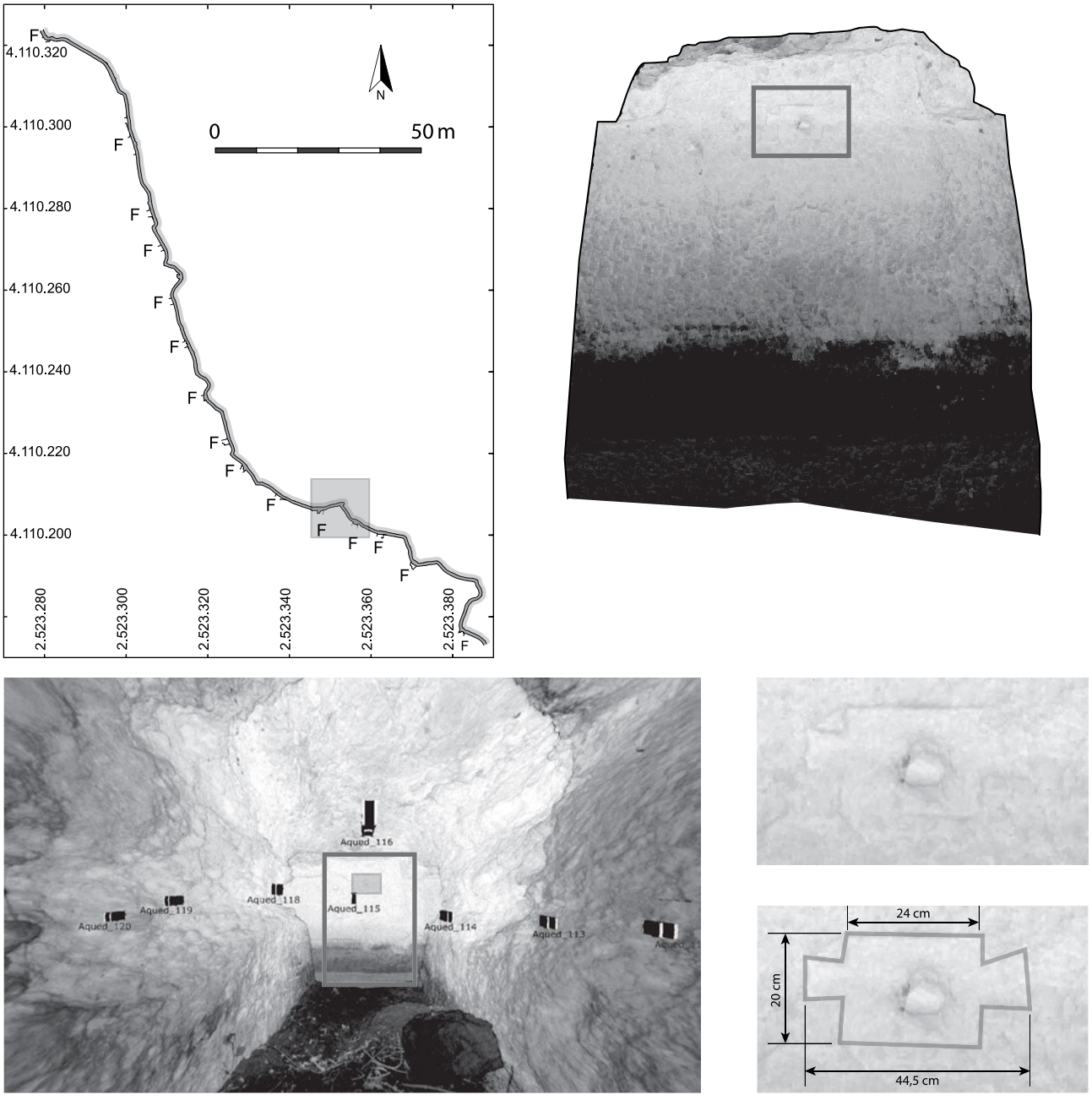

Fig. 10: Syracuse, tabula ansata in the Bottiglieria gallery.

generally used in a funerary or votive context, as shown by that of Buscemi, which offers a dedication to Apollo, Anna and Paides, dated to the end of the Roman Republic (2^{nd} – 1^{st} century BC). These *tabulae ansatae* then become the usual holders of Roman epitaphs until a late period. Their function needs to be clarified here: while they appear occasionally, without recurring regularity, did they have a technical function relevant to the digging or to the rehabilitation of the section concerned? Do they have a topographical indication, letter or number, favouring the identification in the gallery? Whatever their meaning, they indicate to us to an imperial Roman context. It is unlikely, given their location in the hydraulic gallery, that they correspond to religious dedications, although *tabulae* found in the region have a religious or funerary function.

A political will behind the hydraulic programmes

What lessons can we draw then from the renewed study of the Syracusan aqueducts? As it stands, the aqueducts of urban spaces, Ninfeo, Paradiso, Tremilia, offer little historical data, unless one interprets the Greek letters identified in the late 19th century as the marks of a counting system; if this is the case, we can propose that there was a real water policy that needs to be related to a specific time during the urban expansion of Syracuse. The first phase of urban development, as mentioned in the introduction, is that of the Deinomenids, Gelon and his brother Hieron I, who transformed the city into a megalopolis worthy of the great Aegean metropolises, Corinth firstly, but also Athens and Samos, especially as the Aegean context supports this policy.[42] The Greek cities led large hydraulic works policies, known from both literary sources and from archaeology, with fountains and drinking water pipes: in Samos,[43] Athens,[44] Naxos[45] and Megara.[46] In Corinth, the mother city of Syracuse, the Kypselid Dynasty would have constructed aqueducts and monumental fountains, what remains to be proved archaeologically.[47] These often imposing facilities have generally been attributed to tyrannical regimes of these cities between the early 6th or even the late 7th century BC and the years 480/460 BC. According to the philosopher Aristotle,[48] the aim was to put to sleep the aspirations of the people for freedom by providing work and comfort, but in reality, most known aqueducts were designed in ancient cities with booming economies and correspond to stages of monumentalizing urban centres and improving the living conditions, notably sanitisation, of the population. The model for these megalomaniac tyrants, who sought to assert their power and to ensure the sustainability of their power over their people, was the neighbouring Persian Empire, where the Great Kings habitually made the towns under their domination into *paradises,* irrigated areas that hosted fauna and flora from all their empire and appeared as a showcase of their power.[49]

In Sicily, the tyranny is confirmed later in several cities: from the first half of the 5th century BC, autocratic governments pursued expansionary policies that resulted in significant urban and monumental growth. The sovereigns of Agrigento and Syracuse, the Emmenid Theron and the Deinomenid Gelon, respectively, benefitted especially from an extraordinary bonanza, their victory over the Carthaginians at Himera in 480 BC, being the first major dispute between the city of Carthage and the Greeks of the island. This victory brought capital (booty and war indemnities) and cheap labour (prisoners) pouring in. At Agrigento in particular, the ally and also somehow rival of Gelon launched a vast programme of religious and hydraulic construction, well attested both by sources and archaeology:[50] a network of aqueducts, a gigantic pool probably to imitate the Persian paradises, but also to store water in a city with insufficient rainwater

42 Arvanitis 2008.
43 Kienast 1995.
44 Tölle-Kastenbein 1994; Camp 1990.
45 Labrinoudakis et al. 2017.
46 Avgerinou 2019.
47 Landon 1994; Robinson 2011.
48 Arist. Pol. 1313a–b.
49 Briant 1996, 94–96. 214–216.
50 Diod. Sic. 11, 25: *Most of them* [the Carthaginian captives] *were handed over to the state, and it was these men who quarried the stones of which not only the largest temples of the gods were constructed but also the underground conduits were built to lead off the waters from the city: these are so large that their construction is well worth seeing, although it is little thought of since they were built at slight expense. The builder in charge of these works, who bore the name of Phaeax, brought it about that, because of the fame of the construction, the underground conduits got the name 'Phaeaces' from him. The Acragantini also built an expensive kolumbethra, seven stades in circumference and twenty cubits deep* (translation by Oldfather 1970); see also Diod. Sic. 13, 82; Arnone 1952; Furcas 2016; Furcas 2018. According to Giovanni Luca Furcas (oral communication during the conference 'De l'Hydrologie à l'archéologie hydraulique en Méditerranée antique, colloque interdisciplinaire', Aix-en-Provence, 15 mai 2019), Diodorus Siculus is right in considering the conduits as drains and not as aqueducts.

resources and whose population had experienced significant population and economic growth.[51] The city was even described by the poet Pindar as the *most beautiful city of the living*.[52] The building of aqueducts in Agrigento initiated by the Emmenid tyrant encouraged historians to attribute a similar policy to the Syracusan leader, especially as ancient historiography attributed to him a strong international preponderance after the victory of Himera in 480 BC. Most of these major projects were part of an era of urban upheaval that transformed small colonial cities into large urban centres. According to Diodorus of Sicily,[53] and even if we should consider these figures to have been lower, Agrigento would have counted nearly 200,000 inhabitants, of which 20,000 were citizens.[54] Even though we have no figures for Syracuse, we could suggest that it was as densely populated, if not more. The Deinomenid Gelon chose to wipe out a number of rival cities on the eastern coast of the island and deport their inhabitants to the Syracuse site. Faced with Greeks who blamed him for his recent origins, he asserted himself as the spring of Greece[55] and wanted to create a metropolis to rival the great cities of the Aegean world, Athens, Samos and the Corinthian metropolis. He enlarged the city, gave it town planning and a religious architecture capable of embodying his major ambition. The urbanized area then extended from 50 ha to an area which must have been about 250 ha, according to the limits given to the city of the Deinomenids. Ortigia Island, the heart of the old city, was reserved for the tyrant, his relatives and poliades cults, and the source of Arethusa was no longer accessible to the public. We must consider other water resources and the tyrannical context of the period that encourages us to see the establishment of a true water project in the city, as well as that of monumental buildings, which is even easier, given that the Epipolai plateau water table is rich and of good quality. Moreover, it is likely that the two dynasties, who developed many ties, diplomatic and matrimonial in particular, practiced domestic policies of a similar nature. The creation of the Kolymbetra in Agrigento, this reservoir basin in which Agrigento inhabitants would have farmed fish for public banquets and swans for the pleasure of the population, must be understood in the broader context of ostentatious representation by Western sovereigns. I suggest to read this *kolymbetra* as a reproduction of the Persian paradise, set up by the Great Kings in Asia Minor and intended to show the extent of their power. Agrigento is not the only place where the Western Greeks created lush and abundant gardens, as indicated by Athenaeus in his book on luxury.[56] He cites Diodorus of Sicily and even added that the Kolymbetra was built for Gelon:[57]

> *Diodorus of Sicily, in his On the Library,*[58] *reports that the inhabitants of Acragas constructed an expensive swimming pool almost a mile around and 30 feet deep for Gelon; river- and spring-water was diverted into it, and it served as a fishpond and provided large numbers of fish to support Gelon's luxurious, hedonistic life-style. A flock of swans also settled on it, lending it an extremely attractive appearance. Later on, however, it silted up and disappeared. Duris, in Book IV of his On Agathocles,*[59] [says] *that a lovely, well-watered grove is pointed out near the city of Hipponium, and that a spot within it is known as Amaltheia's Horn and was constructed by Gelon. Silenus of Calacte, in Book III of the History of Sicily,*[60] *reports that there is an expensively planted garden near Syracuse called Mythus, where King Hieron conducted his business. The entire area around Panormus in Sicily is referred to as a garden, because it is all full of fruit-trees, according to Callias in Book VIII of his History involving Agathocles.*[61]

51 Bouffier 2000.
52 Pind. Pyth. 12, 1.
53 Diod. Sic. 13, 84.
54 Cf. De Waele 1980.
55 Hdt. 7, 162.
56 Ath. 12, 541f–542a (Translation by Olson 2010).
57 This assertion particularly deserves to be commented on.
58 Diod. Sic. 11, 25, 4.
59 FGrHist 76 F 19.
60 FGrHist 175 F 4.
61 FGrHist 564 F 2.

It is commonplace in ancient historiography to accuse the Western Greeks of engaging in the *tryphè*, this inordinate taste for luxury, or even lust and debauchery.[62] But these indications, which are a hapax in our sources, underline the interest the Deinomenids had for gardens and luxurious parks. The Paradiso aqueduct, whose name may refer to an ancient place name whose meaning has been lost,[63] could be the vector of this lushness, allowing Hieron I, successor of Gelon, to create a kind of paradise garden, like the Greeks created later with gymnasiums in large cities. If the alpha incised on certain covers to these access wells really refers to an inventory of facilities, the Paradiso aqueduct may have been the first investment of a tyrant concerned about his well-being and the ostentatious representation of his opulence and power.

From the Deinomenids to Hieron II: the Galermi aqueduct, a project of the Hellenistic King?

However, the Galermi Aqueduct, currently the best dated, does not go further back than the Hellenistic period, at least for the section of the Bottiglieria, as highlighted by the room decorated with the carved pediment and the minimal repairs in Roman times (the *tabulae ansatae*). Should we look at Hieron II's policies, who came to power around 270 BC, in an island torn apart by centuries-old conflicts with the Carthaginians? Hieron II began the last period of peace for the city, before the intervention of the Romans in 213–212 BC, which marks the end of the independence of the island. He pacified the region, and developed the territorial exploitation of his kingdom, which extended throughout the southeast quarter of Sicily. Cicero, and many contemporary historians after him, attribute to him the *Lex Hieronica* on grain, which taxed the production of cereals and enriched the coffers of the kingdom, while intensifying his relations with Rome, exporting his grain to the Italian capital.[64] On its site, the pacified city was repopulated, economic revival was reflected in the emergence of new neighbourhoods and the installation of crafts, notably ceramics, which require large amounts of water. Hieron II launched major investments in the ancient city, built gigantic monuments: the current theatre, able to accommodate between 14,000 to 17,000 spectators, or an altar dedicated to Zeus Liberator, which occupies a space that has the dimensions of an Olympic stadium, that is, almost 200 m long, and was decorated with gardens. This king blends well into the pattern of the Eastern Hellenistic sovereign, a model known in Egypt, at Alexandria, with Alexander the Great and the Ptolemies, and at Pergamum with the Attalids, who are also responsible for the creation and the beautification of new cities: temples, altars and monumental porticos, gymnasiums and libraries adorn the capitals of their kingdoms. Hieron II is no exception to this tradition. He is surrounded by a court of artists and intellectuals, including the mathematician and physicist Archimedes, who develops for his sovereign and city a number of inventions. Besides the hydraulic screw, that spread to the eastern world, and a gigantic ship so enormous no port could host it,[65] he supposedly imagined ingenious stratagems[66] to keep the Roman army in check during the siege that it led against the city after the death of Hieron II between 213 and 212 BC. Could Archimedes be the designer and great architect of Galermi? Could we then attribute the aqueduct to Hieron II? Although the hypothesis is plausible, we still lack evidence to prove it. Only the niche discovered on the Ciccio catchment could point us in this direction, but the inscription lacks monumentality when compared to those of the theatre dating from the reign of Hieron.[67]

62 See, among others, an article that is always referenced, Nenci 1983.
63 Bouffier 2011, 96–99.
64 Cic. Verr. 2. 3; Carcopino 1914; Pittia 2012.
65 Pomey – Tchernia 2005.
66 Mertens – Beste 2013.
67 Bernabò Brea 1967, 102.

The Romans, who seized the city of Syracuse in 212 BC, also left their mark on the hydraulic installations of the city, although it seemed to become a small provincial town. For now, archaeology has revealed no significant residential areas, and the use of tanks, many in the ancient city, even seems to prove that the aqueducts were no longer maintained or repaired as before. Known for being great water planners, likely to take over water infrastructure and improve, optimize and repair them, they nevertheless left their mark on one of the sections of Galermi, the gallery of the Bottiglieria, as evidenced by the *tabulae ansatae*, unfortunately silent today. The Galermi was, if not expanded, at any rate remodelled and maintained, so the aqueduct must have improved in flow and regularity.

Conclusion

So, to conclude, the recent investigations into the Syracusan aqueducts seem to confirm the implementation of a coherent network of aqueducts during the Greek period. In these conditions, it is difficult to be precise about the period in which it was conceived and done.

The aqueducts of the urban space seem prior to Galermi. One is tempted to attribute the Ninfeo and the Paradiso to the Deinomenids, because of the rough completion of certain sections, because of the incised letters, and because of the name of Paradiso.

However, the extreme technological and human effort that the Galermi represents must have been the work of a team of designers with great scientific and technical skills, such as those observed in the intellectual effervescence of the Mediterranean world during the Hellenistic period from Alexandria to Hieron II's court in the 3rd century BC, with the works of Archimedes in astronomy, his intellectual exchanges with the Alexandrian scholars and his use of instrumentation and mechanisms for thinking about the world. He thus used *dioptra* to measure the universe[68] and there is no doubt that this instrument was decisive in the design of the aqueduct, that had to overcome a large number of topographic and geological barriers. For now, the archaeological evidence is lacking to prove his work on the realization of the aqueduct, but it remains a hypothesis not to be undervalued.

However, one may question the motivations that drove the Syracusans to build this gigantic installation of Galermi. Indeed, it goes from a maximum of 1.5 km of pipes to 27.5 km with the crossing of very important, notably topographic, obstacles. Were the intra-urban aqueducts in poor condition and too expensive to restore? Had the water on the plateau dried up, or decreased? The growth of the city and its economic activities in the Hellenistic period required larger amounts of water, especially for running the ceramics workshops, discovered in several neighbourhoods. Or were there higher quality requirements, as shown by the recommendations of philosophers and hygiene doctors?[69] So many questions to bear in mind in our reflections on the Syracusan hydraulic systems in Antiquity, even if they lack answers.

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68 Di Pasquale 2013, 80 f.; Strano 2013.
69 Plat. Leg. 5, 747d.; Aristot. Pol. 1330b; Hippoc Aer.; Bouffier – Brunet forthcoming.

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Elisabeth Gruber

11 Meeting Water Needs as a Major Challenge in an Urban Context

Examples from the Danube Region (1300–1600)

Abstract: Water appears as a powerful and influential medium in a tight network of relations between human action and the material world with complex impacts. The use, management and control of water constantly led to processes of negotiation regarding competence and responsibilities between the actors involved. It was not only about control and distribution, but also about protection against risks and how to manage them, about the control of abundance or scarcity and the evaluation of alterations in the landscape resulting from dams. This article will reflect on water as a medium and investigate the influence water had on urban communities in the Middle Ages by using the example of the towns Krems and Stein on the Danube. It discusses the system of planning, coordination and resource management required by the construction and maintenance of urban facilities as part of public infrastructure. From this viewpoint, water supply and its communal organisation it will raise questions about the social function of water infrastructure in an urban context.

Introduction

Composed at the end of the 15th century as a visual part of the canonization of the Babenberg Margrave Leopold III, the genealogical tree of the Babenberg family is one of Austria's most remarkable works of late medieval panel painting.[1] Created between 1489 and 1492 in a painter's shop led by Hans Part, the panel painting is considered an impressive example of how late medieval rulers represented themselves in the context of a monastic culture of commemoration.[2] While 46 female representatives of the dynasty, being wives and daughters, are arranged in the form of half figures on tendrils, the 27 male members of the Babenberg family are framed in medallions on the monumental central wing against the background of topographical scenes associated with them. Many of the margraves and dukes portrayed are shown in scenes where landscape painting occupies much of the picture. Representations of towns and cities (Freising, Regensburg, Salzburg, Vienna, Wiener Neustadt), abbeys and monasteries (Melk, Klosterneuburg, Heiligenkreuz, Kleinmariazell), or castles (Falkenstein, Gars/Kamp, Pernegg, Mödling) pin down important stations and events of the protagonists' rule in the topographical area of their influence. From the 11th century on, the measures of the Babenberg margraves (and later dukes) to consolidate their political power – be it in cooperation with or against aristocratic leader

1 It has been restored several times over the centuries, with the first restoration in the first third of the 17th century; restorers also worked on the depictions as such. The bottom part of the panel painting, which was fundamentally restored in the 19th century, was particularly affected. The depiction of the genealogical tree in the context of a work to represent the history of the Babenberg family, commissioned by Archduke Charles II of Inner Austria around 1550, offers an important reference to its original state: Austrian National Library (ÖNB) cod. 8700. Röhrig 1977, 11; Scheibelreiter 2005.

2 A group of young scientists is currently exploring the description and analysis of the canonization process and the context in which it took place, its historical phenomena and how they materialized before, during and after Babenberg Margrave Leopold III's canonization in the respective political and socio-cultural setting of the time, including its reception down to the 19th century, as part of a doctoral team grant from the Austrian Academy of Sciences: Performance of Holiness Using Margrave Leopold III of Austria as an Example <https://performanz-von-heiligkeit.at/> (19. 07. 2019).

https://doi.org/10.1515/9783110677065-011

groups in the region – resulted in expansive foundation and settling activities. Triggered by the country's development and increase in population, the Duchy of Austria experienced a phase of rapid urban growth in the 12th and especially the 13th century. A number of settlements along the Danube, such as Linz, Melk, Dürnstein, Stein, Krems, Tulln, Klosterneuburg, Korneuburg, Vienna and Hainburg, owe the upgrade of their legal status to a town or city, mainly in the 13th and 14th centuries, to initiatives by territorial lords of the Babenberg and later Habsburg families. Other towns, including Eferding, Pöchlarn, Mautern or Großenzersdorf, were promoted by aristocratic or episcopal territorial lords.[3] The depictions of the Babenberg genealogical tree point to those formative events, places and circumstances in the lives of the margraves and dukes portrayed, which – similarly to the specific attributes assigned to saints – historiography of the time classified as characteristic. Locations on a river or at the foot or on the top of a hill became important 'markers' in the history of the Babenberg family – these at least seemed to be the idea of those people who ordered the work at the end of the 15th century.[4] Since the rule practiced by the Babenberg family was closely linked to the Austrian lands, it is not surprising that the Danube, as one of the main waterways leading through the territory, was a key motif in the scenes on display. Many far-reaching actions of the family members on display were tied to the river: depictions of the margraves, being dukes of Austria after 1156, Heinrich I, (reigned 994–1018), Adalbert (reigned 1018–1055), Ernest (reigned 1055–1075), Leopold IV (reigned 1136–1141) or Leopold VI (reigned 1198–1230), as well as Frederick II (reigned 1230–1246) or Henry II (reigned 1141–1177) show them in the context of their foundations – cities and monasteries – along the Danube, including Regensburg, Melk, (Kloster-)Neuburg, Stockerau and Vienna.[5] The effects on an urban space of its location on a navigable river, its shaping and how it was used, become noticeable in the towns and cities on the Danube. They carried out important functions in providing the infrastructure for transregional trade and the exchange of goods, as well as in harbouring important bases for the sovereign's influence. Leopold IV, for instance, was shown as a – as it would turn out later – successful town lord against rebellious citizens during the siege of his residential town of Regensburg[6] (Fig. 1). Depicting the town from a northern perspective brings the massive fortifications with the stone bridge across the Danube into focus. Frederick II, who reigned about 100 years later, was linked to the legendary battle of the Leitha River (1246) against Hungarian opponents. Again, combat action was shown with the residential city in the background – Vienna in this case. The view from the north displays the strongly fortified city and its direct access to the Danube.[7]

Some of the Danube-related scenes of the Babenberg triptych point to significant functions and uses of the watercourse. The detailed depictions of ships, bridges, water dams, water mills, or a fisher with a particular lift net used exclusively in the Danube region (called *gankwat* or Daubelnetz) allude to potential ways of utilising the waterway[8] (Figs. 2–3). The waterway served as a transport route, power station and food source, providing such things as freshwater fish. At the same time, the river was perceived as an obstacle and bridges had to be built or ferry connections established in order to be able to travel from one side of the river to the other. The Danube, however, was not only an important route of transport for trading. As a massive barrier in the natural landscape, it represented an enormous challenge for anyone who wanted to cross

3 See Rosner – Motz-Linhart 2005; Csendes 2000; Weigl 2013 for a survey.

4 Röhrig 1977, 13–17.

5 Cf. Weltin 1976; Zehetmayer 2014; Lutter 2017, on a summary of the Babenberg dynasty.

6 Röhrig 1977, 70.

7 Röhrig 1977, 94; Andraschek-Holzer 2012, 335–338.

8 Duke Albrecht prohibited this type of fishing in 1412, which was documented in 1429 in the collection of Crafts Code of the City of Vienna. The main reason was the fear of over-fishing of the whole fish stock in the Danube: Gneiß 2017, 364 no. 220; Hoffmann – Sonnlechner 2011, 116 f.

Fig. 1: Stiftsmuseum Klosterneuburg, genealogical tree of the Babenberg family, tryptic. The Babenberg Duke of Bavaria, Leopold IV, in front of his residence in Regensburg, detail.

Fig. 2: Stiftsmuseum Klosterneuburg, genealogical tree of the Babenberg family, tryptic. Water mill, detail.

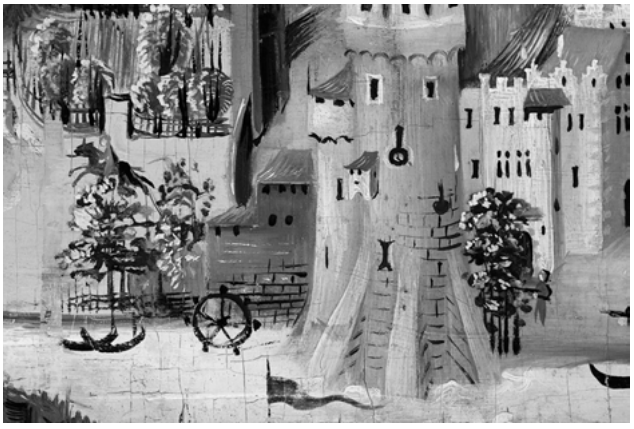

Fig. 3: Stiftsmuseum Klosterneuburg, genealogical tree of the Babenberg family, tryptic. Mill wheel, detail.

it from the north to the south or vice-versa.[9] Since sturdy wooden or even stone bridges were rarely to be found, numerous ferry lines were operated to connect opposite settlements by crossing the river. The numerous depictions of running water and their utilisation against the background of the Babenberg family genealogy poses a number of questions that address the issue of how water was perceived and dealt with in late medieval towns on the Danube. The development of an urban community required not only active people and institutions, but also a working infrastructure. This included the construction and maintenance of roads, squares, bridges, fortifications and public buildings like town halls and burgher hospitals, but also systems of water supply and sewage disposal, the cleaning of wells or measures to prevent flooding. The construction and maintenance of such installations not only offered town lords or wealthy townspeople the opportunity to position themselves through appropriate commitments to the town, but also belonged to the fundamental tasks of an urban community.

With the following considerations, I will, on the one hand, place the focus on some fundamental aspects of water management in an urban context in the Danube region. Access to water, using and regulating the power of water, bridging the water and harvesting from the river seem to be important issues, as they regularly appear as tasks or incidents in written sources, causing costs or keeping townspeople busy in a variety of ways. On the other hand, I will try to show which actions were provoked by dealing with and being close to water.

What does the medium of water mean for late medieval towns and their protagonists?

In his contribution to 'Water as substance and meaning', Hans Peter Hahn analysed the manifold interdependencies and entanglements regarding water with his 'concept of material culture' in mind,[10] stating that 'Water is everywhere. It is part of nature, [...] but it is also part of culture [...]'.[11] Starting from this reflection, it seems appropriate to direct our attention to water as a medium and investigate the influence water had on urban communities in the Middle Ages. How did water shape people's interactions with landscape? In what way did the material properties of water affect their working practices? Which properties of water needed to be 'managed' for what purposes? With the necessity of interacting with water in order to ensure necessary supplies, to use it as a driving force, or to prevent the destruction of buildings, facilities or living quarters, water appears as a powerful and influential medium in a tight network of relations between human action and the material world, with complex impacts.[12] Interestingly, most activities in the context of water relate to its economic or everyday use or control. Even if archaeological findings repeatedly reveal indications of systematic water supply, flood protection or embankments, these appear to be in the scope of everyday use. The same applies to the written records of the local administration. The case study of the aqueducts of Syracuse, sketched by Sophie Bouffier, shows a different point of view. Prestigious hydraulic structures, such as the swimming pool and fishpond built by the inhabitants of Acragas, refer to another aspect of water use: that of the representative demonstration of power, wealth and influence.[13]

9 From the perspective of environmental history, Verena Winiwarter's interdisciplinary research team approached the history of the Viennese Danube basin, starting from its first phase of regulation at the beginning of the 16th century. For their long-term study on river management they also evaluated administrative records, but their focus was on the Modern Period starting in 1500 and lasting until the 1890s. Winiwarter et al. 2013; esp. Hohensinner et al. 2013; Sonnlechner et al. 2013.

10 Hahn 2005; Cless 2014, 21.

11 Hahn 2012, 23.

12 Knoll 2014, 196 f.

13 See Bouffier, this volume.

From my source-based approach as a historian, focusing on written material, resource management of late medieval towns is often seen through the lens of institutions. This is due to the fact that most of the material relating to towns has its roots in the respective administrations. Virtually all documents that I have used for my studies were created as part of the administrative work of secular or religious authorities, such as the town council, the parish church or monasteries, as well as institutions in an economic context, such as trade fraternities and guilds. With the randomness of remaining sources to be considered an important element of what conclusions we can draw for organisational aspects of water management, this material nevertheless draws a comprehensive picture of the activities in which municipal administrations and their actors were involved. Against this background, it has – until today – always been a paramount task of authorities to ensure the water supply of a town and its inhabitants, in terms of finances and infrastructure, know-how and accessibility. Running water requires a complex framework of political, technical and social infrastructure to transport water from its source to the houses and discharge it after use – safely, reliably and at reasonable cost.[14] Some, but by far not all practical and organisational aspects of water management in late medieval towns were recorded in account books and normative sources. They provide an insight into construction work and terms of use, how conflicts about access to water or other regulations regarding water management were handled, but also into preventive or protective measures against fire. These issues of distribution usually led to negotiation processes between urban actors and the groups involved.[15]

Some of these relations, with mutual impact between human protagonists and their actions resulting from the specific properties of water, can be described in their intertwined complexity. This knowledge can be used to understand urban structures both in a social and a material context.[16] The reason why I chose most of the examples from the area of the towns of Krems and Stein on the Danube is not the particularly profound documentation of sources, but the specific constellation of different players on both sides of the Danube that had been forced, over the entire medieval period, to develop concrete methods of how to deal with water, due to their topographical location on the Danube. The towns of Krems and Stein in the immediate vicinity of each other on the left bank and Mautern on the right bank of the Danube represented important traffic hubs on either side of the Danube, with varying intensity in the course of time. They were subject to the political influences of different rulers. While the burghers of the towns of Krems and Stein had gained their town rights under the influence of the territorial lords from the 12th century at the latest, those of Mautern on the opposite side were under the rule of the Bishop of Passau. Due to its extensive rights as a parish, the nearby Benedictine Abbey of Göttweig was also perceived as an influential actor. This setting of territorial influence and political power being separated by a river in combination with the joint utilisation of the region in the Danube section under review, and the necessity to exchange goods, with interaction and mediation across the river being verifiably practised for at least half a millennium, led to a considerable number of written documents.

Access to water

'Water is life'.[17] This is the concise definition which the publishers of the current volume of articles dealing with the use, the perception and symbolism of water in medieval culture have

14 Cless 2014, 32.

15 For an overview concerning Austrian towns, see Scheutz 2016; see Magnusson 2001, for a general overview of the issue of water technology in an urban context.

16 Knoll 2014, 203.

17 Huber-Rebenich et al. 2017, 1.

used to outline the meaning of this fundamental medium. Individual organisms, social formations, and cultural achievements depend on water, making it a life-sustaining, but also destructive force, it 'connects and divides, absolves and dissolves'. This comprehensive array of properties is the reason why 'society as a whole and individual institutions alike need to engage with, and adapt to, these ambivalent aspects of water'. Urban communities are confronted with these facts, too. One of the most costly and complex tasks of municipal administration has always been supplying the town with water. Drilling wells and laying water pipes to provide fresh water or discharge waste water were important, but also expensive tasks of a town's administration, and they fill the account books of all towns and cities – provided that they have been transmitted.[18] In his study on the issue of urban risk management, Ulf Christian Ewert stated some time ago that the supply of water belonged to the 'vital components of the quality of life that could be enjoyed in medieval towns'.[19] Systematic access to and provision of water in the form of fresh water containers, wells, water pipes and flowing channels, as well as the disposal of waste water via sewage channels or the phrasing of cleaning regulations and the like, were the responsibility of a town's administrative bodies, that were entrusted with the related tasks. Taking care of water as an essential element to ensure social order was a task of the urban community which was not to be underestimated, being mainly a matter of organisation. Surprisingly enough, the issue of water management, for instance in medieval Vienna, was initially addressed in a completely different context, namely precautions for fire protection and firefighting. The town charter of the early 13th century already included provisions on how to proceed in the event of a fire, with the threat of penalties in case of violations. However, fire protection was not regulated and organised by the town council until the middle of the 15th century (1454). It can, of course, be assumed that people arranged fire protection measures individually. But the reported events of fire throughout the Middle Ages testify to uncontrolled incidents. The regulation released in the middle of the 15th century was expected to implement a systematic procedure of firefighting. The entire community was called upon to store vats filled with water in attics and courtyards. Joiners and bathers were obliged to be the main organisers of fire protection, and members of 30 other crafts had to assist them by ensuring the water supply. A manually operated piston pump might have already been used at that time to provide water. It was not until the big fire in July 1525 – which started from the princely armoury – that the construction of a major water pipeline was initiated in Vienna, which was completed in 1565. Starting from a freshwater source about 8 km on the outskirts in the village of Hernals, the water was piped into the city to prevent a lack of water in the event of a fire.[20] Preserved municipal invoices first of all testify to expenses that were necessary to build wells and lay water pipes and sewage ducts. First expenditures, for instance, were recorded in 1455 for the construction of the *Fischbrunnen* at Hoher Markt in Vienna, which was equipped with pipes. Work on the stones sourced from the nearby quarries in Sievering, Guntramsdorf, Mannersdorf am Leithagebirge and Breitenbrunn in the stonecutter's at the *Schweinemarkt* (Pig Market, now 1st district, Lobkowitzplatz) lasted for almost a year from February until December.[21] The *Fischbrunnen* on Hoher Markt was one of the most important wells in medieval Vienna.[22] Fish caught in the Danube and other major rivers were kept in constructed basins to be offered for sale. The sources also mention a well at the 'Jews' Gate' and another well located at the butchers' sales tables that supplied the required fresh water. In recent years, wells for the supply of drinking water and used water have also been documented archaeologically, with one of the oldest dating from the 13th century.[23] Account books of Krems also record expenditures in 1516 for the installation

18 Rippmann 2008; Baeriswyl 2008; Malamud – Sutter 2008.
19 Ewert 2007, 223.
20 Krajicek 2016, 37–39; Sakl-Oberthaler – Ranseder 2009.
21 Uhlirz 1896, 157–159, esp. 158 no. 15291; Brunner 1929, 390 f.
22 Gneiß 2017, 498 no. 331.
23 Krause – Sonnlechner 2013, 155.

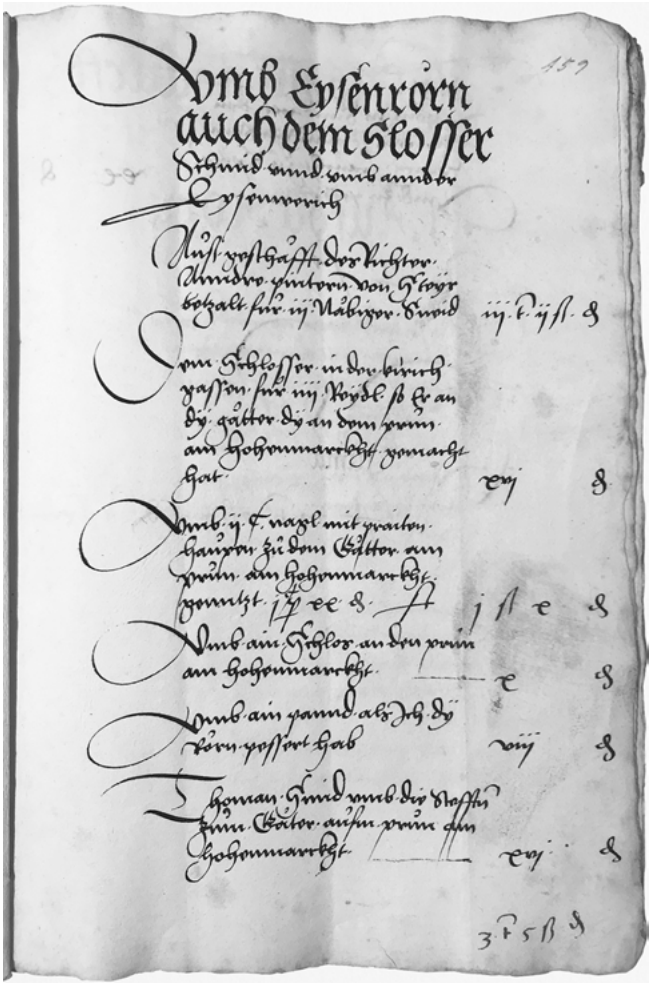

Fig. 4: Municipal Archive of Krems, account book AD 1516, fol. 159.

of pipes at the well at Hoher Markt (Fig. 4). Apart from separately listed iron pipes, expenses were mostly caused by wooden pipes which had to be drilled, repaired or replaced. Like water vat inlets, the pipe connections were sealed with hemp.[24] During excavation work in the south-east of the medieval town of Krems (Drinkweldergasse/Ringstrasse), a paved courtyard with a stone well was uncovered. A basin clad with loam to make it impermeable to water could have been used as a pool to raise fish or keep it fresh.[25]

An instruction in the fishers' order of 1579 to offer fish for sale in fish troughs at the market and not on boats on the Danube leads us to the conclusion that vats must have also been available in Krems for the selling of fish.[26] The purchase of a lockable iron grating suggests that the well was not freely accessible at all times.[27] Expenditures for the wells at the *Täglicher Markt* (Daily Market) and the *Korngrieß*, the trading place of corn (now: Körnermarkt) were made in the same year.[28] Providing fresh water was closely connected to taking care of functioning sewage systems. The account books of Vienna document numerous construction and repair works on sewage drains, for instance under butchers' vending tables, near Hafnerturm, at the

24 Municipal Archive of Krems, Account book 1516, 159 f.; Hoffmann 2000, 101–124; Rippmann 2008; Baeriswyl 2008, 57–61.

25 Hinterwallner 2013, 188 (schematic layout plan of the excavated area). 190 f.

26 Brunner 1953, 234.

27 Municipal Archive of Krems, Account book 1516, 162–173.

28 Municipal Archive of Krems, Account book 1516, 174 f.

fish market or at the *Graben*. In the meantime, archaeological explorations have been able to retrace the routing of individual channels.[29] The town councils had to deal with legal and ecological aspects of trades that needed water and whose waste water had to be discharged, with the shops of leather workers, tanners, or butchers being the main causes of water pollution. Complaints about blocked or smelly sewers, dirty water or rainwater splashing from neighbouring houses presumably were a recurring problem, in particular in the neighbourhood of bathing facilities. Vienna, for instance, had about 25 to 30 baths between the 14th and the 16th centuries, distributed over the whole city; a few were also in the suburbs. In the inner city, these places mostly were at market corners and important streets, with seven on the Alserbach, a small brook running through the city. This, however, changed during the 15th century, when the brook was diverted into the moat. What remained was the topographical description 'at the former bathhouse'.[30] As prominent and generally known points of orientation, baths were used in virtually all towns and cities as a spatial reference to describe the topographical position of individual buildings. 'Opposite the Höll bath' in Krems is only one of numerous examples of this kind used in municipal deeds to describe locations.[31] Only scarce information exists on the baths mentioned in the 14th century for Krems and Stein: the Höll bath, the bath on the *Reisperbach* (a brook) and one in Stein.[32] In 1396, Hans der Bader for the Höll bath purchased a vineyard from Josef from Ybbs and his wife, both burghers in Krems and members of the Jewish community.[33]

The example of Mautern on the Danube shows another problem a settlement on a river could be confronted with. Originally located on the northern side of the town wall near the Danube, the local bathhouse was literally flushed away. A note in the deed of foundation succinctly states: *per Danubium effluxum*.[34] There is evidence that a number of settlements that were originally mentioned in deeds of foundation and chronicles of the 12th century as possessions of Göttweig Abbey could not stand the recurring flooding over time and were abandoned. An island in the Danube mentioned in 1108 with the name 'Mutheimer Werd', which later became the property of the Benedictine Abbey of Göttweig, was flooded several times during the centuries. In the 18th century it was finally abandoned.[35] The settlement of Klebdorf near Hollenburg, which was mentioned in the deed of foundation of the Göttweig church, met the same fate when it was abandoned already in the 14th century due to repeated Danube flooding.[36] The Danube also swept away the settlements of Marquardsurfahr and Strunzenreut further downstream.[37] Christian Rohr's survey on extreme natural phenomena deals with the effects of disastrous environmental events – like floods – on urban administrations in Austrian towns in a comprehensive way.[38]

The topographical location of Krems at the confluence of a tributary to the Danube led to a number of other tasks regarding water management. Several entries in the account books of the town of Krems reported, during the 15th century, expenses for wooden constructions in the Kremsfluss (a brook). The wooden piles fixed in the water close to the inner town bridge over the stream probably served to safely move and pull ashore logs transported on the water and to protect man-made structures against colliding ice floats.[39] Wooden constructions for embark-

29 Smetaczek 2005; Sudera 2005; Krause et al. in press.
30 Hötzel 2016, 82–86; Horn 2005.
31 Brugger – Wiedl 2010, 70 no. 589 (1347 May 20).
32 Kühnel 1967, 21.
33 Brugger – Wiedl 2018, 169 no. 2115 (1396 May 28).
34 Maroli – Plöckinger 1983–1985, 179.
35 Fuchs 1901a, 32 no. 18.
36 Fuchs 1901a, 6 no. 5.
37 Fuchs 1901a, 95 no. 83.
38 Rohr 2004; Rohr 2007; Rohr 2013.
39 Jaritz 1976, 24.

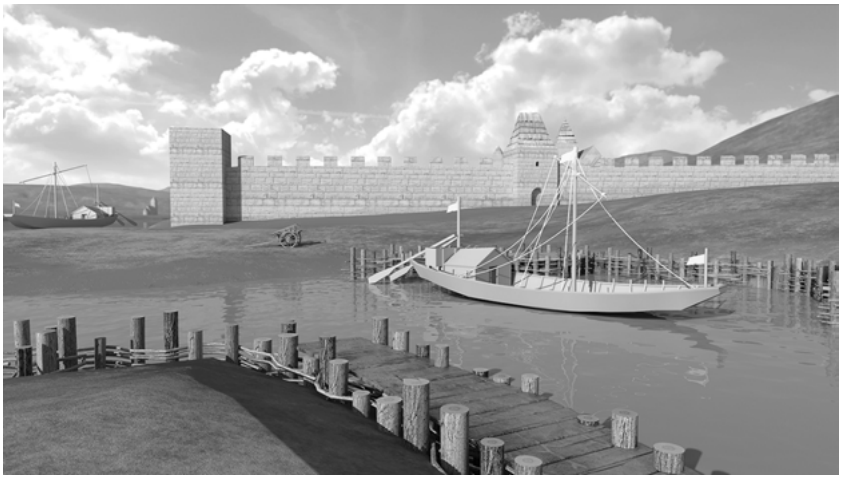

Fig. 5: Reconstruction of the excavated pile system near Stein/Donau.

ing and bridges had to be repaired and renewed on a regular basis. This was also true for a quay on the former estuary of the Alaunbach (a brook), a silted-up branch of the Danube between Krems and Stein. During excavation work in January 2017 for the foundation of the State Gallery of Lower Austria, numerous logs were uncovered and subsequent archaeological investigations revealed that they belonged to a complex pile system (Fig. 5). The finds were under a layer of Danube gravel almost six metres thick. It can be assumed that boats berthed on this reinforced bank. Small metal clamps (as they are still used today for barges) testify to this. The reinforcement consisted of many round piles arranged in several rows that were dendro-dated to 1250–1350. The branch eventually silted up with material washed in from the Danube and the Alaunbach brook, and eventually disappeared completely.[40]

Using and regulating the power of water

In general, written documents relating to the issues discussed here of how water was dealt with in the region of Krems, Stein and Mautern exist only from the 14th century onwards. The operation of mills, however, is documented much earlier. As one of the most important sources of energy for the medieval economy, hydrodynamic power is particularly prominent in the context of milling facilities and in designing the legal framework for terms of use and operation.[41] Mention of a mill in Krems owned by the hospital ward of the convent in Melk and unrightfully in pawn was made as early as 1216.[42] As in other places, mills in Krems were located outside the town walls, along the Krems brook or the Kamp running downstream of the Danube further to the east.[43] Documents testify to a number of mills *sub lapide* to the east of the town, such as the one owned by the Convent of the Dominican nuns of Imbach,[44] those mills of the Benedict-

40 Pieler 2018. I thank Karin Kühtreiber for her many pieces of oral information on the preliminary results of the excavation. A detailed report on the excavation will be available in 2019.

41 Petersen – Reitemeier 2017; Vadas 2017; Vadas 2019.

42 Winner – Herold 2001, no. 27 (1216 May 27).

43 Fuchs 1901b, no. 1175, 249 f. (1433 February 2); no. 1287, 364 f. (1442 October 14).

44 Haus-, Hof- und Staatsarchiv, Imbach, Dominikanerinnen (1259 March 1); (1282); Haus-, Hof- und Staatsarchiv, Imbach, Dominikanerinnen (1351 February 24); Zajic 2007, 42. 56.

ine Abbeys of Melk,[45] Göttweig[46] and Admont[47] whose location was not detailed, and more, otherwise unspecified mills on the Krems brook. Typically, the mills owned by cloisters were leased, which, in turn, entailed agreed revenues and levies. In the middle of the 14th century, the obligations linked to renting the mill of the Benedictine Melk Abbey were extended. In addition to the customary annual service and construction work needed to maintain the building, the tenants were obliged to provide accommodation for convent members, including nightgowns, wardrobes, stables, lights, presses, tubs and vats. These obligations were passed down to the next tenant and continued. Their concrete implementation might have occasionally led to conflicts, since in 1454 the new tenant, for instance, limited his accommodation obligation by excluding board, fodder, hay, bedding and light.[48] For a mill on the Krems brook in a village situated upstream not far from Krems, the different usages which the running water offered are documented. A fish pond in the moat obviously was dammed up with a sloped reinforcement driven into the brook to keep away floating sheets of ice. The mill tenant held the fishing rights for the pond, but had to share the revenues of the annual pond emptying with the owner. Furthermore, a bathhouse was linked to the mill.[49] The example of the mill illustrates the interplay of material and social processes. On the one hand, water power is used by the mill to drive a grinding plant; the necessary installations create a calm water basin that enables fish farming; the accumulation of running water allows the running of a bathhouse.

Harvesting from the river

Using the Danube as fishing grounds (*Fischweide*) and the related fishing rights as one of the sovereign rights had to be permitted by the territorial lord. In 1362, the Benedictine Abbey of Melk was granted the right to fishing grounds in the Danube that extended from the middle of the Danube to the river bank. The penalty imposed for a violation of this right of utilisation was high, amounting to 100 pounds of gold.[50] The fishers in Krems were granted a similar right, which was documented by instructions of the territorial lord in 1455 and 1459.[51] Such provisions regularly led to disputes like the documented conflict between the burghers of Krems and Stein on one side of the Danube and the town of Mautern, subject to the Bishop of Passau, on the other. The burghers of Krems and Stein were accused of having denied the Mautern citizens the utilisation of the fishing grounds in episcopal possession. The burghers of Krems and Stein argued that they had used both the flood plain and the fishing grounds together with Göttweig Abbey for years. They, in turn, accused the townspeople of Mautern of having prevented them with heavy weapons from using their rights, namely fishing and harvesting ice in winter. There is no evidence on the final outcome of the conflict. The parties' arguments make it clear that opinions regarding fishing practice and the use of Danube water/ice apparently differed. While Krems and Stein adhered to the territorial lord's instructions of prudent utilisation of the water, the use of special fishing devices caused significant damage by damming water.[52] About 20

45 Winner – Herold 2001, no. 147 (1303 January 1); Winner – Herold 2001, no. 317 (1318 May 1); Winner – Herold 2001, no. 675 (1357 September 1); Winner – Herold 2001, no. 720 (1363 July 4); Winner – Herold 2001, no. 798 (1383 July 4); Winner – Herold 2001, no. 830 (1388 April 24).

46 Fuchs 1901a, 541 no. 609 (1364 March 31).

47 Winner – Herold 2001, no. 248 (1314 November 11). According to a note on the back of the deed, this mill was located on the Ledergasse in Krems. Jaritz 1976, 19, n. 3.

48 Winner – Herold 2001, no. 1486 (1454 August 23).

49 Fuchs 1902, 226 no. 2012 (1487 December 15).

50 Winner – Herold 2001, no. 713 (1362 January 22).

51 Brunner 1953, 114 no. 186 (1455 June 19), 118 no. 194 (1459 September 4).

52 A similar conflict was also documented in the area of influence of Klosterneuburg Abbey: Hoffmann – Sonnlechner 2011, 124.

years later, the territorial lord felt impelled to restrict uncontrolled fishing in the entire Austrian part of the Danube. Laying down a closed season that ended on the 29th of September was meant to limit extensive fishing. This, however, was not quite successful, because 1506 saw another reaction to the still existing nuisance and a regulation was decreed to protect specific fish indigenous to the Danube.[53] The urban community was in charge of the concrete implementation of these instructions. In 1546 and 1579, they issued an order for fishers. In addition to general guidelines on the practicing of the trade and quality assurance, basic conditions for the selling of fish were laid down.[54]

Bridging the water

It is obvious that bridges had important functions in the Middle Ages.[55] They represented an indispensable component in road networks and traffic connections and created transport links particularly vital for towns and cities. As installations that could be used by a large number of people for crossing, they contributed to the exchange of goods and information, but also to the proliferation of danger and disease.

Dating back to the 14th century, Viennese account books list numerous expenses for construction work spent on the maintenance of bridges. In the north of Vienna, many wooden bridges were built in the Danube flood plain to connect the inner city to the surrounding area. The reasons why bridges were built were manifold: many commercial businesses, such as leather production or viticulture, were located in the regions to the north of the city. Cattle from Hungary grazed at the so-called *Ochsengries* before they were sold at the market or continued on their way to Upper Germany. Agricultural products from the areas on the northern bank of the Danube were also brought into the city on these access ways. Documents repeatedly emphasised the common good to justify the construction of bridges.[56] The provisions of Duke Albrecht II, for instance, laid down in 1439 for the Vienna Danube Bridge toll that the bridge should be made accessible to anyone who could ride, drive, walk or carry goods. Everyone was free to choose the traditional form of crossing on ships below the bridge, or the way over the bridge on foot or on horseback. The construction of the bridge was justified by the fact that many inhabitants and visitors had to cross the river to pursue their business. Both their goods and their own lives were exposed to dangerous situations. In view of the high costs involved in the construction, maintenance and securing of bridges and their connecting routes, mandated fees had to be paid.[57]

The permission granted by the Austrian duke to the towns of Krems and Stein to build a bridge across the Danube represented an important milestone in the development of transregional trading routes. Around the middle of the 15th century, the town of Krems-Stein obtained a number of rights that fundamentally changed its position as a centre of trade and crafts. The staple right bestowed in 1462 and the permission for direct trading with Venice using the road towards the south via Mariazell were the start of a phase of favoured conditions. Apart from

53 Hoffmann – Sonnlechner 2011, with sources; Simon-Muscheid 2006, 30 on water protection and fish as a resource in general.

54 Brunner 1953, 234 f.

55 See Maschke 1977; Hirschmann 2005; Becker 2010; Fouquet 2018 for a survey of significance, functions and construction of bridges with various evidence, and Gruber 2019 to the connecting and separating properties of bridges.

56 This idealised concept was expressed in urban buildings and objects that served a common purpose and held a symbolic value such as town walls, bridges, or the town's main well at the square – often decorated for representational purposes. Isenmann 2010, 109 f.; Gruber 2017, 41 f.; Zajic 2014, 398–426.

57 Brunner 1929, 383; Lessacher 2016, 156–162.

Vienna, no other town had these rights. The already long existing privilege that restricted the reloading of wine, grain and other goods on the left bank of the Danube between Grein and Korneuburg exclusively to Krems, together with permission to build the bridge, made the town an economic hub. Presumably, the bridge itself was not built before the end of the 15th century. In the section of the Danube in the Duchy of Austria, the conditions for building bridges were difficult. The width and flow velocity of the river required special measures to be able to create a stable structure. At least for the bridges in Linz, Enns and Krems, the use of a pile driver is documented. This mechanical fixture was used to drive in the wood piles that would carry the bridge. A heavy, iron-strengthened wood pile was driven into the river bed using a rammer that was positioned on rafts. The construction of this device was not only elaborate, but also expensive. The construction invoices of Enns testify to many expenses for the procurement of material that was needed to build the device. Debarked round oak piles were fixed together with iron ferrules to form a mallet to which an iron base plate was attached. It took six weeks of preparatory work until the fixture was ready to use. There is a background to the manufacture of this device that is important when exploring bridges as objects and their connections. In 1492, Frederick III had called upon the burghers of Enns to return this important device to Stein; it had been used in building the bridge in Stein and that had arrived in Enns under various circumstances; it was to come back to Stein, where it was urgently needed to complete the bridge.[58] Bernhard Karlinger, an influential burgher of Krems and mayor, town magistrate, council member and toll levier in Stein, had turned to Frederick III with this request. This last-mentioned function might have been the reason why he wanted the absent pile driver be returned to the ownership of the townspeople of Stein. In recognition of their contributions to Göttweig Abbey, Karlinger and his first wife Martha were admitted in 1475 to the abbey's fraternity.[59] He and his second wife Maria Magdalena donated many masses in the churches of Krems and Stein. The side wings of the Altar of the Holy Trinity in Stein depicted him and his two wives as donors.[60] The urgent need of a device that was indispensable for the construction of a bridge and that could not be reproduced for every single application, owing to the expense of manufacturing, not only brought together the protagonists who actively wanted the pile driver to be returned to Stein, namely Bernhard Karlinger as the burghers' representative, Frederick III as territorial lord and the citizens of Enns.

At the beginning of the 18th century, Zedler's encyclopaedia described bridges as the 'most elegant works of architecture' that 'link a country to another being separated by deep valleys, streams, rivers, and crevices'. The associated advantages influence both 'human society' as a whole and 'the trades'.[61] Zedler did not mention any disadvantages. He also ignored the question of how missing bridges influenced potential access options. His interest focused on the existence of bridges as the result of human intervention. A spatial connection between the two sides of topographical situations, such as bodies of water, that otherwise were very difficult to overcome or only with much effort, enabled a secured and easier crossing, thus promoting the exchange of goods and information, but also the proliferation of danger and diseases. The construction, maintenance and repair of bridges required a great deal of investment of financial, human, material and non-material resources.

Following the water

Water as one of the matters that are fundamental for the existence of living things entails not only a variety of possible interactions between people and nature, but it also compels action and

58 Katzinger 2014, 117–119.
59 Fuchs 1902, 81 no. 1844 (1475 March 31).
60 Görg 1961, 29–31.
61 Zedler 1733, 1537.

intervention under varying circumstances. 'Water can be controlled, channelled and contained, equally water runs free, wild and uncontrolled, with the ability to devastate and destroy, or otherwise trickles away and dries up, taking with it its life-sustaining powers'.[62] As of late, discussions dealing with the materiality of things have increasingly addressed these conflicting interrelations. 'Water provides a useful focus for thinking about relationships between things and persons and between material properties and meanings'.[63] This interaction can be on a personal level or organised in community settings. Due to the internal structures of their administration and the way in which they organised their living together, towns, convents and castles, in particular, allow conclusions to be drawn with reference to the interaction between water and people. Examples from the region of Krems, Stein and Mautern have been used above to outline various aspects of how water was used and dealt with, as well as to illustrate actions caused by water. They also show 'how the agency of water shaped peoples' interactions with and within the environment'.[64] The use, management and control of water constantly led to processes of negotiation regarding competence and responsibilities between the actors involved. It is not only about control and distribution, but also about protection against risks and how to manage them, about the control of abundance or scarcity, and the evaluation of alterations in the landscape resulting from dams, canals, etc.[65] As part of public infrastructure, the construction and maintenance of urban facilities such as bridges, wells, rainwater drainage or sewage ducts required a complex system of planning, coordination and resource management, including manpower and a common perception of communal acting. From this viewpoint, water supply and its communal organisation raise the question of the social function of water infrastructure in an urban context.

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Fig. 5: Augmented Reality App Kremser Hafen, Niederösterreichische Landesregierung.

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62 Steel 2018, 6.
63 Strang 2014, 133.
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Christian Rohr

12 Ice Jams and their Impact on Urban Communities from a Long-term Perspective (Middle Ages to the 19th Century)

Abstract: Ice jams and subsequent floods were among the most disastrous events for riverside cities in pre-modern times. An ice jam could cause the water to rise very quickly and in some cases much higher than even the worst summer floods. Urban quarters could be flooded rapidly and with little time for any rescue activities for the afflicted inhabitants. The low water temperature made it nearly impossible to survive in the floods. This paper examines ice floods in a long-term perspective to see how urban communities in Europe perceived and adapted to those dangerous hazards. After an overview of the sparse records from the Middle Ages (still to be researched systematically), three single events from Early Modern Times are highlighted. By looking at the disastrous ice floods of 1573, 1784 and 1830 in the cities of Krems and Vienna, both situated along the Danube River in modern Austria, the development of coping strategies and the emergence of memory cultures in an urban context are outlined.

Introduction

Ice jams and subsequent floods are among the most disastrous events that can occur in riverside cities. Within the field of historical disaster research, however, they have been remarkably neglected. This paper contributes to the field by showing the potential for studies dedicated to ice jams and their consequences in urban contexts. It begins with general considerations on disaster perception and management, followed by basic information on ice jams and ice floods, including a short overview of the state of the art in managing them. The examples consist of an overview of records from the Middle Ages, as well as three examples from the Danube region in Austria: the ice flood of 1573 in Krems (Lower Austria), the central European event of 1784 with a focus on the situation in Vienna, and once again an ice flood in Vienna that took place in 1830.

This research focuses on the reconstruction of the events, the relevant management strategies with an emphasis on the actors involved, and the memory cultures deriving from the events, leading in some cases to long-time prevention and adaptation measures. By concentrating on the ice jams of 1573, 1784 and 1830, different types of sources will be presented: a detailed petition to the Emperor to gain help, instrumental measurements in combination with newspaper reports, and finally pictorial evidence showing details of coping strategies not otherwise documented.

The long-term perspective applied will help to show a) which areas of the city were hit repeatedly due to the topography of the river and the cityscape; b) how adaptation strategies were developed, and what they were; and c) how the actors involved changed or did not change with regard to their vulnerability and responsibility. The period under examination extends to the first half of the 19th century; since then, stratifications and warm effluents from industrial complexes, as well as a general warming after the end of the so-called 'Little Ice Age' (1300–1850) have made ice floods in Western and Central Europa less likely.

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From natural hazards to (natural) disasters

The study of natural hazards from a cultural history perspective has become very popular in the last two decades.[1] Such studies tend to focus on the perception, interpretation, (risk) management and commemoration of events by those affected and by human societies in general. In this context, the term 'natural hazard' is taken to mean the physical event itself, which in some instances has an impact on the human environment, whereas 'natural disaster' is used to denote the perception of such an event by those involved.[2] Several factors are necessary for a natural hazard to be considered a natural disaster. Not all are necessarily relevant at the same time, but at least three or four should be applicable:[3]

a) the helplessness of humans when attempting to cope with damage by available means;
b) an inability to explain and understand the event;
c) material and personal suffering;
d) the unexpectedness of the event, which depends on how prepared an (urban) society is for single or recurrent threats;
e) whether a series of natural hazards occurs within a short period of time, thereby raising the vulnerability of those afflicted;
f) symbolic connotations and patterns of interpretation, such as connections to natural disasters described in the Bible;
g) the wider historical context in the form of the economic, religious and climatic crises (e. g. in the 16th and in the early 19th century).

Unexpected and sudden natural hazards, such as earthquakes, storm surges, severe thunderstorms with hail or floods caused by ice jams, are typically perceived as disasters, because people do not have time to install an effective system of prevention, which, in turn, means that the number of victims is higher. In some cases, vulnerability also plays a role, as when, for example, urban settlements are erected carelessly in dangerous places or unsuitable building materials are used.

If a society is prepared to cope with an environmental hazard, people account for it throughout their daily lives and within their socio-economic system. Based on their communal experience, they adapt the design and layout of settlement and their behaviour to minimise risks. Where the level of resilience in such a society is sufficiently heightened, the result may be a 'culture of disaster'[4] or, more correctly, a 'culture of risk management'.[5] For such communities, most natural hazards cease to be disasters, and their inhabitants understand the reasons for and indications of these extreme events. The inhabitants undertake strategies of prevention, which can include building and regularly maintaining dykes, locating settlements on relatively secure ground and adapting building techniques to the risk in question. For example, windows are placed above ground floor level to prevent the ingress of floodwater, or roof constructions are designed to withstand heavy storms. As far as is possible, regional and supra-regional warning systems may be installed as a further preventative measure. As will be demonstrated in this study, precisely this kind of 'culture of risk management' existed among urban communities in pre-modern Central Europe.

1 See, for instance, Rohr 2007; Gerrard – Petley 2013; Labbé 2017; Schenk 2017.
2 Cf. Quarantelli 1998; Oliver-Smith 2002; Groh et al. 2003; Smith – Petley 2009.
3 Rohr 2007, 55–62; Rohr 2013, 135.
4 Bankoff 2003.
5 Rohr 2007; Schenk 2010 for riverine cultures; see also Jakubowski-Tiessen 1992; Allemeyer 2006; de Kraker 2005 for maritime coasts.

Ice jams and subsequent floods

According to the 1986 definition by the International Association of Hydraulic Research (IAHR) Working Group on River Ice Hydraulics, an ice jam is a 'stationary accumulation of fragmented ice or frazil that restricts flow' on a river or stream.[6] Contributing factors for ice jams include both weather conditions and the course of the river itself. On the one hand, longer cool periods, even in autumn, and several weeks of temperatures below zero in winter are necessary for the river water to cool down sufficiently. During the so-called 'Little Ice Age', as well as due to volcanic forcing, the number of cold autumn and winter seasons was higher than today. In addition, in pre-industrial times, this cooling was also more readily possible because the water was not – or only rarely – warmed by industrial effluents. On the other hand, an ice-cover will be produced on shallow water with a low current flow, and therefore if the riverbed is not straightened, but widely spread, it is more likely to appear. If the thick ice cover breaks up during warm late winter or early spring weather, the ice floes start moving and can become stuck in shallow areas or blocked by bridges or other buildings that constitute an obstacle. If we consider that many towns had been built on places where bridges across the river could be erected easily, ice jams are more likely in an urban context. Furthermore, the vulnerability is normally higher in densely populated areas.

Ice jam floods are less predictable and potentially more destructive than open-water flooding and can produce much deeper and faster flooding.[7] The immediate increase of the water level due to ice jams can cause much higher flooding levels than any flood caused by melting water or heavy rain. In particular, floods with floating ice floes can be even more destructive than 'normal' open-water floods with driftwood in the water: the damage to bridges, houses, water mills, industrial complexes, harbours, ships and the cultivated environment as a whole is normally much greater. Finally, people and cattle falling into the cold water rarely survive.

Today, ice jam flooding is mostly a problem in regions of the northern hemisphere with long and very cold winters, such as in Canada, the northern part of the United States, Scandinavia and Russia. Most of the literature, both related to historical events and current ones, deals with those regions, but not with central or Western Europe.[8] In the natural sciences, research on river ice and ice jams is quite advanced thanks to the conferences organised by the Committee on River Ice Processes and the Environment (CRIPE) of the Canadian Geophysical Union (CGU) and by the International Association of Hydraulic Research (IAHR) with a specific working group on 'Ice Research and Engineering'.[9] Historical studies focusing on pre-modern ice jam flooding are, however, extremely rare. One exception is Thomas Wozniak's case study of the unique ice jam in Constantinople in the winter of 763/764.[10] A recent state-of-the-art paper by Prabin Rokaya, Sujata Budhathoki and Karl-Erich Lindenschmidt also supports this impression. The authors found, in total, 188 papers published in journals and conference proceedings before October 2017 by creating a word cloud for the keywords in publications. Most of those papers are dedicated to water resources, engineering and geology (each of these three groups constituting approximately a quarter of the overall publications), and the rest is also related to natural and technical sciences. Most of the studies are on Canada and Alaska or on the Russian north, while fewer have considered Europe.[11] Even if we consider a strong bias, because many

6 Beltaos 1995, 71.

7 Cf. Beltaos 1995, 71–75.

8 Cf. Beltaos 1995 on Canada. For an overview of the numerous publications of this author, see the bibliography in Rokaya et al. 2018, 1452. For a recent case study of the Aura River in Turku, Finland, covering the spring ice-breakup from 1749 onwards and the numerous ice jam floods connected to them, see Norrgård – Hellama 2019.

9 <https://www.iahr.org/Portal/About_US/Technical_Division/Ice_Research_and_Engineering_Committee.aspx> (19. 07. 2019, content not available any longer).

10 Wozniak 2017. An enlarged analysis of ice jam flooding in the Early and High Middle Ages is in Wozniak 2020.

11 Rokaya et al. 2018, 1444 f.

historical publications are not published in journal papers with keywords, and although the bibliography to this article contains at least some studies related to historical flood events, it is remarkable that natural scientific research has hardly taken note of studies based on documentary evidence. The above-mentioned study disqualifies them as 'descriptive'[12] and does not value them as important for understanding past and present-day societies and their coping strategies (e. g. settlement places, infrastructure, annual socio-economic living conditions).

Ice floods in the Middle Ages: an overview

Our knowledge about larger ice jam floods on rivers and in narrow maritime straits in the Early and High Middle Ages (before 1250) is limited to short reports in annals and chronicles of damage and casualties. One exception is the winter of 763/764, which has been recently analysed by Thomas Wozniak. His case study is based on 37 entries in chronicles, of which 16 describe the extreme cold in the year 763 and another 21 deal with the year 764. For contemporary chroniclers, the unusually long duration of snow cover was noteworthy. The Byzantine chronicler Theophanes the Confessor (760–818) provides the longest and most detailed eyewitness description. His report states that the Black Sea was frozen from early October 763 to March 764 for 150 km from the shoreline and to a depth of about 14 m. According to Theophanes, the snow layer covering the ice was about 9.5 m deep. When the ice burst in February, some big ice floes drifting through the Bosporus strait destroyed parts of the town and city walls of Constantinople. Altogether, the hard winter was reported in sources from Ireland, different European monasteries and various Byzantine authors.[13]

Wozniak's larger research project has documented more than 60 years of extreme winter events during the period between 500 and 1100. Most of the records describe only specific features: either the seasons are mentioned in general terms, such as *hiems magna* (a strong winter), or the sources provide indirect temperature indications related to the frozen water of rivers and lakes, but also about the type and results of precipitation, such as a complete snow cover. In some cases, the chroniclers gave daily data for the onset of snow cover and the melting of the snow. The above-mentioned observations deviate very strongly in extreme years from the determined average values of today's normal periods, with the winters of 859/860, 875/876, 975/976 or 1067/1068 having a four- to five-month snow cover or the winters of 708/709, 839/840, 993/994 or 1076/1077 having snow cover lasting almost half a year.[14] We may assume that in those years the larger rivers also had an ice cover, causing problems with ice jams in early spring. There are only records for some winters in annals and chronicles that tell us explicitly about completely frozen rivers and subsequent floods, such as the Elbe River in 814/815, the Rhine, Danube, Elbe and Seine rivers in 821/822, the Seine River in 848/849, the Rhine and Main rivers in 880/881, the Thames and Havel rivers in 927/928, numerous not clearly specified rivers in central and western Europe in 1060 and 1068/1069, the Werra River in central Germany and others in 1074/1075, as well as several large river catchments in all of Europe and the Bosporus strait in 1076/1077.[15] In 1093, many rivers in England, the Netherlands and Belgium, as well as the entire Rhine River catchment, were frozen. Even rivers in Ireland were sometimes frozen, such as in the winters of 934/945, 939/940 and 941/942. At least some of those extremely cold winters may be connected with volcanic eruptions that are documented in ice cores, such as in 821/822 and 939/940.[16]

12 Rokaya et al. 2018, 1449.
13 Wozniak 2017.
14 Wozniak 2017, 155 f.; Wozniak 2020.
15 Cf. Alexandre 1987, 339–341; Wozniak 2020 with detailed references.
16 Cf. McCormick et al. 2007, 878–889.

Whereas Wozniak's forthcoming book on natural disasters in the Early and High Middle Ages will provide the first comprehensive overview of ice jams and subsequent floods for the period up to the year 1100, a systematic study of extreme ice floods for the following centuries is still a *desideratum* in historical disaster studies. This is, of course, due to the increasing density of sources, which not only report on large ice flood events on a macro-level, but can also give insight into the effect of destructive ice floes and floods on a micro-level, including the impact on water mills and urban infrastructure. In general, the reports on flooding events became more detailed and also referred to casualties and economic consequences.

An example of a well-documented ice flood is the one that took place on the Danube River in Austria in the early spring of 1234. After a very cold winter, the melting of snow and ice led to an extreme flood, whereby the Danube spread far into the surrounding land. Numerous villages and even walled cities were submerged and destroyed. Countless animals died, as well as many people; fields, meadows and vineyards were heavily devastated. Due to the large ice floes drifting down the river – and probably also causing ice jams – an even higher number of people was killed than would be expected in normal flooding; obviously those ice floes crashed into houses and city walls with full force. In addition, it can be assumed that all the people who were seized by the water masses had no chance of survival owing to the low water temperature. The ice floes remained in the landscape for a long time during the year 1234 and melted slowly; agriculture was impossible in the devastated areas. As a result of the ice floods – which had also destroyed the grain stocks – people suffered from famine.[17]

In general, ice on the rivers and subsequent ice floods seem to have been rather the normality compared to years without frozen rivers. In this way, the so-called 'Kleine Klosterneuburger Chronik' (Little Klosterneuburg Chronicle) found it noteworthy that in the very mild winter of 1355/1356 it had been not only very dry and snowless, but also that there had not been any ice jams on the Danube River (*und gestieß die Thainau nie*).[18] On the other hand, the same chronicle tells us about the very harsh winter of 1328, when the Danube River was covered with thick ice for 17 weeks. As a form of gallows humour, a peasant started to plough the snow weeds and hollows on the ice instead of his field during carnival time.[19]

Prevention and adaptation strategies for ice floods in an urban context can be reconstructed in more detail from the 14th century onwards. Urban institutions, such as the bridge masters of Wels (Upper Austria), were responsible for the repairs to bridges after ice jams. Urban accounts have survived from the 15th century, such as the bridge master accounts of Wels, the weekly expenditure books from Basel, or the so-called 'Seckelmeisterrechnungen' (treasurer's accounts) from Fribourg (Switzerland). In combination with narrative sources, they have recently been used for flood reconstruction, including ice floods.[20]

Micro-historical case studies shed light on the impact of ice floods on urban and suburban mills in the Late Middle Ages and in Early Modern Times. Gerhard Fritz has recently examined narrative sources, account books and urban regulations from southern Germany dealing with the risk of natural hazards to watermills. His results show the use of diverse measures to cope with ice floods. In the case of a water mill on the Pleichach River in Würzburg, the landlords were not co-responsible for the repairs after damage by natural forces, but the owner alone had to carry all costs.[21] In 1485, however, the Count of Fürstenberg assisted the miller of Haslach im

17 Frass 1971, 165 f.; Rohr 2007, based on the contemporary reports in the *Annales sancti Rudberti Salisburgenses*, the *Continuatio Sancrucensis II* and the *Continuatio Lambacensis*.

18 Rohr 2007, 449.

19 Rohr 2007, 449 f., based on the 'Kleine Klosterneuburger Chronik': *Anno 1328 ist die Thonaw gestossen und der stoss ist gestanden 17 wochen, das molten darauf sind worden, das ainer im vaschang, (zu ainem schimpff) darauff geackhert in den molten, die der wind darauff gewaet hat*.

20 Cf. for Wels, Rohr 2006; Rohr 2007, 280–311; Rohr 2013, 139–144; for Basel, cf. Wetter et al. 2011; for Fribourg, cf. Longoni 2019.

21 Fritz 2018, 213, based on a charter of 1336 (Urkundenregesten zur Geschichte der Stadt Würzburg, 1201–1401, ed. W. Engel, Nr. 154).

Kinzigtal (Black Forest) to cope with damage after thunderstorms, floods, ice and other natural forces.[22]

The annual accounts of Hohenberg and narrative sources tell us more details about destruction to the water mills caused by ice. Ice could shut down, damage or destroy the mill through drifting ice floes. People tried to protect the mills with rakes or so-called 'ice trees', which were probably beams mounted across the tributary channels. If that were not enough, staff would have to observe the mill day and night, keeping the ice away from the mill with bars or other equipment. Sometimes that did not help either: in the winter of 1395/1396, the Obermühle in Rottenburg was devastated twice in a row 'by ice and water', as the annual accounts of Hohenberg describe in great detail.[23]

Bridges and water mills seem to have been the most vulnerable places in urban and suburban environments, but adaptive measures obviously were hard to achieve, because these constructions naturally were exposed to the river. In some cases, city walls, too, had been destroyed and at least parts of the city centres were flooded. The responsibility for coping with the damage varied from case to case. However, we do not have enough evidence as to whether frequent ice floods led to a relocation of urban settlements or of single bridges or water mills.

The ice flood in Krems (1573)

The period around 1570 was characterised by many extreme weather events. Harvests were often destroyed or very poor due to the bad weather. During this time of multiple crises within the Little Ice Age, prices for wheat and rye rose significantly.[24] In addition, people were compelled to pay additional taxes to help fund the wars of the Habsburg emperors against the Ottomans.[25] In Austria, a series of major floods occurred in 1567, 1569 and 1572.[26] Furthermore, the city of Krems in Lower Austria, situated at the end of the Wachau, a narrow passage of the Danube River, was hit by a severe flood caused by an ice jam in January 1573.[27] The accumulation of so many destructive events over such a short time caused this series of events to be viewed as a disaster even within an existing 'culture of flood management'. People could not cope with the damage as they had done in the past. As a consequence, the city council of Krems petitioned the Emperor and landlord Maximilian II (1564–1576) on 17 February 1573.[28] Although the original of this document, formerly preserved in the Vienna Archive of the Imperial Chamber (*Wiener Finanz- und Hofkammerarchiv*), now seems to be lost, its contents are known. In the first section of the document, the councillors described the effects of the 1572 summer flood, which had been severe, but manageable with existing resources. Due to the subsequent ice flood, however, they had been unable to cope and therefore pleaded with the Emperor to commit financial support. Moreover, the city walls and many houses were severely damaged and could not be repaired until the winter. As a result, the city's vulnerability to a second event was much higher than usual.

The winemakers of Krems alleged that their economic loss was even greater: most of the vineyards, fields and meadows near the river were totally ruined and could not be quickly restored.[29] Possibly the inventory in the petition was exaggerated to underline their cause, be-

22 Fritz 2018, 216, based on a charter of 1485 (Fürstenbergisches Urkundenbuch 4, ed. S. Riezler, Nr. 50).
23 Fritz 2018, 217 f., based on the annual accounts of Hohenberg in 1395/1396.
24 Pfister – Brázdil 1999, 41 f.; Behringer 2003.
25 Winkelbauer 2003, 467–469.
26 Rohr 2007, 243–257.
27 For the following section, see Rohr 2013, 136–139; Rohr in print.
28 Kinzl 1869, 150–153; Rohr 2007, 254–256. 332–336.
29 Petition of the city council of Krems (Kinzl 1869, 150).

cause there were, in fact, vineyards also higher up on the slopes above the Danube. However, the houses of the winemakers and at least some of the wine cellars were located near the river bank, and we may assume that they were out of use for months or even years.

Due to the consequences of the summer flood, the ice flood of 9–12 January 1573 became a real disaster. In the petition to the Emperor, this dramatic event is described in great depth. The ice floes on the Danube River built up a large dam within a few hours and the water rose quickly, bringing more and more ice floes into the city. Eventually, the water and the ice brought down parts of the walls, entered the city centre and flooded some streets up to the windows of the houses. The peak level of the ice flood was 1.5 feet higher than the summer flood. Only a third of the twin cities remained dry. The inhabitants could not rescue their cattle, pets and hardware, and they could only escape by climbing onto the roofs of their houses.[30] The clean-up operation only began 12 days after the flood, and even six weeks after the event, blocks of ice were still lying around in the streets.[31]

According to the petition, the loss of wine and grain stored in the houses had been enormous. The future for the winemakers was dark, the petition claimed; the orchards and vineyards would be devastated for years, houses were severely damaged and the wine cellars no longer fit for purpose. The petition concluded that more than 40 houses in Stein and a similar number in Krems would remain empty and deserted. Given that the twin cities of Stein and Krems consisted of 400 houses each in 1565,[32] this means that 10 % of the houses remained uninhabitable. In addition, the winemakers would not be able to sell their products and would therefore fall into poverty.[33] A paragraph of the municipal regulation of 1524 stated that in the case of a flood winemakers are allowed to bring their wine casks to a secure place and to sell wine there. In this way, the winemakers should still be able to provide for their wives and children.[34] Nevertheless, this regulation failed to protect the winemakers in the ice flood of 1573, because it happened so suddenly, as well as occurring at night, so there would have been no time to empty the wine cellars.

The real dimensions of the damage, however, might not have been as dramatic as reported in the petition to the Emperor. It is assumed that 'only' the districts of the city situated in the plains near the shore of the river were hit substantially. People obviously managed to escape in time and they were presumably given shelter in the houses of other citizens, because there is no mention of any who drowned, froze to death or became homeless.

It is clear that the damage was far from terminal for some of the inhabitants of Krems, as one set of documents preserved in the Vienna Archive of the Imperial Chamber makes clear. Some of the city's wealthier residents were able to grant a credit of 5,500 guilders to the Emperor, who had major problems financing his war against the Ottomans in present-day Hungary. In this series of documents, dating from 1572 and 1573, the summer flood of 1572 and the ice flood of 1573 are not mentioned at all. The loan of 5,500 guilders was the last part of a 15,000 guilder credit, granted by the nobleman Michael Freiherr von Eyzing from Krems. Over the following years, the Emperor asked for additional credit amounting to over 10,000 guilders.[35] This indicates that at least some inhabitants of Krems came through the disasters of 1572 and 1573 without remarkable losses.

The mental management and memory of the 1573 catastrophe was achieved by fixing flood inscriptions that recorded the date and water level. Inscription tablets can be found in several public places in Krems, in particular on the town gates. One inscription and flood mark relating to the ice flood of 1573 is still affixed to the Steinertor gate and reads:

30 Petition of the city council of Krems (Kinzl 1869, 150 f.).

31 Petition of the city council of Krems (Kinzl 1869, 151).

32 Kinzl 1869, 137.

33 Petition of the city council of Krems (Kinzl 1869, 151 f.).

34 Municipal regulation for Krems and Stein, 12 March 1524, Article 63; see Rohr 2007, 377 f.

35 Rohr 2013, 138 f.

Den 12 January Anno 1573 ist die gros Eysgüß khu(m)mben vnd in der höch gewesen wie der strich hie vndten verzaichent ist vnd hat gewert zwelff tag lang und grossen [s]chaden gethan

(On 12 January in the year of 1573 there was a huge ice flood, which reached the level shown by the line below. It lasted for 12 days and caused immense damage).[36]

Historical flood marks are useful only up to a point for hydrological research, because we have to consider natural dynamic processes in the watercourse, anthropogenic impact on the river and on the inscriptions themselves (e. g. they are sometimes freshly painted or displaced). However, we may rather use them as signs of memory for 'cultures of flood management', that is, as a 'memento naturae' to keep risk awareness alive.

The ice flood of 1784

The Lakagígar (Laki) volcanic eruption in Iceland during 1783 was followed by a very cool fall and severe winter in 1783/1784, which was characterised by low temperatures, frozen soil, ice-bound watercourses and high rates of snow accumulation across much of Europe. Sudden warming coupled with rainfall led to rapid snowmelt, resulting in a series of flooding phases. The first phase of flooding occurred in late December 1783 and early January 1784 in England, France, the Low Countries and historical Hungary, but the second phase at the turn of February to March 1784 was of greater extent, generated by the melting of an unusually large accumulation of snow and river ice. This phase affected catchments across France and Central Europe, where it is still considered one of the most disastrous known floods throughout the Danube catchment and in southeast Central Europe.[37] Cities like Vienna, Bratislava and Budapest suffered severe damage from the ice floods, as did Paris, Prague and Würzburg. It is remarkable that the German term *Katastrophe* apparently appeared for the first time related to the natural disasters in 1784, used in an article of the *Zürcher Zeitung*.[38]

The sources for this extreme winter and the ice floods are excellent for many places and in particular for Vienna.[39] Narrative sources, including newspapers, are available as well as contemporary images[40] and private documents; gauge and weather stations with sub-daily measurements provided observations on temperature (in Réaumur), air pressure, wind direction and the water level of the Danube River. The *Wiener Zeitung*, which appeared twice a week, included not only numerous reports on heavy rain, floods and cold weather related to Austria, Bohemia, France, Germany, historical Hungary, Italy, Portugal, Russia and Spain, but also instrumental meteorological and demographic data from Vienna. Hydrological measurements at the Vienna-Tabor gauge were made under the direction of the K. K. Wasserbau-Administrator Jean-Baptiste Bréquin (1712–1785) and were published in the *Wiener Zeitung* until his death in January 1785.[41]

The weather situation and the impact of the ice flood can therefore be reconstructed in some detail: after an extremely cold January, in particular around 7 January 1784, daily temperatures rose from below 0 °C to 10 °C on 25 and 26 February, which – coupled with rainfall – caused the rapid (i. e. within hours) breaking of the river ice. During the night of 26–27 February, ice and

36 Rohr 2013, 137.

37 For a European-scale reconstruction of this event, see Brázdil et al. 2010. For a detailed analysis of the situation in Saxony, see Poliwoda 2007, 59–84; for the Rhineland (cities of Bonn and Cologne), see Ennen 1999.

38 Zürcher Zeitung, 15 March 1784. Cf. Poliwoda 2007, 30.

39 For the situation in Vienna and along the Danube River in Lower Austria, see also Strömmer 2003, 209–213.

40 For Vienna see, for instance, a coloured copperplate print by Hieronymus Löschenkohl (1784), showing the flooded Leopoldstadt quarter in Vienna (Vienna, Wien Museum, Inv. No. HMW 13431).

41 See in detail Schönburg-Hartenstein – Zedinger 2004.

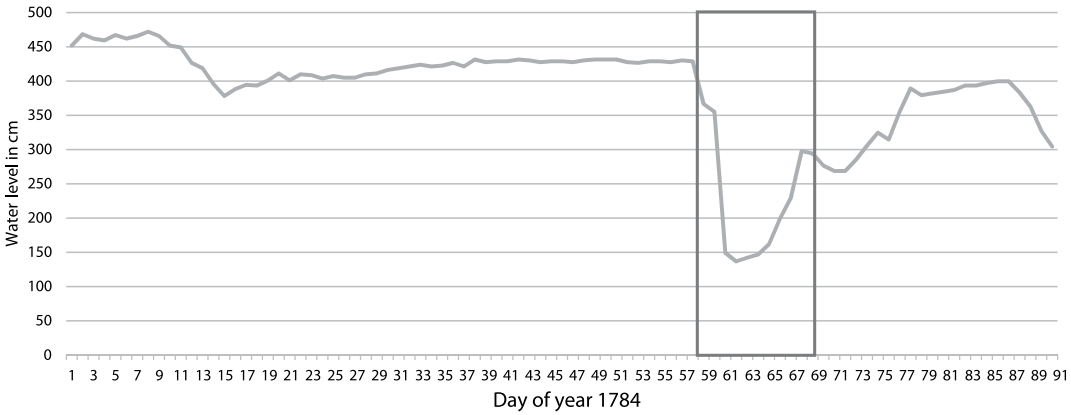

Fig. 1: Vienna, water level of the Danube River, Tabor gauge (1 January to 31 March 1784). The period of the ice flood from 28 February 1784 onwards is marked with a rectangle.

Fig. 2: Vienna, the area of the Vienna-Tabor gauge and the Augarten area according to the Josephinische Landesaufnahme ('Josephinian land survey'), section 71: Vienna and surroundings, detail (1773–1781). The presumable position of the ice jam is marked with the rectangle and the position of the Vienna-Tabor gauge at the Tabor bridge with the circle.

floods destroyed numerous bridges in Vienna and caused severe damage to a large number of properties in the suburbs (now within the outer districts of Vienna), such as Nussdorf to the north of the city centre. The severity of the conditions on the local populace worsened as temperatures again fell below 0 °C on 29 February.

The instrumental data from the water gauge at Vienna-Tabor is at first glance misleading. The water level reached its peak on the morning of 27 February (13 ft. 9 in.; 419 cm) and stayed higher than 11 ft. (335 cm) until the morning of 29 February. During the day, the water level decreased quickly and remained extremely low at 4 ft. (122 cm) for several days from 1 March onwards (Fig. 1).

The explanation for these data is given in several reports of the *Wiener Zeitung*. Ice floes started moving and got stuck in shallow areas and by bridges. A report from 3 March 1784 testifies to the presence of an ice jam near the Augarten just some hundred metres upstream from the Vienna-Tabor gauge (Fig. 2):

> *Schon am 28. [Februar] des Mittags brach es [das Eis] oberhalb Nußdorf los, und fieng an sich in Bewegung zu setzen. Des Morgens am 29. erhielt das Eis in dem Donauarme nächst Wien ebenfalls einigen Trieb, stemmte sich aber gleich Anfangs an der ersten Donaubrücke nächst dem Augarten. Hier waren Arbeitsleute vorhanden, welche die Eisschollen zerbrachen, um sie in leichteren Gang zu bringen. Sie wurden gegen Mittagszeit plötzlich von der Arbeit weggescheucht, da die Donau mit einem mächtigen Schwalle sich in schnelle Bewegung setzte. In ihrem Laufe wälzte sie an beyden Seiten des Ufers, wo es nicht ganz steil und sehr hoch war, mächtige Eisschollen übereinander hin, und bildete sich ein neues erweitertes Ufer.* [...]

(Already on the 28th [February] at noon [ice] broke up above the village of Nussdorf and started to move. On the morning of the 29th, the ice in the Danube arm nearest to Vienna also gained some momentum, but at first it was jammed at the first Danube bridge next to the Augarten. There were workers there who were breaking up the ice floes to make them pass through more easily. At noon, the workers were suddenly shooed away from work, as the Danube set itself in motion with a mighty gush. In its course, it rolled mighty ice floes on top of each other on both sides of the bank, where it was not really steep and very high, and formed a new extended shore [...]).[42]

In addition, the reports of the *Wiener Zeitung* provide vivid and detailed insight into the socio-economic consequences of the flooding in Austria, Bohemia, historical Hungary and Germany. The most detailed reports concerned the situation in Vienna on 29 February and the following days, when the ice flood covered large parts of the districts on both the left and right branches of the Danube River, and in particular the suburb of Leopoldstadt (currently district II in Vienna). Inhabitants were trapped in their houses and had to be sustained with food delivered by boat:

Noch ungleich betrübter ward die Lage der Einwohner in der Leopoldstadt, wo alle Häuser längst dem Ufer mit Wasser erfüllet wurden. Die Höhe des Wassers stieg an vielen Orten bis 3 Schuh, so daß man nicht mehr anders als auf Kähnen von einem Orte zum andern gelangen konnte. Es wuchs die hierauf folgende Nacht noch um ein merkliches, und was diesen traurigen Umstand noch weit mehr verschlimmert, ist die anhaltende Kälte, wodurch die Hofnung einer baldigen Oefnung des stemmenden Eises in der Donau entfernet, und durchaus das Elend vergrössert, das unterdessen freylich durch alle in der Gewalt der Regierung stehenden Mittel, welche mit grosser Weisheit und Sorgfalt sind vorgekehret worden, gelindert und erträglicher gemacht wird, aber noch immer hart genug für diejenigen ist, so es betrift.

(Still sadder was the situation of the inhabitants in Leopoldstadt, where all houses along the bank were filled with water. The level of the water increased at many places to three feet [95 cm] so that one could not get [in any] other way from one place to another [except] by boat. It still rose the following night considerably and what made this sad situation far worse was the persistent cold weather, removing the hope of a rapid breaking up of the ice on the Danube River and increasing the misery thoroughly. The misery was meanwhile, of course, made more mild and bearable by all possible means in the power of the government, which were arranged with great wisdom and care, but it still remained difficult enough for the people hit by the flood).[43]

The mighty ice floes caused severe damage to houses, bridges, and the water supply system. In particular, the economic situation of the poor seems to have been disastrous during the hard winter of 1783/1784, both before and after the floods. The *Wiener Zeitung* contains several reports of donations for the poor, presumably money, but in one case also large amounts of firewood. Donations are recorded from members of the Hapsburg family, by aristocrats, by anonymous benefactors and by the church. Individuals also provided support, such as a medical doctor in Vienna who offered to examine and cure the poor for no charge. Similar works of mercy and solidarity were also reported for other towns. The dean of the parish church of Krems was even honoured for his humanitarian efforts by the Emperor.[44] In Malá Strana, a district of Prague, the Order of the English Misses opened their garden and built an additional bridge to enable hundreds of people to escape the ice flood; they also received ill people from the Institute for the Poor and cared for them for over 12 days.[45]

The *Wiener Zeitung* also contains detailed lists of people who died in Vienna during the weeks preceding and following the ice flood. The city centre of Vienna and its suburbs (Vorstädte) were inhabited by 209,121 people in 1783.[46] On an average day, about 15–25 people died; on 7 January 1784, during the peak of the early January frosts in Vienna, 53 people lost their lives. During the ice flood of late February and during the following weeks, the average mortality did not increase much (17–32 people died per day), suggesting that fewer people were killed

42 Wiener Zeitung, 3 March 1784, 438.
43 Wiener Zeitung, 3 March 1784, 438 f.
44 Kinzl 1869, 314.
45 Wiener Zeitung, 20 March 1784, 578.
46 Weigl 2003, 110.

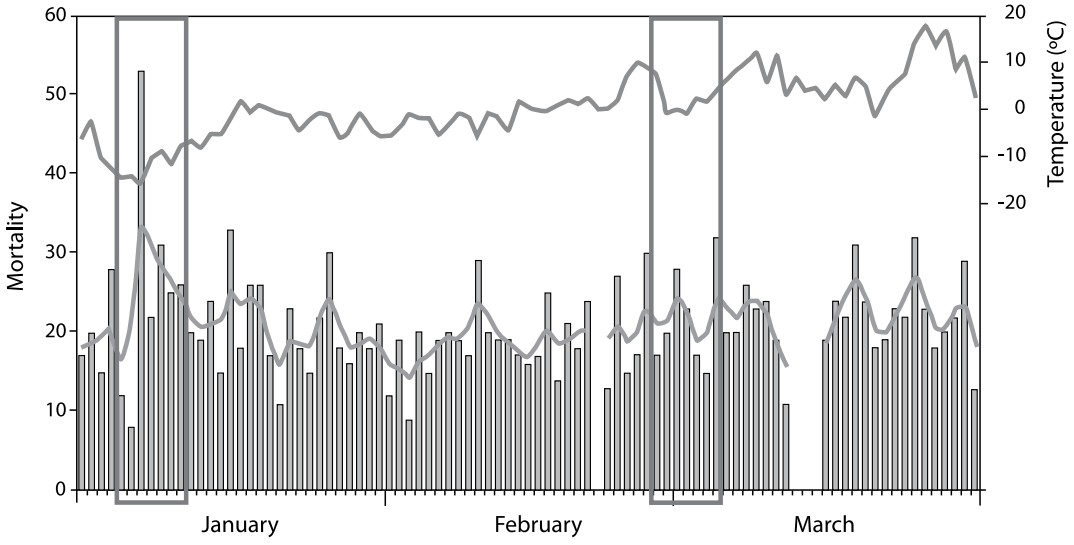

Fig. 3: Vienna, instrumental temperature measurements at 2 p.m. at the Vienna-Tabor water gauge station and mortality rates (people dying per day), January–March 1784 (smoothed by 5-day Gaussian filter). The rectangles mark the coldest days around 7 January 1784 and the time of the ice flood from 28 February 1784 onwards (for data see *Wiener Zeitung*; no mortality data available for 22 February and 13–15 March 1784).

by the ice flood than by the extreme frost in early January (Fig. 3). The warning and evacuation systems in Vienna during the ice flood seem to have been relatively successful in reducing the loss of life.[47]

Nevertheless, the *Wiener Zeitung* also reported that several unidentified people were killed during the ice flood; it is likely that they were homeless individuals or travellers:

> *Im Monat Februar d. J.* [1784] *sind in dem Herrschaft Dürnkrutter freyen Landgerichte im sogenannten Ebersdorferfeld zwey erfrorne unbekannte Mannspersonen gefunden worden, wovon der erste bey 40 Jahre alt, und von grosser Statur ist, ein länglicht runzlichtes Angesicht, schwarz abgeschnittene Haare, schwarze Augen braumen [sic] und Bart, am Leib einen Kopernitz, [...] der zweyte ist bey 18 Jahre alt, hatte ein rundes Gesicht, und keinen Bart, schwarz abgeschnittene Haare, [...] dann schienen beyde dem Ansehen nach aus Mähren zu sein* [...].
>
> *(In February [1784] two male persons were found frozen to death in the area of Dürnkrut in the so-called Ebersdorferfeld (Lower Austria), of whom the first is about 40 years old, large, with a long, narrow wrinkled face, black short-cut hair, black eye-brows and beard, wearing a Kopernitz coat, [...] the second is about 18 years old, large, with a round-shaped face and no beard, black, short-cut hair, [...] They both seem to have come from Moravia [...]).*[48]

The ice flood of 1830

The first third of the 19th century was part of the so-called Dalton Minimum (1790–1835), a period with low solar activity. Severe winters and cool summers were quite common during that time, and for the years following 1808/1809 and 1815, volcanic eruptions brought short-term climatic extremes, such as the 'year without a summer' in 1816 after the Tambora eruption.[49] The ice flood of 1830 in Central Europe was similar to the one in 1784. Again, most of the Central European rivers froze, including the Danube River and its catchment and the rivers in the Czech lands and central Germany.[50] Besides the sources available for 1784 (i. e. newspapers, instrumental measurements), the pictorial evidence is even better for 1830. In addition, the Viennese eyewitness Franz Sartori described the situation in Vienna in a 248-

47 Brázdil et al. 2010, 180 f.
48 Wiener Zeitung, 17 March 1784, 560 f.
49 Cf. Wood 2014; Behringer 2015; Krämer 2015.
50 Cf. Strömmer 2003, 295–301 for Lower Austria, including the city of Vienna; Poliwoda 2007, 194–203 for Saxony.

Fig. 4: Vienna, the flooded quarter of Leopoldstadt (Jägerzeile) on 2 March 1830. Watercolour drawing by Eduard Gurk, 1830.

Fig. 5: Vienna, the flooded quarter of Roßau (Schmidgasse) on 2 March 1830. Watercolour drawing by Eduard Gurk, 1830.

page treatise. The focus of the author is on the affected districts of Vienna (casualties, i. e. 74 people killed, damages), on rescue management (single 'local heroes', donations) and on the role of the Hapsburg imperial family.[51]

Eduard Gurk (1801–1841), a Viennese artist and imperial court painter (*Hofkammermaler*), made a series of 'official' watercolour drawings showing Archduke Ferdinand in action (Figs. 4–7). These are not only interesting in the sense of how the imperial family wanted to demonstrate pious solidarity with their subjects in a time of severe political repression, but also in showing details of disaster management not documented elsewhere. Fig. 4 depicts the Archduke on a boat in the centre, whereas other boats supply people with food (on the right). Ice floes and furniture drift in the water. Numerous other boats with well-dressed people in the back-

51 Sartori 1830.

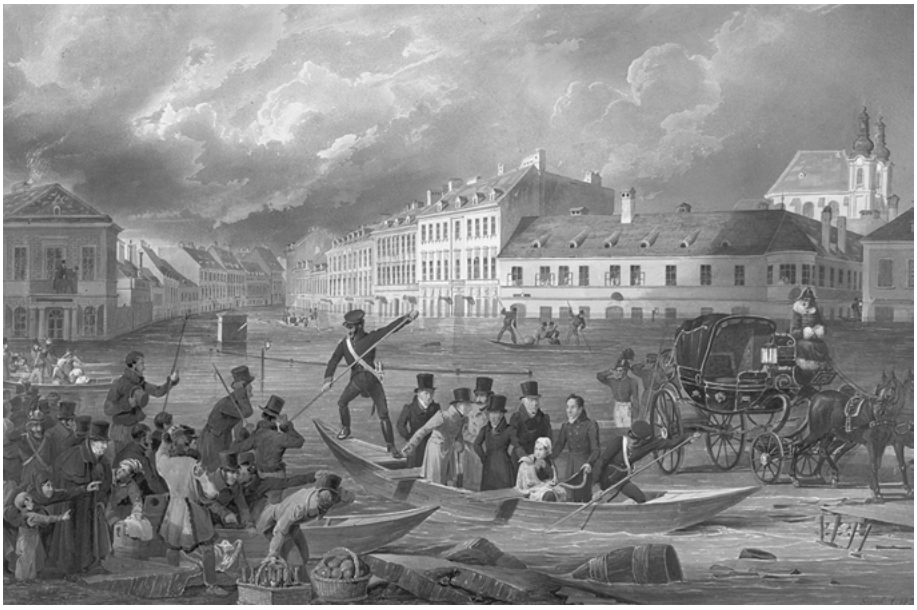

Fig. 6: Vienna, the flooded quarter of Roßau (Schmidgasse) on 2 March 1830 – the disembarkation of the Archduke. Water colour drawing by Eduard Gurk, 1830.

Fig. 7: Leopoldau, the flooded suburban village on 4 March 1830. Watercolour drawing by Eduard Gurk, 1830.

ground show that many houses were obviously equipped with such boats for evacuation, a preventative measure introduced after the ice flood of 1784. In Fig. 5, a child is being rescued, and the bourgeois rescuers are supported by the people in the house. Again, furniture is drifting in the water. Protective fences in the street are to prevent ice floes and other drifting objects from crashing into the houses, a protective measure not documented otherwise and presumably going back to the experiences of 1784. Fig. 6 shows the end of the Archduke's trip through the flooded streets. Horse and carriage are already awaiting him. Finally, Fig. 7 gives an overview of the situation in the suburbs. The village of Leopoldau near Vienna is completely covered with ice floes; they would remain for many weeks and make agriculture and traffic impossible.

Conclusions: Ice floods and their impact on urban societies

In many instances, ice floods were catastrophic events because they gave the affected population hardly any time to prepare. First, the rescue of victims and management of damage had to be undertaken with the available means. Second, these floods were often part of a series of catastrophic events such as in Krems, when the ice flood of January 1573 hit a highly vulnerable society after an extreme summer flood in 1572, or in Vienna in 1784, when the ice flood followed a year of bad harvests in 1783 and an extremely cold January in 1784 after the Laki volcanic eruption. Bridges and water mills were the most vulnerable buildings in urban and sub-urban environments and constituted an obstacle for the ice floes, leading to ice jams.

New protection and coping strategies had to be developed, such as the establishment of 'ice observers' on elevated hills after 1784. After finding that having workers attempt to break up the ice in advance was not very effective, protective fences were erected in the streets as one drawing of the 1830 event testifies. Many houses in the endangered quarters of the cities were equipped with boats for escape. Solidarity through donations as well as the housing of evacuated people was widespread.

Until the 18th century, the urban authorities were mainly responsible for disaster management and future prevention strategies, and in cities with a high risk of flooding, urban legislation provided shelter for the affected inhabitants. Only when the available means were simply not sufficient was further support requested as the petition of 1573 to the Emperor testifies. In some cases from the Late Middle Ages, the mill owner had to cope with the damage alone. From the times of enlightened absolutism, rulers such as Emperor Joseph II, as the sovereign in Austria, took over a 'patriarchal duty' to help their subjects, like a father caring for his children, as shown in 1784. In 1830, during the time of neo-absolutism, the presence of Archduke Ferdinand was even more prominent during the ice flood.

Urban cultural memory is represented through flood marks on prominent buildings such as town gates, but also through drawings and even treatises collecting newspaper reports and documenting the donations and deeds of 'local heroes'. It is remarkable that religious responses to ice floods are missing for all periods examined, beginning from the Middle Ages to the 19th century. Although severe ice floods were unusual, extraordinary events, such floods were in many cases still part of 'normal life' within cultures of risk management.

Illustration Credits

Fig. 1: Christian Rohr, values based on the data published in the *Wiener Zeitung*, 17 January to 3 April 1784.
Fig. 2: Vienna, Österreichisches Staatsarchiv – Kriegsarchiv, BIXa242 sectio 071.
Fig. 3: Brázdil et al. 2010, 181, based on the data published in the *Wiener Zeitung*, 10 January to 3 April 1784.
Fig. 4: Vienna, The Albertina Museum, Inv. No. 22610.
Fig. 5: Vienna, The Albertina Museum, Inv. No. 22609.
Fig. 6: Vienna, The Albertina Museum, Inv. No. 22615.
Fig. 7: Vienna, The Albertina Museum, Inv. No. 22616.

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Betty Arndt

13 Medieval and Post-Medieval Urban Water Supply and Sanitation

Archaeological Evidence from Göttingen and North German Towns

Abstract: Accessibility to clean water is a fundamental need of medieval towns. It was a necessary supply in private households, in craft and industry, for mills and for livestock husbandry. To assure this, natural streams and rivers were used, forming dividing, as well as connecting elements in the townscape. In north German towns, with Göttingen as an example, water supply was provided by private wells and by public infrastructure, such as water pipes. Archaeological evidence for both exists and examples are given. Some towns needed a *Wasserkunst* (waterworks) to lift the water in the pipes with sufficient pressure. Most plots of land also had a cesspit for the disposal of faeces. The vicinity of the fresh water supply and sanitation have often been cited as an example of poor hygienic standards. Evidence for this statement – often repeated unchallenged – is discussed in this paper. Water quality was monitored and attended to, which is shown not least in the praise of fresh, clear water in texts, and in costly fountains in marketplaces.

Introduction

The region of the northwest German lowlands forms an old cultural landscape that contains a series of high and late medieval towns. Many of these north German towns participated in the Hanseatic League, the famous network of merchants that, for centuries, was responsible for successful trade and constantly growing wealth. The regional, but mainly long distance, trade in the North Sea and in the Baltic reached as far as London and Bruges in the west and as far as Novgorod in Russia in the east. It connected the metal-mines of the Harz Region and the saltworks of Lüneburg with the fishing grounds of Sweden and Norway, and connected the markets with the inland trade. The high and late medieval towns, many of them founded during the 12th century, can be characterized as communities of burgesses and council, containing churches and seats of nobility, surrounded by fortifications of wall, moat and rampart. Unlike in rural areas of the time, the burgesses were comparatively free, with their own urban self-government and legislation. Even with differing natural conditions, the towns therefore can be regarded as comparable. Inside the towns, the accessibility to clean water was a fundamental need. It was a necessary supply in private households, in craft and industry, for mills and for livestock husbandry. The text below tries to give a rough overview of private and public water management infrastructure, quoting examples from different towns, with the main focus on Göttingen in Lower Saxony. It also discusses connected problems of waste water and waste disposal in the towns with their high housing density.

Natural waters

Ditches, creeks and rivers in medieval towns had a dividing and a connecting impact at the same time. The location of the proto-urban settlement of Gutingi in the 7th century and the

Note: This article will try to describe and reference examples of urban water supply of towns in north-western Germany, but will focus mainly on Göttingen, where the author has been responsible for archaeology for more than 25 years.

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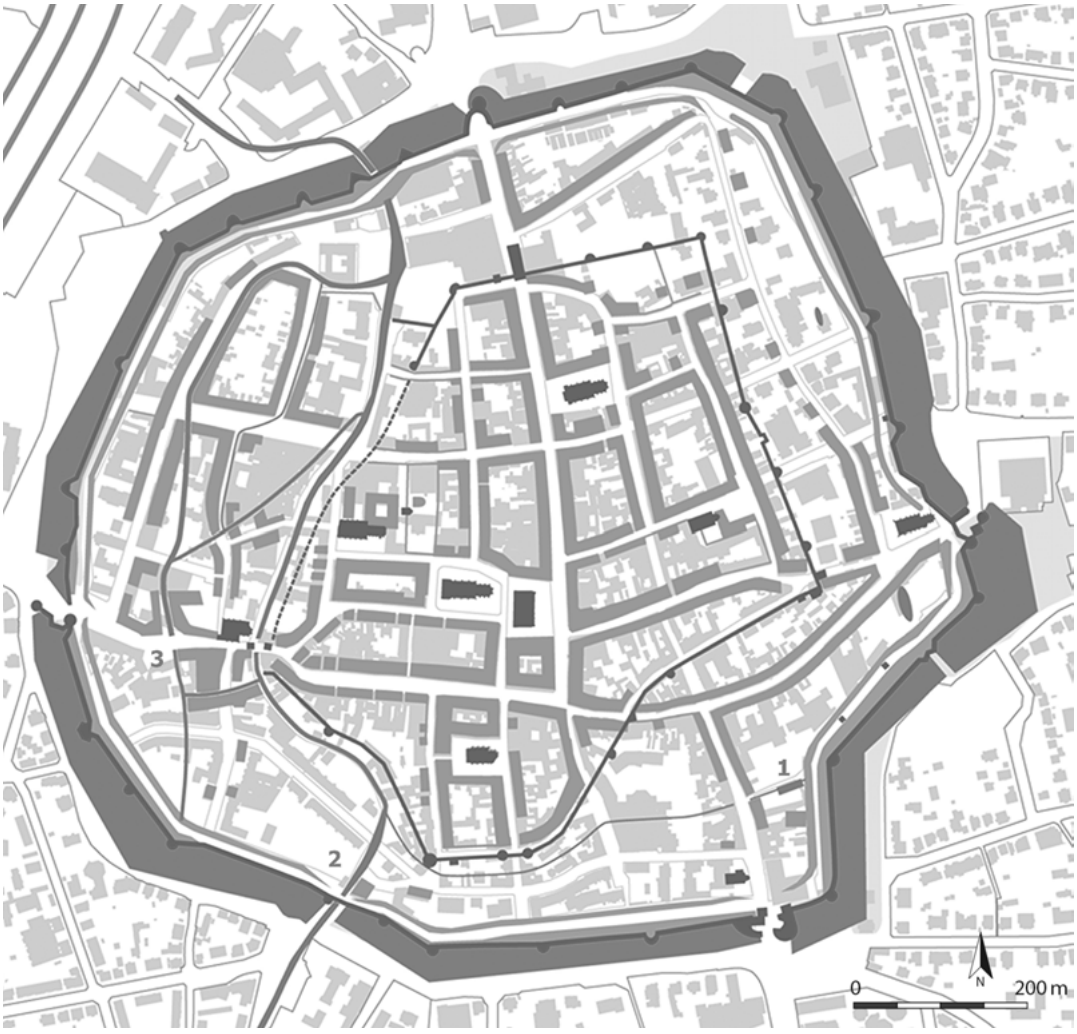

Fig. 1: Map of the old town of Göttingen with surrounding rampart (dark grey), water-filled moat and the inner stone wall (black line). 1: the artificially diverted Gote; 2: the lined Leinekanal forming a part of the inner fortification; 3: natural side arms of the Leine (e. g. 'Cow-Leine') in the west, used by several industries.

foundation of a town beneath it in about 1180 is said to be connected to a ford on the nearby river Leine. Even when the river was only small, it formed an obstacle for carts and walkers, which could increase in seasons of heavy rainfalls when the water level could suddenly rise enormously, so the facility to cross it was essential for the use of the old trading routes.

The proto-urban settlement of Gutingi was set beneath the Hellweg, a trading route dating back to the time of Charlemagne or before. A nearby stream coming down from the eastern hills would naturally have taken a northern route, following the topography, as hydrological studies have shown.[1] However, the people in the village of Gutingi redirected the stream to make it flow through the area of their settlement (Fig. 1, 1), which was set on a small ridge. Evidence for this was found in several transects in the excavation of the village in 2003.[2] They showed the stream of the small river and a broad flooding zone, which is the result of flooding in several seasonal heavy rain events. The flooding zone could be seen in areas of different sizes of grains of soil, which indicate different velocities of the water flow. Somewhere in the west, this new stream was connected again with a side arm of the Leine.

The redirection of the stream must have been an enormous effort for the community – and it shows the importance of, and need for, fresh water, which has been vital for every settlement

1 Keller 1980.

2 Arndt – Ströbl 2005, 29–35; Arndt 2004a, 119.

since prehistoric times. This redirected creek was called Gote, and was eponymous to the settlement. Following the Etymologists who have tried to trace the (unusual) name of the settlement,[3] the Saxon word *Gutingi* means something like 'settlement on a gutter'. Here 'gutter' seems to be used in the middle low German meaning for canal, which would underline the artificiality of the stream – and which is confirmed by the results of the excavations that showed that the stream was redirected.

Presumably, around 1180 the medieval town was founded directly beneath this old settlement and was fortified with a wall, leaving the proto-urban settlement outside. The name passed on to the town, while the older village was now called *dat olde dorp* (the old village).[4] It was only integrated into the town when a second fortification with a rampart and broad ditch was erected from 1363 onwards. Water surrounded the town in the moat, which was ponded in several steps because of the sloping terrain.[5]

The Towns

Inside the towns, fresh water was crucial for the life of humans and livestock. It was needed for several purposes in every household: not only for drinking, cooking and washing, but also – very important – for brewing. The small side streams flowing through the western part of the town of Göttingen were therefore used as a natural water supply (Figs. 1, 2). One of the side streams, called Small Leine or Cow-Leine, which no longer exists, could be identified in excavations in Groner-Tor-Straße 14.[6] Greyish-blueish layers of clay show that this small stream had cut into the underlying glacial pebbles. The small stream was lined by a row of small wooden posts, possibly an attempt to control the flow of water and keep it in a bed. An accumulation of posts on the bank suggests a construction to make the water more easily accessible.

In some north German towns, a stream flowed in an open bed directly through the market street – like the Gose in Goslar[7] or the Brehme in Duderstadt in Lower Saxony, with a breadth of about 1 m.[8] Historical evidence gives a first date for the Brehme of 1276. Only as late as in the 18th century was this open water lined with stones. It not only served as a fresh water supply, but could also be used to flush away dirt and rubbish. In an attempt to keep the water clean, several rules were passed, including the interdiction of washing pigs in the Brehme.[9] An old, still repeated rhyme[10] indicates that an official announcement was made on the day before beer brewing started, asking to refrain from urinating in the Brehme at this time (though it remains unclear if there is evidence for a legal rule in historical sources).

Crafts and workshops in need of water

In addition to the 'private' need for water, several crafts had an intensive need for water and rely on a constant water supply. The workshops were therefore often placed next to the moat or a river. In Göttingen, for instance, there were dyers, as the textile industry was important

3 Lehmberg 1999, 59.

4 Arndt 2016, 131.

5 Arndt 2010, 226 f.

6 FStNr. 48/07 (FStNr is the Find Site Number and is the reference number for the excavation in the archive of Stadtarchäologie Göttingen. This number is also referred to in the regular reports on Göttingen excavations in 'Göttinger Jahrbuch' – see Bibliography); Arndt 2007, 269–271; Arndt 2008, 103–106.

7 Griep 1998, 20.

8 Porath 1998, 60 f.

9 Porath 1998, 60.

10 The German rhyme says: *Hiermit wird bekannt gemacht, dass niemand in die Brehme macht, denn morgen wird gebraut*.

Fig. 2: Göttingen, Angerstraße 4, a row of wooden boxes for watering and soaking hides in the tanning process.

economically to the town. An excavation of a dyer's workshop in 2005 in Angerstraße 14 showed the foundation of the dyer's oven, which once carried a big tub for heating the dye lot.[11]

Tanners nearly always had their workshops directly next to rivers, as they were in need of running water. A Göttingen workshop found in Angerstraße 4[12] was situated directly next to the Leine canal. In a rescue excavation, remains of a large wooden tub were found, possibly for watering the hides in an alkaline mixture of water and ash to dissolve hair and any remaining flesh. A row of rectangular wooden basins was used in the process of soaking the leather with tanbark (Fig. 2), but some of these also seem to have contained ash. Between the different steps of flushing and soaking, the hides were presumably rinsed directly in the canal. Small strips and offcuts of leather could be found in thick layers on the plot.

The adjacent Leinekanal formed, for more than a century, an important part of the fortification of the town (Fig. 1, 3). The canal was stabilised by a wooden reinforcement. Horizontal wooden beams of oak, up to 7 m long, could be seen in a rescue excavation in 1994,[13] they were held by pointed vertical posts, but unfortunately no decent documentation was possible. They prove that the canal was lined with wood, before it was later stone lined with the local limestone. The wood, however, delivered dendrochronological dates of 1285 (–6/+8) and several dates between 1413 and 1491, which likely show repeated renovations of the construction.

It is often stated that water-polluting industries were placed at the outflowing end of rivers and canals; this cannot be proved, at least for Göttingen. Efforts to sustain the good quality of water, however, can possibly be seen in the regulations for craftsmen.

Mills

The (wooden) lining of the canal was not only necessary to keep the water in a given bed and keep it from meandering, but also to control (the amount of) the water flow, which was impor-

11 FStNr. 48/06; Arndt 2007, 274–276.
12 FStNr. 35/03; Arndt 1996b, 252 f.
13 Arndt 1996b, 253.

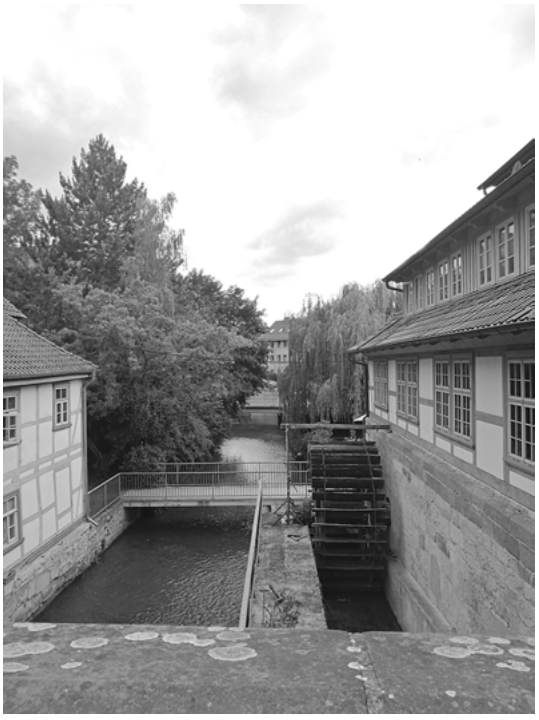

Fig. 3: Göttingen, the Lohmühle (Tanbark Mill, left) and the Odilienmühle or small mill with reconstructed wooden wheel (used for polishing metals, right) at the influx of the Leinekanal. View from rampart.

tant for managing the mills. Until the steam engine was invented, water and wind mills were important to provide energy for several early industrial processes.[14] The mills served not only for grinding grain for bread, but also for chipping malt for brewing, for producing oil or for fulling cloth in the textile production process, for grinding lime and plaster for building, for sawing wood, and for whetting and polishing metal objects (*Odilienmühle*). In 1305, Göttingen already had five mills,[15] all of which were water mills situated on the Leinekanal. Their large wooden wheels were operated by the natural flow of the water. Only one windmill is known, presumably of minor importance, which was erected on a former tower of the old town wall (14th century).[16] The *Große Mühle* (the big mill) had as many as nine millworks. Some mills also served to stamp oak bark that was needed for tanning. The purpose can often be found in their names, such as in *Lohmühle* (tanbark mill) (Fig. 3), and in some cases the guilds were responsible for their maintenance.

The north German town of Stade also had a major water mill, first mentioned in 1297, which was operated by the alternating tidal stream of the river Schwinge.[17] In the town of Einbeck, the 'technical mills' were placed outside the medieval town, while the flour mills for grain were situated inside the fortifications.[18] All three were water mills. The grinding of grain for flour and of malt for the famous beer of Einbeck, which was exported in large quantities, was kept as a monopoly of the council. In most medieval towns, the tax for grinding was an important source of income and grinding at home was forbidden.[19] As water mills often interfere with water management on a broader scale, permission of the sovereign would have been necessary in many cases, at least in the rural areas. Inside the late medieval towns, however, the mills could be operated under communal control.[20] The water mills not only interfered with the natural flow

14 Prange 1989, 512–514.
15 Fahlbusch 1952, 105.
16 Fahlbusch 1952, 109; Göbel 1993, 23 n. 22.
17 Lüdecke 2004, 207.
18 Heege 2002, 108.
19 Göbel 1993, 111 f.
20 Petersen – Reitemeier 2017, 279 f. I am grateful to Prof. C. Rohr (Bern) for the hint to this reference; Göbel 1993, 57 f.

of water, as it was necessary to dam up the water, they could also cause trouble for fish (and fishermen) and for navigation. The town of Lüneburg, for instance, retained the right to dismantle three water mills on the Ilmenau River should they cause problems for shipping the salt of the profitable Lüneburg salt-works or the necessary supply of raw material to this end; they also exercised this right.[21]

Wells

For a long while, the responsibility for fresh water lay with the individual household.[22] In Göttingen, citizens built wells in the yards behind their houses.[23] The archaeological investigations have shown different types of wells. The oldest known ones of the 12th century are also the smallest in diameter. An example from Rote Straße 34[24] was only 80 cm in diameter. It was built of broken limestone of different and irregular sizes, forming a polygonal cylinder, and dates to 1260 or shortly after. It was placed behind the house in the yard. In 1414, the well was closed and covered by an extension of the building and thus needed to be replaced. The new well was placed again in the yard behind the house, but was larger, with an inner diameter of 1.10 m. All examples of the 15th century are about this width. This well was dug with a large tapered building pit. Most wells had to be dug up to 8.50 m deep to reach the ground water flow.

All wells in Göttingen lay behind the houses, with a distance to the street of 11.50 m to 14.30 m. If this reflects a building regulation, as H. Plath already found in 1950 for Hanover,[25] would be a subject for further investigation. In Hanover, all wells were placed 60 (medieval) feet[26] away from the street.

Some examples were built in an exact round circular form, for which the stones had been chiselled concave on the inside, as is the case of an early post-medieval example from Rote Straße 30[27] (Fig. 4). Some long stones reach out far to the outside to function as guides (in a

Fig. 4: Göttingen, a well of local limestone behind the building in Rote Straße 30. The well is built over a wooden frame.

21 Petersen – Reitemeier 2017, 287.
22 Dirlmeier 1981, 151. 154.
23 An overview is given in Arndt 2004b.
24 FStNr. 02/08 and 02/10; Arndt 1997, 226 f.
25 Plath 1978, 16.
26 Plath 1978 gives 32.50 cm for the medieval foot measure, which means the wells in Hanover were built with a distance of 19.50 m from building line.
27 FStNr. 02/06; Arndt 2004b, 138.

Fig. 5: Göttingen, the Klotzbrunnen in Hetjershausen shows a well with stone enclosure and a long wooden lever to lift the bucket with water.

system of runner and guides). It was constructed on a wooden frame of 1.13 m edge length. The well exists today and still reaches the ground water at 6.30 m under the surface.

Other wells were constructed above round frames, for which out-of-use wheels could be reused sometimes (e. g. Groner Tor Straße 14[28]). The largest excavated well in Göttingen showed a diameter of 1.60 m (Prinzenstraße 8[29]). The stones again were chiselled round on the inside and it was infilled in the 17th century, as finds indicate. In Papendiek street, a ground water well had an inlet of a water pipeline in the upper part of the lining. A historical etching of 1765 shows a public well at this place.[30]

In Göttingen, in more than 30 years of archaeological investigation, no example of a wooden well has been found, so it seems likely there is none. Limestone was the main building material for everything and could be found easily in the surroundings. Wood, which was needed for the wooden, timber-framed houses, was potentially too expensive.

What did the wells look like? Unfortunately, the upper part, the part of the wells above ground, is always missing. The Sachsenspiegel, a medieval book of laws, requires wells to be built knee-high above the ground, in order to prevent people falling in. If somebody died (because he fell in), a penalty is due. The illustrated edition of the Oldenburger Sachsenspiegel from 1336 shows a well with a beam next to it to lift the buckets with water.[31] In the village of Hetjershausen, now part of the town of Göttingen, an example of this type of wooden construction still exists (Fig. 5).

Another possible construction is a draw well with a windlass, where the buckets could be pulled upwards with a chain or a rope. A decorated fragment of a plate of 'Werraware' in the collections of the *Stadtarchäologie* shows one of these, with a pitched roof above it[32] (Fig. 6).

28 FStNr. 48/07; Arndt 2007, 269–271.

29 FStNr. 17/08; Arndt 1998b, 198.

30 Papendiek 14, FStNr. no. 49/06; Arndt 2004c, 155–157.

31 Sachsenspiegel digital: urn:nbn:de:gbv:45:1–3571; <https://digital.lb-oldenburg.de/ihd/content/pageview/192532> (29. 07. 2019).

32 Göttingen, Weender Straße 11, FStNr. no. 17/02, Inv. no. 2908 (late 16th/early 17th century).

Fig. 6: Göttingen, fragment of decorated earthenware (Werrakeramik, late 16th/early 17th century): woman standing at a well (watercolour with graphical completion).

Since at least the 15th century, the council took more responsibility for the water supply, to which end public wells were installed in the streets, in addition to the private wells behind the houses. A Göttingen chronicle of 1734 lists 42 public ground water wells and 10 wells supplied by water pipes.[33] Archaeological evidence for such a street well was found in 1996 in the Rote Straße during the renovation of the sewage system (Fig. 7). A wooden water pipe entered a rectangular box of large sandstone slabs with a stone pavement. On the opposite side, another pipe leads the water out again. We have no remains of the upper construction, but it is likely this was the underground structure of a running fountain in the street, which is also marked on the 18th century plan.[34]

Water pipes have been in use in Göttingen at least since 1429. They were supplied by natural streams, which was possible through the natural incline of the surface. The water coming downhill from east of the town first supplied the council fish pond inside the ramparts, before the water was fed into the wooden pipes running down to a central fountain at the market place. A written source says the Göttingen fishmaster shall let water flow when the inhabitants of Rote

33 Zeit- und Geschichtsbeschreibung 1734, book II, Chapter VII, 63–65.
34 Arndt 1998a, 83; Arndt 2004a, 124.

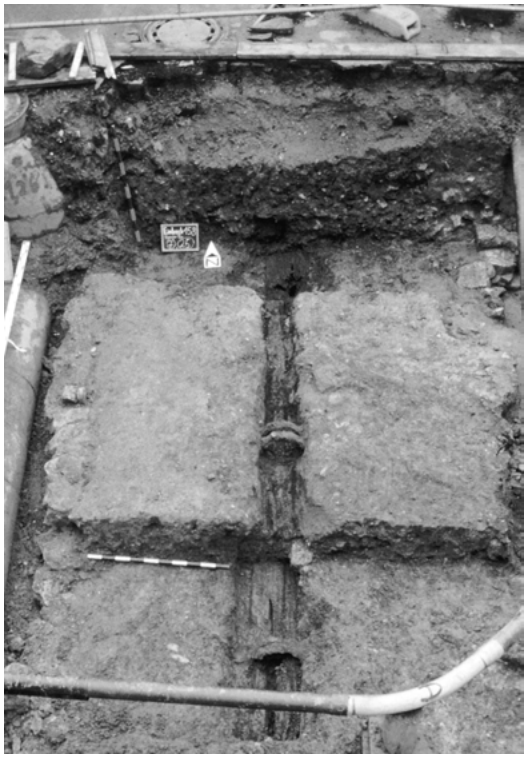

Fig. 7: Göttingen, Rote Straße, large stone box as substructure of a public well in the street, fed by an underground wooden water pipe.

Fig. 8 Einbeck, wooden water pipe near Benser Tor. The two segments are connected by a metal sleeve.

Straße want to brew beer.[35] Provision with water from outside the towns could generally be vulnerable in belligerent times (because of the necessary urban autarchy) and thus was often only additional to the private wells.

The pipes found in Göttingen were all post-medieval, but were all of the same type. A beam of oak was sawn so as to create an octagonal section. With a long metal drill, a spoon auger, the inner opening was produced. The separate parts were linked together with an iron sleeve that was punched in the wood.[36] Similar types of wooden water pipes have also been excavated in Einbeck, the oldest dating to 1440 dendrochronologically. The connecting pieces were here made of copper or copper alloy (Fig. 8). In Lübeck, apart from round pipes, long wooden boxes, rectangular in section with a flat cover, were also in use.[37] Here, the sleeves could also be made of lead. Lüneburg had to save surplus water in a pond before it could be led inside the town through wooden pipes,[38] a system known of since the late 14th century.

Wasserkünste

In addition to sampling points, wells, and an open canal, the Neustadt of Einbeck had a *Wasserkunst* since the 15th century.[39] It was necessary to lift the water into the pipes, as the flow of the surrounding streams seems not to have been strong enough. The charming German word *Wasserkunst* (literally: 'art of water', meaning waterworks) describes a technical device to lift water which is then fed into pipes. *Wasserkünste* existed in several late medieval towns, apart

35 von der Ropp 1907, 320 no. 225.
36 Arndt 2018, 295.
37 Grabowski 1994, 33 f.
38 Ring 2004, 237.
39 Heege 2002, 128.

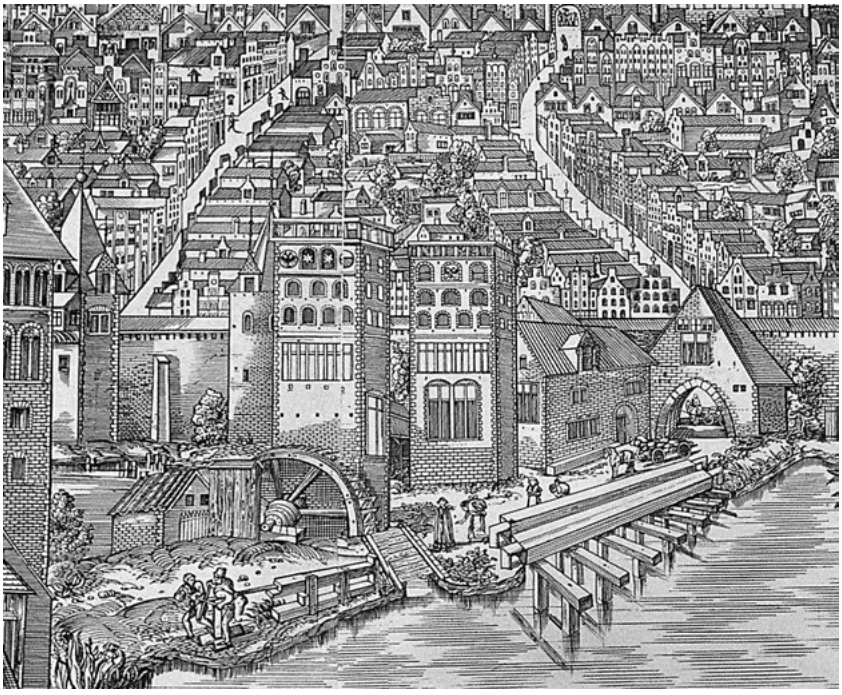

Fig. 9: View of Lübeck from Elias Diebel (1552), the two towers of the waterworks of the brewers (*Brauwasserkunst*, left) and of the merchants (*Kaufleutewasserkunst*, right) at Hüxterdamm. In the foreground wooden water pipes are being drilled.

from Einbeck, for instance, in Hildesheim, in Braunschweig, in Lüneburg, in Stade, and in Lübeck, to name just the best known.

The Hüxtertor Wasserkunst of Lübeck on the river Wakenitz is shown in a woodcut by Elias Diebel of 1552 (Fig. 9): it lifted the (previously held-back) water with a large wheel, and the water could then flow into the town through the wooden pipes with sufficient pressure. The image shows two high tower-like buildings: the Wasserkunst of the brewers on the left (*Brauerwasserkunst* of 1294) and next to it the Wasserkunst of the merchants (*Kaufleutewasserkunst* of 1533), as well as a bucket wheel that is driven by the natural flow of the river; in the foreground two men can be seen drilling the wooden pipes. In Lübeck about 1302, more than 1800 households were supplied by six *Wasserkünste*, a system that remained in use until 1867.[40] Some of the wooden pipes in Lübeck led directly into the houses, which is something we have not found in other north German towns.

Public wells, canals in the streets and water pipe systems show, that from the 15th century at the latest, the water supply became more and more a communal affair. From Einbeck we know that the neighbourhood had the common responsibility to maintain the wells and the system of pipes.[41]

Sufficient water supply was also necessary for fire protection.[42] Regulations for fire protection were important, as a fire could cause major damage in a short time, as could be seen in Einbeck, where a town fire burnt down nearly the entire old town in only four hours, killing about 400 inhabitants, in 1540.[43] In Göttingen, leather buckets for extinguishing fires were kept in the town hall; furthermore, a subsidy was paid for people to change their (dangerous) thatched roofs to tiled ones.[44] Göttingen, fortunately, remained untroubled by larger fire events.

40 Gläser 2004, 187–190; Grabowski 1994, 27–46.
41 Heege 2002, 125.
42 Brinkmann 1987, 292 f.
43 Heege 2002, 52.
44 Ehrhardt 1997, 43.

Rubbish and garbage

When the wells fell out of use, they were filled in, often with rubbish. Archaeological evidence from these fillings indicate that, in most cases, household rubbish was used, but not excreta or human faeces. In an example in the Weender Straße 48, it seems the whole household inventory was disposed of in an empty well (that had been in use since the second half of the 13th century), resulting in an enormous quantity of ceramic material and nearly no soil infilling between the pieces.[45] More than 240 complete ceramic vessels could be reconstructed, including pieces of a Meißen porcelain tea service, plus pieces of cutlery, glass bottles and vessels and the singular find of a French Dijon mustard pot, which altogether show an upper-class household of about 1760 with a well-off lifestyle. No wooden material was found, however, and no noble metal. It is clear that only selected material was thrown into the former well. The criteria of this selection process, however, are to a great extent, unknown to us.[46]

A smaller part of the household garbage was disposed of also in cesspits. Originally, these were built for use as toilets, to get rid of human excreta and faeces in the narrowness of the towns. In Göttingen, most of these cesspits are stone lined and square or rectangular, sometimes vaulted. In the poorer areas, old barrels without a bottom and cover were also used for this purpose.[47] For Göttingen we can say that the number of wells on private plots is significantly lower than the number of cesspits, as far as can be seen in the archaeological evidence. It is also clear that far from *all* rubbish was thrown into cesspits or unused wells. Here again, the selection process that decided which object was to end up in a cesspit (and which was dumped somewhere else) is basically unknown to us. Maybe wet and unhygienic things like pots with rotten food were disposed of here, as well as broken sherds that could potentially cause harm.[48]

The problem of dirt and rubbish lying around in the streets was addressed by the town council in most towns, and several regulations and penalties concerning this problem existed.[49] In Göttingen, the *dreckwagen* – the rubbish cart – came and took the rubbish outside the town. Everybody was supposed to help with it, as the statutes of 1468 make clear:[50] *When the rubbish cart (dreckwaghen) comes to the door in times when the rubbish is driven out, everybody shall help to put the rubbish in front of his door in heaps and load it on (the wagon).* Violation was fined with a penalty of 6 penninge (pennies).

From 1458 on, a streetmaster overlooked the cleanliness of the streets. Rubbish was also classified into different categories. Everybody had to clean up the dirt in front of his house and was not allowed to put it in front of other houses, but had to bring it outside the town wall. Dung was not allowed to lie longer than two days; when a roof was renewed, the thatch might not lie longer than three days (surely also to prevent fires). Wood was not allowed to lie in the streets at all. Slaughtering in the streets was forbidden, tanning only allowed in one's own yard.[51]

To see all these regulations as a sign of ignorance about dirt and generally unhygienic conditions in medieval towns, as is often and repeatedly stated, is clearly wrong and is seeing things in too simple a way. Surely, any ban on swine and cattle inside towns, for example, could not be enforced for several reasons, so the problem of dung existed and had to be managed. Rules were imposed and the streetmaster was installed to make sure they were observed.

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45 FStNr. 22/08; Arndt – Gößner 2007, 22–24.

46 Arndt – Gößner 2007, 22; Arndt 1999a, 54 f.

47 Arndt 2004b, 138 f.

48 Arndt 1999b, 105 f.

49 Thoughts on the spread of rubbish and its cycle in medieval towns were expressed early by Keene 1982; more recent thoughts on rubbish, health and environmental impact can be found in Evans 2010. For Göttingen: Arndt 1999a.

50 von der Ropp 1907, 117, 7 (1420); 298 IV, 51 (1468).

51 Arndt 1999a, 58–61.

The existence of expensive cesspits shows that human faeces were seen as unwanted, if not as hazardous, too. The closeness of ground water wells and cesspits in medieval towns is also often described as an expression of ignorance that will have resulted in very unhealthy conditions. However, the contamination of ground water by chemical or bacterial pollution from human excreta through the earth is limited, and also dependent on the direction of the ground water flow (and any possible contamination is never upstream from its source). A study by the World Health Organization found that the bacterial pollution grows for about five metres' distance, but will decline again in the next six metres, while the chemical pollution can scatter into a much wider area.[52] It seems that the pores in the soil lock up after some time. The pollution of the surroundings by a cesspit is therefore limited in time and space. Apparently, this can be observed in excavations, when a 'ring' of differently coloured earth around a cesspit is clearly visible. In some cases, cesspits were deliberately sealed with clay impervious to water.[53] Vermicular eggs, often found in cesspits, will not migrate through the earth into a nearby well at all and are not taken in with drinking water. An infection with endoparasites is nearly always connected with poor hygiene in food intake, which means quite simply not enough hand washing or eating uncleaned fruit or vegetables which were treated with dung, or by eating raw or undercooked meat or fish. Even when it is still not advisable to have a cesspit and a well at a small distance from each other, the danger might be overestimated and falsely generalized from our modern hygienic point of view.[54] In addition, the threat of bacterial (and chemical) pollution, for instance, was unknown in medieval times, whereas bad smells were regarded as harmful and were therefore a topic of legislation and controversy of neighbours. It could only be seen as ignorance on this topic, when the danger of water pollution through industrial or household garbage or through faeces would have been fully known and understood.

In some towns, rules existed for the location of cesspits in the yard – demanding a minimum distance to the neighbouring plot. These rules are based on the Sachsenspiegel and can also be found in local legislation. In Göttingen, latrines in the ground had to be three feet away from the neighbour's boundary, latrines over ground seven feet.[55] The cesspits were often placed at the far end of the yards behind the houses, but could also be found under rear buildings.

We also know that water quality was monitored. This might be the reason why some wells were finally filled in with garbage and closed. Clear and sweet water was praised in reports of visitors and contemporaries.[56] Information on cleaning, maintenance, repairs and technical improvements of wells and water supplies is also known from many towns.

Not least, many towns had a large central fountain, which was an adornment for the whole town. One of the oldest of its kind in Germany is the Romanesque market fountain in Goslar (Fig. 10): two large basins entirely cast of bronze[57] (of the 12th century or around 1300, respectively) with a decoration of fabulous creatures carry a gilded, crowned imperial eagle. In the early 14th century, this fountain will not only have been of enormous value, but the fact that it is highly decorated and that it stands on the market place shows the importance of clean and free fresh water – it was something the burghers were proud of.

In 2013, the foundation of Göttingen's famous Gänseliesel Fountain in front of the historical Rathaus (built in 1270) was excavated. The fountain, only built in 1902 and still a landmark of the townscape, was moved from the centre to the margin of the marketplace in 1968, leaving the old foundation in the ground.[58] On this occasion, the remains of a round sandstone basin of the first market well from 1568 were also found, as the oldest of three successive market

52 Wagner – Lanoix 1958, 28 f.; Arndt 1996a, 13; Arndt 2004b, 142 fig. 9.
53 Arndt 2004a, 126; Arndt 2004b, 138.
54 On water conditions and assessing health hazards in medieval towns: Röber 2016, 32.
55 von der Ropp 1907, 13. 53.
56 Zeit- und Geschichtsbeschreibung 1734, book II, Chapter VII, 65–67. 132–135.
57 Goslar on the Harz was head of the famous Rammelsberg mining region (now world heritage site).
58 Arndt 2014, 318–323.

Fig. 10: Goslar, the Romanesque Market fountain. The two basins are cast of bronze and decorated with sculptures.

wells. At least from the 17th century on, a 'pipemaster' (*Röhrmeister*) was paid to take care of the well and the pipes leading to it. The large basin also served as a reservoir for firefighting water.[59] A chronicle describes a stone lion in the middle and water that poured down from it through small pipes. Its water is portrayed as *light and clear and with a lot of little bubbles*.[60]

Altogether, it may be said in conclusion that water has been an important feature in towns from medieval times on up to the present age. The inhabitants were not at all ignorant as to the quality of water; on the contrary, water has always been monitored and attended to in several ways, and became more and more a matter of communal responsibility, as a service of general interest.

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59 Ehrhardt 1997, 60 f.
60 Zeit- und Geschichtsbeschreibung 1734, book II, Chapter VII, 66.

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Ulrich Müller

14 Harbourscapes

Three Examples from Early to High Medieval Northern Europe

Abstract: The port as an interface between the town and its (maritime-fluvial) hinterland is a place of complex spatial interactions. Habourscapes take this multidimensionality and multivocality into account. In this paper, the concept of habourscapes is presented to describe the multidimensionality of ports as an urban area. Starting from Appadurais' concepts of (-)spaces and (-)flows, the contribution attempts to explore five 'scapes' to present multiple interwoven practices. This is done using three examples (Haithabu, Schleswig, Lübeck), which paradigmatically represent specific 'development phases' of urbanity as well as specific 'port types'.

In the travel journal of the Norwegian merchant Ottar and the Anglo-Saxon Wulfstan, which was inserted into a translation of Paulus Orosius' *Historiarum adversum paganos* made around 890, we find evidence of one journey made by Wulfstan in the geographical introductory chapter: *Sciringes heale he cwæð þæt he seglode on f dagan to þæm porte þæt mon hæt æt Hæþum, se stent betuh Winedum 7 Seaxum 7 Angle 7 hyrð in on Dene*.[1] Helmold von Bosau completed his *Slavenchronik* (*Chronica Slavorum*) around 1167. After the Slavic centre of Buku was destroyed, Count Adolf II von Schauenburg sought out a location where a new city might be founded. He chose a 13 m high moraine, set between the Trave and Wakenitz rivers. In the year 1143, there was a port at this location: *Videns igitur industrius vir competetiam loci portumque nobilem cepit illic edificare civitatem vocavitque eam Lubeke, eo quo non longe abesset a veteri portu et civitate, quam Henricus princeps olim constituerat*.[2] In the Schleswig town charter laws, codified circa in 1200, the Schlei inlet is noted as a royal body of water in § 86.[3] Whoever might wish to erect a building on the waterfront needed the approval of the bailiff. Whether travel journal, chronicle, or legal written source, all three of these historical documents not only name concrete geographical locations, they also all mention the port as an interface between the sea and the city. According to Carsten Jahnke, a port is a

> *rechtlich definierter Landungsplatz an einem Gewässerabschnitt [...]. Die rechtliche Entwicklung des Hafenbegriffes ist mit der Ausbildung des Stadtrechts verbunden. Im Hafen gewährte der Landesherr periodisch oder ganzjährig Fremden Kaufmannschutz [und] Marktschutz [...] sowohl auf dem Land als auch zu Wasser. Dieses setzt gefestigte Vorstellungen über die Eigentumsverhältnisse über Flüsse, das Meer und die Strände voraus*.[4]

Port and harbour cities have been centres for trade, culture, and commerce since time immemorial. Wulfstan and Helmold show us that the location of a harbour plays a decisive role: geographical factors such as accessibility and water-depth, currents, and wind favour the development of a port. However, both of these texts, as well as the Schleswig town charter, show that a political culture favouring maritime trade can also promote this development.

Urban agglomerations can be identified as 'hubs' within dynamic networks. By constituting foci of cultural, social, political and economic forms of interaction, 'urbanscapes' stand out

1 'From Sciringes heal he says that he sailed for five days to the port town that was called *Haepum* (Hedeby), which is located amongst the Wends and Saxons and Angles and is property of the Danes'. Batley 2007, 47.

2 Helmold 1, 57, 8–16.

3 Jessen 1996.

4 '[...] legally defined mooring located by a body of water [...]. The legal development of the idea of a port is bound to the development of the municipal laws. A ruler could extend periodical or all-year-round protection to foreigners engaged in merchant or trade activities, on the shore as well as on the water. This requires set concepts concerning the ownership rights held over rivers, the sea, and shore'. Jahnke 2011, 649–652.

https://doi.org/10.1515/9783110677065-014

against their environment. The port is an urban subspace with a very unique face. It is a hub of multiple flows of people, objects and ideas that are more than just an expression of economic relationships. Ports are hubs for global commercial and socio-cultural relationships – this is not only true for our modern societies, but also for their pre-modern forebears.[5] As intersections between water and land – seas and rivers on the one hand, and cities, roads and hinterlands on the other – they have always facilitated local and long-distance transportation, as well as the trading and movement of goods, knowledge, and people. 'Harbourscapes' are understood in the following text as spaces formed by action ('doings'), perceptions and interpretations ('sayings').[6] The material and immaterial 'Designs' resulting from this process can be explained as the consequences of practical needs and lifestyles, that for their part are based on both habits of perception and historical constellations.[7] Haithabu, Schleswig, Lübeck are all three typical ports of their time. At the same time, they represent universal dimensions which are best represented by the concept of 'scapes'.

'Scapes' is an omnipresent term in cultural studies and medieval history.[8] Thus terms such as 'urbanscapes', 'riskscapes', 'heritagescapes' or 'commodityscapes' are common.[9] Despite all their differences, they share a capacity to put our relational views of, on, and concerning a topic into perspective. 'In analogy to the notion of landscape, the new terminology carries a spatial connotation that points to the ambiguity and fluidity of social phenomena. Against the backdrop of increasing global connectivity and flows, it conceives of space in terms of relations'.[10] The concepts of the Indian anthropologist Arjun Appadurai form a direct or indirect point of reference for various 'scapes'. Appadurai describes globalisation in the form of dynamic currents of people, technologies, finances, media, and ideas ('ethnoscapes', 'technoscapes', 'financescapes', 'ideoscapes', 'mediascapes').[11] At the same time, these five currents of globalisation are also components, just as individuals and groups of people construct a notion of their own movements in the global context: 'worlds that are constituted by the historically situated imaginations of persons and groups spread around the globe'.[12] As consistently as Appadurai emphasises these relationships in a global society, his concepts cannot simply be applied unmodified to pre-modern societies: it is especially difficult to find evidence of his postulated separation of the nominated fields.[13] In archaeological scholarship, Appadurai's approach has been most significantly received with a particular focus on methods of attribution, as well as being taken up in the course of network-turns and modified in the service of assemblage theory.[14] A detailed discussion of Appadurai's concept for archaeology is definitely still pending, but – and here lies its epistemological value – this concept can help us to emphasise the interconnectedness of global (cultural) landscapes and local (commercial) spaces in the sense of a *glocalisation*. In times of medieval globalization and complex connectivities, habourscapes are an example that

5 Cf. North 2016; Borgolte – Jaspert 2016; Blockmans et al. 2017; von Carnap-Bornheim et al. 2018; Elvert – Elvert 2018. For a comparative approach, see Stanley et al. 2012.

6 Christophersen 2015, 125–128; Brugger et al. 2018.

7 In the following text, the term 'harbourscapes' will be used to express the meaning of a harbour in a way that reaches beyond its function as a mooring place for ships, and into the multiplexity of the whole harbour area. Because of the commonly made, but only loosely defined differentiation between 'harbour' as the mooring grounds, and 'port' as the wider area, the precise term used should be 'portscapes'. 'Harbourscapes' is used above all as a concept in current city planning, cf. Russo 2016.

8 For example, Fouquet et al. 2018; Kooij 2018.

9 For example, Knox 1995, 6: 'Commodityscapes produced by flows of material culture that encompass everything from architecture and interior design through to clothes and jewellery'.

10 Müller-Mahn et al. 2018, 195.

11 Cf. here Appadurai 1990, 329–331. For criticism of the concept, see for example Heymann – Campbell 2009, 134–139.

12 Appadurai 1996, 33.

13 Müller 2017a, 17–21.

14 Müller – Schurr 2016, 218–220.

global and thus location-independent 'scapes' can be found in specific places. In the following, three different ports with their specific structures will be outlined and finally discussed in terms of the 'scapes' concept.

Three harbourscapes

Haithabu, Schleswig und Lübeck (Fig. 1) are not only distinguish themselves by their geographical proximity in northern Germany, but are also seen in scholarship as prototypes for specific urban configurations and the globalised societies of the Early and High Middle Ages. Haithabu and Schleswig lie at the end of the Schlei, an approximately 42 km long fjord in the south-eastern part of the Jutland peninsula. Lübeck is located about 17 km from the Baltic Sea, between the Trave and Wakenitz rivers.

Even though the legal (sovereign) aspect was, and still remains, decisive in the development of a port, the setting created by a favourable topography should not be underestimated. Thus Helmold states: *Nam ex una parte Trabena, ex altera Wochniza preterfluit, habens uterque paludosam et inviam ripam. Ex ea vero parte, qua terrestre iter continuatur, est collis contractior, vallo castri prestructus*.[15] The question of historical water depth is crucial for harbours on the coast, as also for other sites near the coastline. Reliable data exists for the Schlei in particular. In the Early Middle Ages, the water level stood at 0.80 m below the mean sea level (MSL), in the late 10th century a depth of about 1 m below the MSL was recorded, and circa in 1100 the water level stood at approximately 0.2 to 0.3 m below the MSL.[16] It has also been possible to reconstruct the shoreline of the river Trave, and its historical topography.[17]

Haithabu (Fig. 2) is recognised as a synonym for centres with urban structures, and has been variously characterised (according to individual perspectives and levels of research) as a proto-city, a trade and crafts centre, a hub for maritime commerce, and as an *emporium*.[18] The universally optimal location on the east-west and north-south transport routes not only transformed this place into a key point in the traffic between the North Sea and the Baltic Sea, but also between continental Europe and Scandinavia. The written sources provide evidence in every respect for the significance of the location. Haithabu is a comprehensive settlement complex and part of a settlement landscape characterised by both limnic and maritime activities on the Jutland peninsula. The undeveloped acreage (circa 27 ha) within the Haithabu *Halbkreiswall* (a semi-circular wall erected in the later 10th century) and the surrounding area were already

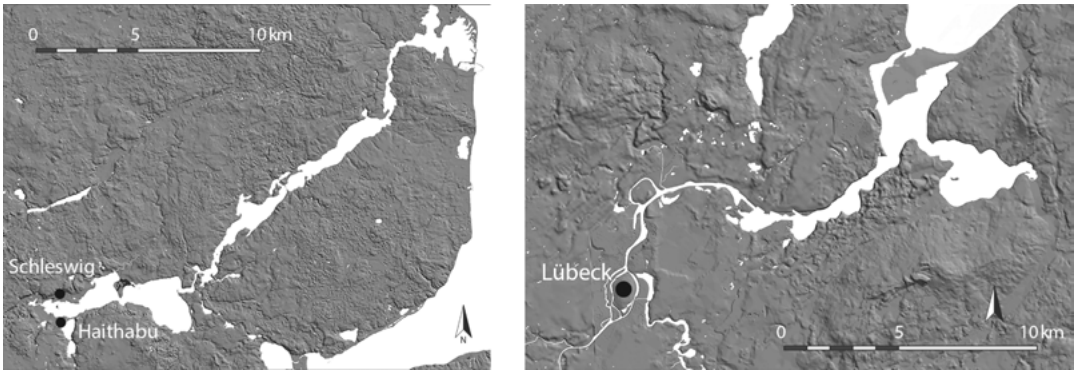

Fig. 1: Location of Haithabu, Schleswig and Lübeck.

15 Helmold 1, 57.
16 Rösch 2018, with further details.
17 Kräling 2019, 43–52.
18 Kleingärtner 2014, 68–72; Kalmring 2016.

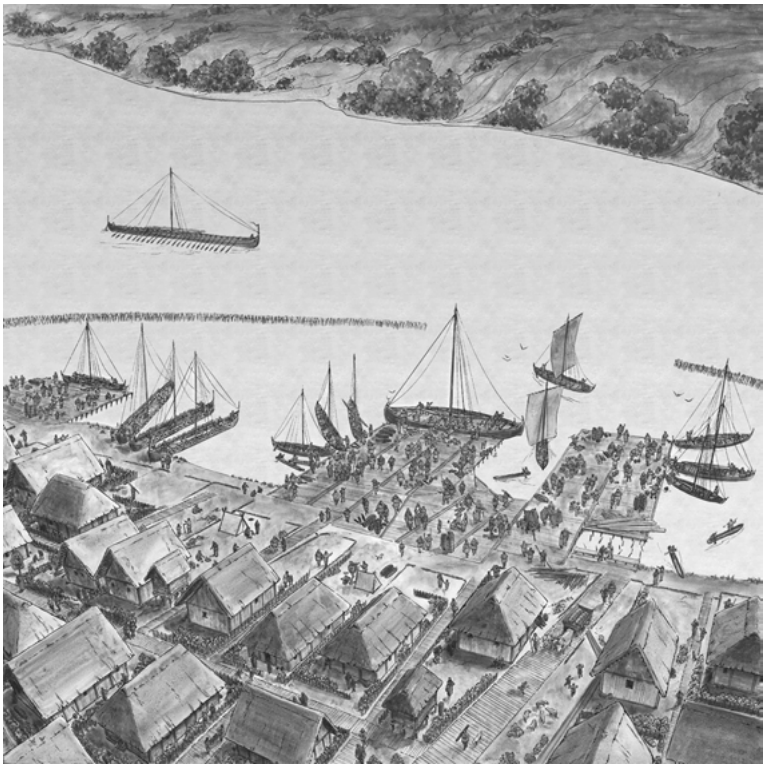

Fig. 2: Haithabu, reconstruction of the port in the 10th century.

the subject of comprehensive excavations at the end of the 19th century, the results of which were systematically presented. The prospection and geophysical testing performed within the wall from the 2000s onwards have provided research into Haithabu with a new impetus as regards assessment of the population density and settlement structure, and also regarding the question of the settlement's intended function.[19] It is now assumed that there was a fairly dense level of building development. While the cemeteries were already the focus of archaeological research quite early on, academic interest in the harbour was roused following the recovery of two wrecks in 1953 and 1980. A total of approximately 2200 m^2 of the shallows and shoreline areas were examined during 1978/9, and these excavations were presented in a fundamental new analysis by Sven Kalmring.[20] Even before the development of the first harbour building works, there were recognisable activities taking place in Haithabu during the middle of the 9th century that Kalmring has connected to a hithe.[21] The water's edge was used for various activities. During the following years, we can observe developmental phases consisting of the raising and levelling of the land, as well as protective measures in the waterside areas. The building works covered an area of approximately 1800 m^2 and can be dated between 817 and circa 885. To the side, in the southern part of the site, these measures can be divided into four developmental phases. Here, the ground level was raised in about 823 or later and 890, and the port area was pushed back around 11 m into the lagoon. The period of actual port construction began around the end of the 9th century (Fig. 3). After this, a secure access route to the jetties was created. The first jetty was completed around 865, and sometime between 865 and 884 this was then connected with the pre-existing building to create a 'platform'. The succeeding building measures also enlarged the port structure. This step-by-step building process and the extension into the lagoon created a closed frontage by the end of the 9th century. At the

19 Hilberg 2018.
20 Kalmring 2010.
21 Kalmring 2010, 265.

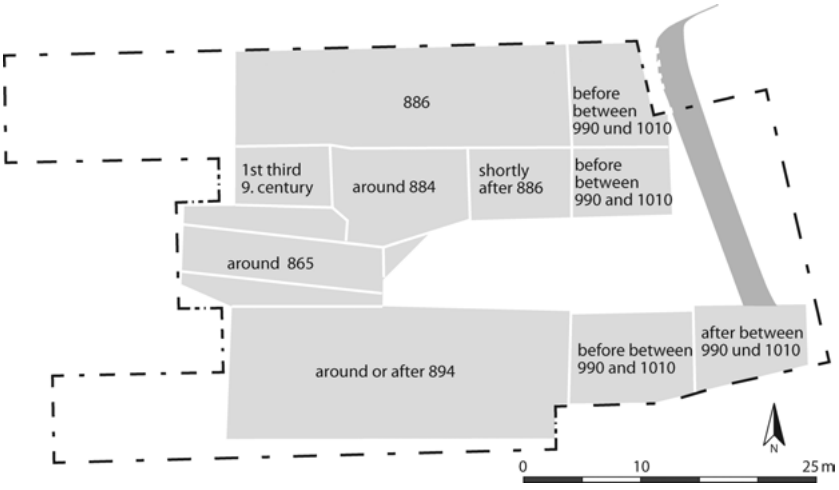

Fig. 3: Haithabu, development phases of the harbour based on archaeological excavations.

bridgeheads, this offered mooring possibilities for ships with a deeper draught, and also offered smaller boats the possibility of mooring alongside. It is conceivable that in this way a spatial separation of local and long-distance shipping was formed.

According to Kalmring, the use of the harbour area for the dumping of waste meant that the necessary water depth for appropriate ships was gradually reduced until it was no longer available.[22] This is the only explanation for the further developments that took place at the end of the 10th and beginning of the 11th centuries, after which the pier comprised a surface area of 1475 m^2. In this case, there was less dumping of waste from the settlement, and rather more 'commercial waste'. This included shipping equipment and ballast weights, as well as evidence of maintenance and repair work for ships and the port buildings. Last but not least, a certain amount of cargo went overboard during the loading and unloading processes.

The geophysical testing and systematic inspection of the *Halbkreiswall* begun in the 2000s have yet to provide evidence of any free spaces that could have served as a marketplace. This, and other comparable finds, gave Kalmring reason to accept the idea of a harbour market. Detlev Ellmers used the term *Ufermarkt* (beach market) to signify general areas with evidence of trade or bartering.[23] However, Kalmring in particular has made the effort to create differentiated terminology. Harbour markets are markets located within port facilities;[24] in contrast, beach markets are specifically connected with the actual landing places. The harbour market of Haithabu would have been situated on the platforms themselves. The almost closed-off area, as well as the characteristic nature and distribution of finds such as coins and weights here, all support this theory. Furthermore, the platforms also offered space for storage and the display of goods – whether short-term for products like canvas and fabrics, or long-term, as might be assumed for ballast weights.

While there is ample evidence of the economic and related logistical functions of the port, its further uses are a matter of speculation, or rather very difficult to prove. Thus, a harbour is always a judicial space, or it may be used for military purposes. Social differentiations are part of everyday life in the port, just as the port itself has a place within an ecological system. These varied and in part interwoven uses may be discussed with reference to particular finds or groups of finds, but it is still not easy to move from general statements to real knowledge in terms of individual cases. The harbour of Haithabu was an urban space since at least the 10th century, indistinguishable at first glance from the rest of the urban structures surrounding it. This

22 Kalmring 2010, 440.
23 Ellmers 1990, 104–107.
24 Kalmring 2010, 443–448.

space nonetheless displays a relevant internal differentiation, and not only through the actual logistical features of the port (land bridges, storage, market). Even if we knew the precise details and, most importantly, the functions of the waterfront building developments along the west-east route, we would still be permitted to assume that this development included functional zones that corresponded with the activities of the port. One fact remains fundamental to our understanding of the *emporium* here, which is that the marketplace, with all of its various functions, was not separated from the platforms.

Haithabu as an emporium is very strongly focused on supra-regional connectivity. The development of the port over 200 years reflects both the different intensities of these relationships and the fact that it was always a hub in maritime networks.

Schleswig is referred to as a *civitas* in the written sources.[25] Set opposite Haithabu on the northern side of the Schlei, the city was the southernmost centre of the Danish kingdom between the second half of the 11th century and the mid- to late 12th century.[26] Schleswig was located in the north-western section of the innermost Schlei, on a hilltop formed by Pleistocene deposits and with a maximum height of 8 m. Today, the old city covers approximately 16 ha. Prior to the anthropogenic sedimentation of the west-lying *Königswiesen*, the location's historical topography was that of a pouch-shaped peninsula with a surface area of about 10 ha. Systematic archaeological research into Schleswig was initiated at the beginning of the 1970s, whereby the excavation of the historical waterfront areas accounted for the largest excavated surface area. These excavations were the subject of a new analysis by Felix Rösch in 2018.[27] Now, as before, there remains controversy as to when and how the 'move' from Haithabu to Schleswig happened and which areas of the peninsula were concretely developed during the 11th century (Fig. 4.1). On the grounds of a new analysis of the written sources, the historian Christian Radkte supports the thesis that Schleswig already existed in the first half of the 11th century.[28] The earliest archaeologically observable development is the creation of at least six distinct plots of land in the period around 1070. This may be considered the most chronologically meaningful evidence for the initial settlement of the peninsula. In any case, the settlement areas along the Schlei were systematically developed (Fig. 4.2). The plots established during the 1070s were about 6 to 10 m wide, and it is posited that they extended some 15 to 25 m to the north. In the beginning, these plots of land were probably already divided by ditches and fences, and lay about 4 to 5 m from the shoreline. Plot 2 is exceptional, with a width of approximately 20 m and a significantly different orientation to the others. From 1076 on, the first fundamental changes took place. Thus, some of the land plots were extended in the direction of the Schlei's shoreline, and to the east a road running parallel to the shore was constructed. On the one hand, these building measures opened up access for all of the plots along the shoreline, but on the other hand, they restricted any further extension in the direction of the Schlei. The road, with its west-east route, created a corridor for interaction that not only opened up the area to the waterfront, but also connected the plots of land to one another. If we assume that the plots were individually managed, from this point on the road would create, as it were, a 'public space'. It is reasonable to agree with Rösch when he assumes that this development was probably the result of a royal initiative, or at least required royal permission. At the same time, some individual initiatives can be observed. For example, the construction of the road progressed in two directions, and a misalignment can be seen at the juncture. One engaging question that remains as yet unanswered is whether this road continued westwards, connecting to an access road in the direction of the Schlei.

25 Radtke 2017b.

26 On the archaeology and history of Schleswig, see most recently Müller 2016, 346–350 and Rösch 2018, 35–38 with further details.

27 Rösch 2018. The following explanations are based on Chapter 9.

28 Radtke 2017a.

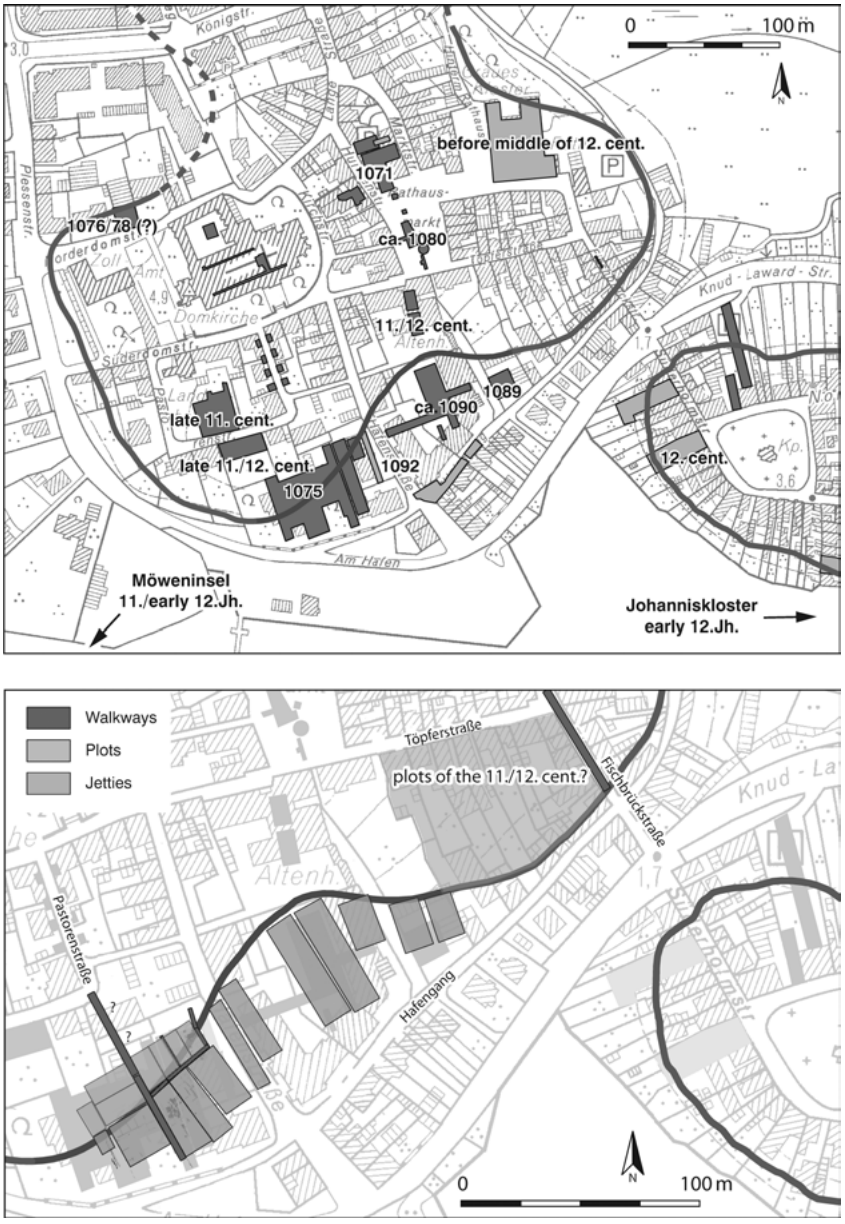

Fig. 4: Schleswig, Old Town,
1: Excavations with features of the 11th century.
2: Walkways, plots and jetties in the harbour district.

From the beginning of the 1080s, both consolidation and land-filling works took place along the road and on the southern borders of the land partitions. These works definitely aimed to consolidate the area as a building site, forming the foundation for further development. In the year 1085 these works were completed. The erection of a jetty, though quite small, at least optically marks the aspiration to build out into the shallows. Within four years, the area of the original land partitions had been opened up with individually executed dam constructions. The extent to which these dams actually served as mooring places is questionable. Because the water depth remained shallow during this early phase, it was hardly possible for ships with a deeper draught to dock here. Apart from the theory that such ships docked anchored at the mouth of the inlet and were unloaded there, these dams also constituted a measure against the restricted space available on the peninsula. In the following period they also served as multipurpose spaces, as is reflected in the different forms and uses of the buildings found there. Hearths, cesspits, wells, stalls for domestic animals, and ovens signify that some dams were used as living space, while others served as space for workshops for crafts and trades. The jetty built

Fig. 5: Schleswig, Old Town, reconstruction of the port around 1100.

out onto the Schlei in front of platform 2 is especially noteworthy, as it clearly served as a marketplace. Beyond the existing connection to the shore, there is a visible public road, which not only extends towards the north, but also reaches out into the Schlei. Following this, the building developments continued through the 1090s. In many places the dams were extended into the shallows. In addition, there was an increase in the density of buildings on the shoreside. By the mid-1090s, these building measures were completed to the point where a step-like terracing of the dams had been created. These terraced dams extended about 8 m out into the Schlei in the western area, and up to about 18 m out in the eastern area. At the end of the 11th century, approximately 25 years after the initial building work began, further and more comprehensive building and restructuring work on the land plots, the dams, and the roads was undertaken. The harbour district reached the apex of its development. A reconstruction from the period around 1100 allows us to observe the area's complexity and differentiated forms of usage during that time (Fig. 5). Platform 2 (measuring about 20 m in width) and its dam-like extension have been referred to as the marketplace on the basis of the very low building density, the remarkable distribution of finds, and the background provided by written sources and analogous finds. These waterside developments meant that from 1095 on, mid-sized cargo ships could also be despatched without problems. The docking area was now equipped with such docking facilities along a total length of 300 m. We know relatively little about the form of the rest of the city during the second half of the 11th century. Nonetheless, there is evidence of settlement activity across the whole peninsula from the 1070s onwards. Even though clear traces of the cathedral building, parish churches, and the *aula regia* only date from the 12th century, cemeteries, churches, and buildings of state must have belonged to the earlier topography. Analogous to Haithabu, the harbour market in Schleswig created a situation whereby the port area was directly connected to the urban areas of the city.

By the end of the 12th century, an increasing amount of restructuring could be observed in the city, demonstrating the area's decrease in significance between the second half of the 12th century and the period around 1200. In current scholarship, these changes are taken as evidence of the decline of Schleswig during the 13th century, seen in connection with a system-

atic reconstruction of the city.[29] In the course of these structural changes, an inner-city marketplace was created, built on a plot where a church and its cemetery had stood since the late 11th century. At the end of the 1230s, large areas of the port were given up. A Dominican monastery was erected in their place.

Since the second half of the 11th century, the city of Schleswig had been a centre for trade between eastern and western Europe, but also an important connection between the Scandinavian and continental markets. Schleswig was the southernmost Danish metropolis, and because of this it functioned as a flagship. Here at the intersection of land and sea there arose a space for interaction that corresponded to the *portus* and *locus celeberritimus* recorded in the written sources. In Schleswig, the change from a seaside town still in the early medieval tradition to a high medieval town can be traced. Schleswigs' habourscapes are an expression of these changes, which are, however, linked to completely new directions by the loss of significance around 1200.

The city of Lübeck lies around 17 km from the Baltic Sea. Lübeck is a 'hotspot' for both historical and archaeological scholarship, where the development of a high medieval port city and a Hanseatic city with a very particular type of urbanity can be almost paradigmatically observed.[30] The relevant historical interpretations are based, above all, on the statements of the chronicler Helmold von Bosau. He not only reports on the harbour, but also describes the founding of the city in 1143 by Adolf II von Schauenburg. Following an historically recorded fire in 1158, Heinrich der Löwe founded the legendary *Löwenstadt*.[31] The status of a free city, granted in 1226, but also the period of Danish rule between 1201 and 1227, gave the city decisive momentum to become the Queen of the Hanse.[32]

The *Altstadtinsel* of Lübeck lies between the Trave and Wakenitz rivers. The historical topography of the raised, approximately 100 ha river-island is very different from that of today, but this can be reconstructed very well with the assistance of LIDAR scans and drillings. Until the 13th century the areas near the water were characterised by large marshlands. This held especially true for the lowlands of the Trave, which were first made accessible thanks to land reclamation undertaken from the 13th century on, and which led to building developments that reached all the way to the rivers.

At the time of the city's foundation, there were extensive lowlands, characterised by coves and found especially in the north of the old city island. In the area between the later Alfstraße and Braunstraße, there was a plateau that offered an attractive space for settlement, reaching eastwards from the steep drop into the lowlands of the Trave river to a further terrace in the terrain (Fig. 6).

The analysis of the 2009–2016 excavation, presented in 2019, gives us an entirely new image of the city's early development and the related harbourscapes. The excavations to the north and south of Fischstraße revealed eleven approximately 15–20 m^2 wattle-and-daub buildings aligned with the shore and shielded to the north by a ditch. In the rearward section to the north-east, there was also evidence of an open, square-shaped area (Fig. 7).

The 14-C data (2 Sigma) date these to between 1080 and 1130. Hence, there are buildings and constructed spaces that clearly pre-date the founding of the city by Schauenburg. This could be an 'ältere Filialstelle oder gar potentielle Verlegung'[33] of the Slavonic settlement *Alt-Lübeck*, which was destroyed in 1138. It is also conceivable that this was a permanent or temporary settlement area for Saxon merchants, in which case the location should be referred to as a

29 Müller 2016, 253 f.
30 Müller 2017b, 710; Jahnke 2019 with notes on historiography.
31 Helmold 1, 86.
32 Jahnke 2019, 226–229.
33 Rieger 2019, 78.

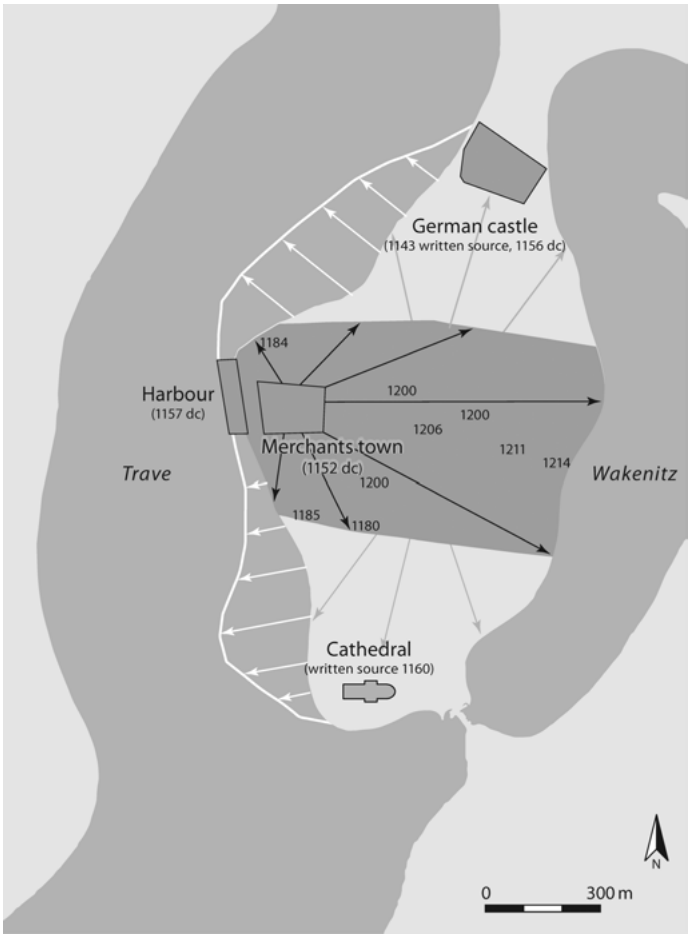

Fig. 6: Lübeck, Old Town, reconstruction of the urban development.

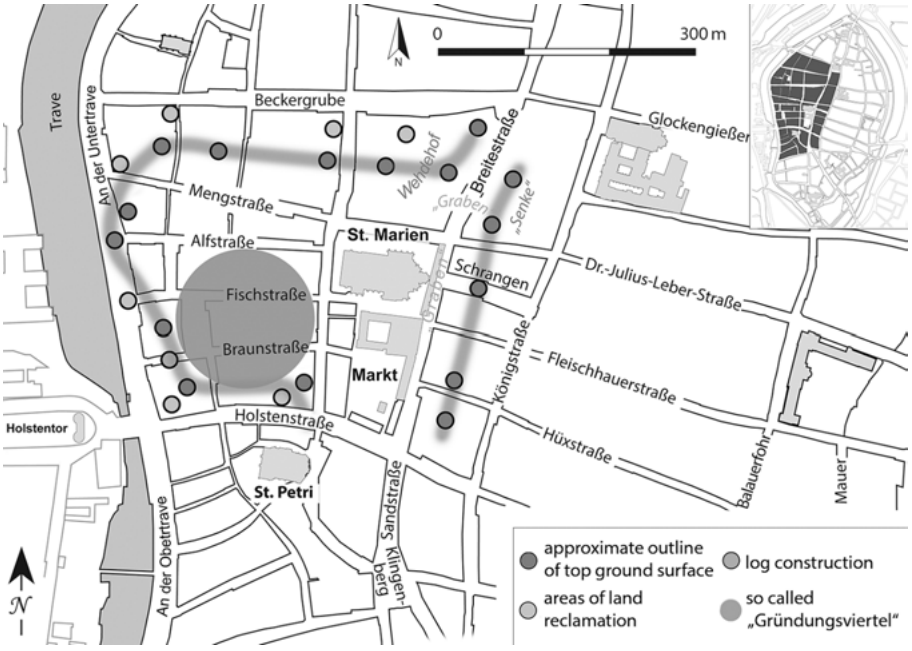

Fig. 7: Lübeck, Old Town, reconstruction of the earliest settlement.

vitte – a medieval place of (fish)-trade.[34] Even if there is no direct evidence of a landing, a shallow drop to the Trave river and a wide beach zone are visible, and these ought to have made this an ideal landing location. In connection with this, Dirk Rieger brings the question of an early merchant's church into play.[35] The open space can certainly be defined as a public space. Comparable finds from this space point to its use as a marketplace. Here it is important to note that the concept of the marketplace was not limited to the exchange of goods, but rather included many other kinds of material and immaterial practices and interactions.

Count Adolf II von Schauenburg's founding of the city has influenced the historical and archaeological scholarship on this topic for more than a hundred years, and led to four different models of the early *civitas*.[36] Archaeologically speaking, Schauenburg's founding of the city can be divided into two phases, both of which are clearly connected to the older waterfront settlement. The first phase matches the date of about 1143 for the city's founding, the later phase dates from the mid-1150s. In contrast to the apparently quite informal layout of the early waterfront settlement, the building measures from 1143 onwards seem planned. A planned approach is observable in the scheme whereby the architecture of the main buildings is orientated towards the street front, with both open and built-up courtyards, as well as in the general infrastructure. In this way, it appears that the architecture from Schauenburg's time was most likely individually executed, whereas the buildings from the later phase seem to have been strictly standardised. The orientation of these blocks of buildings in relation to the harbour is striking. Taken together, these factors indicate that there was a master plan that reached well beyond individual properties, since under Adolf II there was definitely expansion in the settlement, or perhaps even the creation of a structured settlement enclosure, with buildings partitioned into blocks. It is plausible that such measures could only have been implemented by royal decree, or through the representatives of the King. The Slavic invasion of 1147 created a turning point in these activities. Even if the effects of this event are assessed differently by various scholars,[37] it is clear that more than just the building structures changed during the second 'Schauenburg-phase' in Lübeck. The construction of an open space for a (later) forum at the top of the old city intentionally created a new space for interaction. Nonetheless, it is assumed that just as before, the majority of exchanges took place in the beach market, and it was only during the first thirty years of the 13th century that the new inner-city market achieved the status of a main market.

Although there is no concrete evidence of a harbour pre-dating the Schauenburg-period settlement of the waterfront, consolidation measures were taken in the flood zone during the course of the mid-12th century (Figs. 7–8). This included pole pilings around 1157. During or after 1164, we can see evidence of land reclamation to the north of the outcrop. This area, which remained largely undeveloped, is currently interpreted as a beach market set upstream from the original settlement.[38] There was expansion during the following decades, including more land reclamation and the construction of a bulkhead. Used as a quay, this made it possible for ships to moor alongside. With a length of at least 200 m, this created a harbour-front that would have been completed by the end of the 13th century at the latest. It was also part of the seaport and, according to statements in the written sources, lay to the north of the Holstenbrücke.[39] D. Rieger and I. Schalies understand these measures as parts of a master-plan that aimed for expansion right from the foundation of the settlement, and ultimately had the whole of the old city island

34 On this, Rieger 2019, 75–79. The finds also point in this direction, as do Rieger's considerations concerning the possibility of a church of St Clement.

35 Rieger 2019, 73 f.

36 Rieger 2019, 83 fig. 43.

37 Rieger 2019, 89.

38 Schalies – Rieger 2019, 56.

39 Schalies 2014, 165.

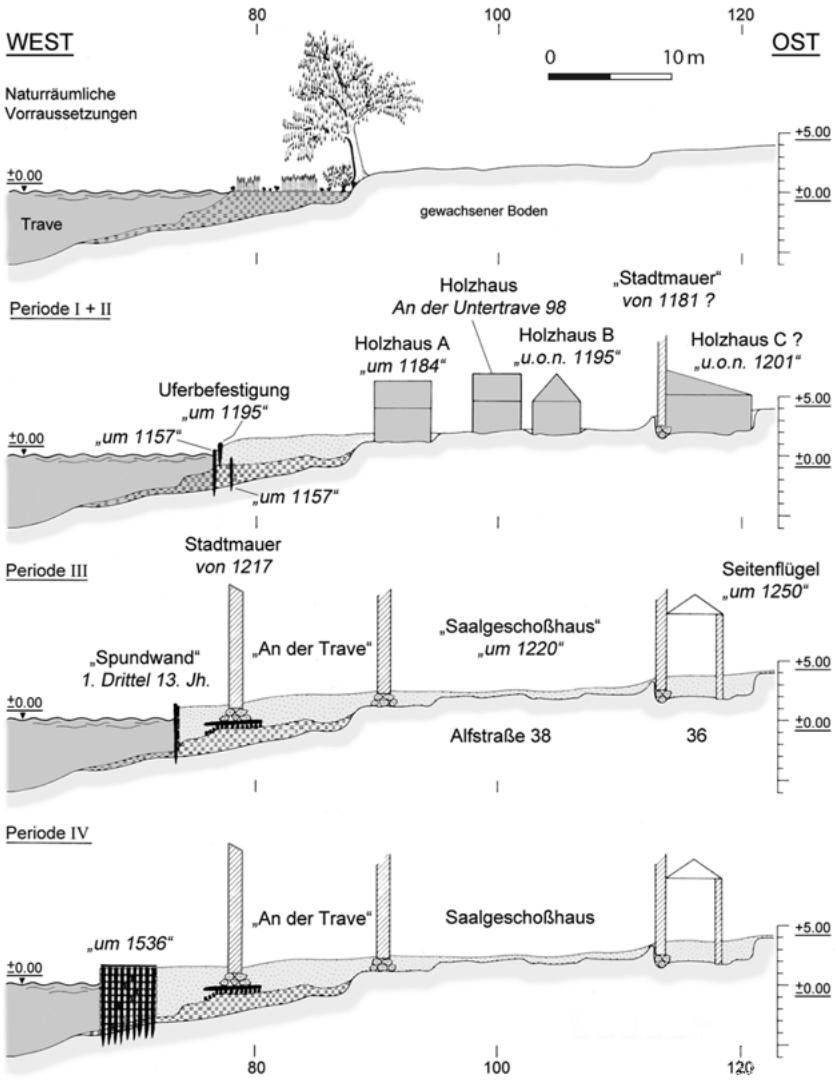

Fig. 8: Lübeck, Old Town, reconstruction of the second beach market and later harbour, ca. 1157–1217.

in its sights. Besides the transport connections and security considerations, the development resources also played a fundamental role.[40]

Although it was once assumed that a city wall was erected about 1181, which was interpreted as evidence of the first defensive effort of the *Bürgerstadt* (civil city), these assumptions have come under criticism in the intervening years.[41] The 1217 city wall was the first defence to enclose the whole of the old city hill. Finally, it should be noted that the developments extending southwards from the Holstenbrücke (evidence for which dates from 1216) and along the upper Trave river progressed in a different way. The written sources provide proof of an inner harbour and many granaries and storehouses from the late 13th and early 14th centuries, as well as for the wharves located on the external side of the city. The toll-house, dated from 1284, closed off the port district to the south.

Both earlier and current scholarship have favoured the model in which there was a transition from a beach market to a harbour market, and the development of an inner-city market. The market on the eastern shore of the Trave river, dated between 1157 and 1217 (Fig. 8), is interpreted as a beach market by Ellmers und Schalies, while Kalmring considers this a harbour

40 Schalies – Rieger 2019, 63.
41 Schalies – Rieger 2019, 66.

market.[42] In light of the current much earlier dating to about 1100, Rieger initially argued for a waterfront settlement with an open space that served as a marketplace, storage space, or cargo handling area.[43] The restructuring, with its systematic building scheme, seems to lead to the more recent beach market in a hitherto undeveloped area. Fundamental changes only occurred from the 1130s on, and these were manifestations of both the new policies of Heinrich des Löwen, and fundamental economic and cultural shifts in the Baltic area. This can be observed, for example, in the apparently standardised timber and early brick architecture built with large cellars, in the systematic opening up and developing of land moving toward the hilltop, and in the new civil and sacral infrastructure. In all this, the beach market retained its function until the beginning of the 13th century. It was not until the creation of the inner-city market that fundamental changes to cargo-handling took place. Loading and unloading procedures would become dominant on the quays, and trading areas and stockyards would be reduced to a minimum. These changes were not limited to new marketplaces within the city. Further inner-city changes were visible in the form of large storehouses and merchant houses, which created a completely new quality of urbanism. This urbanism, expressed in the form of the brick-built *Dielenhäuser*, would finally come to characterise the image and narrative of the Hanseatic city right up to the present day.[44] The new excavations may have thrown new light on 'early Lübeck', but the urban layout is connected with maritime trade and this has manifested itself in over 500 years of harbour growth.

Harbours …

The ports of Haithabu, Schleswig and Lübeck represent very different political, economic and cultural constellations, and provide proof of pre-modern globalisation.[45] As hubs for global networks, they not only connected the maritime worlds of the North Sea and the Baltic Sea, but also facilitated trade and exchange well beyond Europe. As different as these harbours were in terms of their individual development, they were all locations existing in physical, concrete space, on the one hand, and, on the other, were at the same time spaces constructed via various co-dependent forms of interaction.[46] Here, there was a concentration of different forms of cultural, political, or economic exchange, whose locality was interwoven with global perspectives. Specific architectonic and immaterial arrangements result from these different forms of exchange, as well as the perception and interpretation of those exchanges. In this way, 'harbourscapes' are not merely a part of the maritime cultural landscape, but also have the capacity to express global views.

Independent of this, the disposition of geological factors – in a wider sense the whole natural environment – plays a role in the initial choice of location for harbours. This basic parameter, though it does not seem to be the only determining factor, ultimately influences the further development of the harbour against the backdrop of changing maritime technology and the necessary logistic-infrastructural facilities. This is clearly displayed in the attempts at dam-building undertaken on the Schlei and all of the land-reclamation measures, but also in the gradual opening of the whole shoreline of the Trave river. Focusing on the material settings – that is, the physical level of the concrete building remains – allows us to observe the arrangements and relationships of these surviving buildings. These include not only the facilities directly associated with the port, but also the road- and street-systems that connected the port district

42 Ellmers 1990, 104; Schalies 2014, 166 fig. 6; Kalmring 2010, 443 f.
43 Rieger 2019, 79.
44 Torbus – Wojtczak 2017.
45 Müller 2017a; Hodos 2016.
46 Rogers 2013, 185–190.

to the rest of the city's urban spaces. Looking at these reveals functional connections in the form of land-bridges, quays, or storage spaces, living or craftsmen's quarters, shipyards or marketplaces. A particularity of Haithabu and Schleswig (but also of early Lübeck) is the way in which the location combines the logistics of cargo loading and despatch with those of commercial exchange and trade. Further urbanisation led to differentiated and more complex structures, and it was this that first resulted in the relocation of the market into the city. The city was ultimately closed off, both materially by the city walls, and immaterially by the municipal laws.

The question of who started these building arrangements and retained responsibility for their ongoing functioning should, according to practical-theoretical approaches, be 'located' in various dimensions. Neither the king alone nor his local representative, nor the apparently flat hierarchies of self-organised groups of interested parties (guilds, travellers with common routes) were the sole initiators here.[47] The model of interdependent processes of negotiation on various levels comes closer to the reality than any purely top-down or bottom-up approach. All three examples given here prove that the internal and external urbanisation of the city resulted from the initiative and support of the king, as well as that of the local elite. Even when the practices of individual actors or groups of actors can be identified, it must be assumed that such city-creating measures do not result solely from private initiatives.

… and Habourscapes

If we also understand 'harbourscapes' as 'imagined worlds', constructed via the various 'scapes' and the historically contextualised imaginations of people and groups, we find our focus shifts beyond social practices to the wider cultural processes that work to create new global orders. With the beach- and harbour markets in Haithabu and Schleswig, just as in early Lübeck, the port became visible as a place of economic transactions and a part of the early and high medieval 'financescapes'. Viking-period *emporia* like Haithabu were in particular perceived as 'special economic zones'.[48] These zones were not only bound to the European networks, but also, in their function as 'brokers', formed points of interface with the global networks of the Middle Ages in Africa and Asia.[49] In the spatial interface between logistics and economy (the marketplace), we see the material and immaterial flows concentrated into the smallest possible area. The port also represents various forms of monetary commerce.[50] On one hand, Haithabu is a 'subspace' for bullion-based trade and commerce, which dominated north and northeast Europe during the Early Middle Ages. Here goods were weighed against hack-silver or Arabic dirhams and an exchange rate fixed. Then again, in a certain way the *emporium* formed a 'special monetary zone', connecting the Carolingian and Ottonian monetary economies with the areas of bullion-based trade and commerce to the north and northeast. The transition to a monetary economy was already almost complete in Schleswig, but the marketplace still remained the economic centre of exchange, just as it was before. Finally, Lübeck not only represents an economy exclusively based on monetary trade and commerce, it also shows a shift and increased dynamic in the streams of goods and finances, and their increased complexity. The former is demonstrated by the inner-city marketplace, as well as in the partial relocation of these activities to the merchants' houses; the latter is expressed not only in the new economic forms of transactions, but

47 For example, Ellmers 2018; Radtke 2017b; Jahnke 2008.
48 Kalmring 2016, 17.
49 Sindbæk 2017, 560–562; Preiser-Kapeller 2018, 141–192.
50 Kershaw et al. 2018.

also in the reduction of transaction costs and new forms of organisation that are always mentioned in connection with the Hanse.[51]

On the basis of finds from Haithabu, Schleswig and Lübeck, it is possible to recognise a spatial and functional shift in the movement of goods. Until the 11th and 12th centuries, long-distance trade was concentrated on prestige goods from northeast Europe (furs, amber, wax and slaves) and goods from the Far East (silks, spices and frankincense). From the 12th and 13th centuries, Hanseatic trade built itself up on bulk products such as herring, salt, grain, and woollen cloth. In addition to this, the Hanseatic trade played an intermediary role between western and eastern Europe, as well as middle Europe.

At the same time, 'technoscapes' manifest themselves most significantly in the changes to maritime technology. From the archaeological point of view, attention here must certainly be turned towards ship-types. Whatever the genesis of the ship type *Kogge* (a single-masted, square-rigged and mostly clinker-built vessel) was, during the 12th century onwards, the cog was absolutely ideal for the requirements of bulk trade. Even if a direct correlation between ship-types and harbour facilities cannot always be demonstrated, the increases in cargo capacity and draught for long-distance trading vessels between the later Viking period and the High Middle Ages necessitated appropriate mooring facilities.[52] The port areas accommodated these new requirements, and the changing logistics were not only displayed in the construction of land bridges and quays, but also in the new forms of packing (barrels) and the relocation of storage spaces. Although objects are the carriers of ideas, and ideas communicate something to other people, the 'ideoscapes' in the port areas – which are not always easy to recognise archaeologically – appear in the various concepts of maritime law, customs law, and seller's rights, and of course also in the municipal laws. The question of correlation between maritime and municipal law is currently under intensive discussion, as is the differentiation between ship-owners and ships' crews, as well as between the actual owners of goods and trading agents.[53] Here, there seem to have been some fundamental changes during the 11th and 12th centuries in the Baltic area. While the town charter of Schleswig still reflected the significance of the merchants' guilds, the *Lübsche Recht* was considered a valid form of municipal law, and was used as the exemplar for the founding of many new cities in the Baltic region.

Taking a general perspective, these three ports certainly represent the power of what Nils Blomkvist describes as the 'Catholic world system', which is also more than a little visible in the career-specific faith and practical religiosity of the Hanseatic merchant-class.[54]

The port is often seen pragmatically as a place of cultural encounters, and this is particularly clear in the narratives of modern harbour areas. In terms of constantly changing flows of people, it is the mobility of the merchants that first comes to mind.[55] However, it is not only the travels of Wulfstan and Ottar in the 9th century, or the apprenticeship and merchant's life of Hildbrand Vechinchusen in the early 14th century that stand as representatives for this global mobility. Ship-owning families were deeply woven into the urban narrative and participated in the formation of both the life of the port and that of the city as a whole. There were also the travellers from distant locations, for example the Arabic merchant and diplomat At-Tartûschi from Tortosa in Spain, who visited Haithabu in 965. A completely different side of the 'ethnoscapes' is visible in the slave trade, for which early medieval Haithabu was an important hub, but which also presents archaeologists with massive challenges.[56] Slaves were not only traded in the north but also, and most importantly, in the Arabic lands. This example simultaneously

51 Kypta 2016, 151–155.
52 Blobel 2014; Englert 2015, 261–283.
53 Blomkvist 2005, 374–375; Englert 2015, 39–54; Cordes 2017, 71–73.
54 Blomkvist 2005, 30–35; Ayers 2016, 111–146; Jezierski 2016.
55 Christophersen 2017.
56 Fontaine 2017, 479–482. 488.

emphasises the fact that, while ports were spaces of transcultural encounter, they were also places of exclusion and inclusion.

The term 'mediascape' refers to the electronic and print media, but also describes visual culture. 'Mediascapes' create an image of a distant culture. For the Middle Ages, 'mediascapes' cannot be interpreted purely in the way Appadurai suggested. Thus, written or oral narratives, but also the perception of the foreign or different, will be an expression of 'mediascapes' in this context. Unique testimonies are the statements of Wulfstan or At-Tartûschi. But it is also the people and the objects connected with them that can be understood as an expression of 'mediascapes'. On one hand, medieval badges or fibulae can be understood as an indicator of strong social affiliations, on the other as 'social media' with which the person wearing them expresses certain (world)-views. Ultimately, then, these 'harbourscapes' were spaces of absolutely direct communication. This is recorded in all the various historical material. The verbal communication between the different actors – those who, for example, took Low German as their *lingua franca* – is hardly accessible via archaeological means. However, both implicit and explicit knowledge and its transferral can sometimes be observed, for example, when dealing with questions of port construction, maritime technology, or navigation.

The examples given here provide a diachronic and historical perspective on just how complex the development from a simple hithe to an actual port was. A working model that reduces the number of steps in that development, as well as its different forms, may be seen as acceptable. However, such simplified images have a long-lasting impact on both scientific and non-scientific perceptions. In contrast to this, the 'harbourscapes' model understands that harbours, functioning as subspaces of urban constellations, are the exit-, inter- and end-stations of intensive maritime movement. The space of the harbour connects water and land. But the port as a place of encounter neither begins nor ends with the quays. These 'harbourscapes' create an area for social, cultural and political processes of transformation, which manifest themselves in concrete urban locations. They represent a paradigm of connectivity in motion.

Illustration Credits

Fig. 1: Drawing by Susanne Beyer, IUFG CAU Kiel.
Fig. 2: Courtesy of the Museum für Archäologie Schloss Gottorf/Wikinger Museum Haithabu.
Fig. 3: After Kalmring 2010, 453 fig. 324.
Fig. 4: After Rösch 2018, 241 figs. 83. 85.
Fig. 5: After Rösch 2018, 272–273.
Fig. 6: Drawing by Susanne Beyer, IUFG CAU Kiel.
Fig. 7: After Schalies – Rieger 2019, 61.
Fig. 8: Schalies 2014, 164 fig. 4.

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Rainer Schreg

15 Human Impact on Hydrology

Direct and Indirect Consequences of Medieval Urbanisation in Southern Germany

Abstract: It is the aim of this contribution to widen the perspective on urban water. Beyond the archaeological traces of water management related to towns, we need to take the ecological consequences of urbanisation into account. On the one hand, the urban infrastructure with water regulations, channels and sewers had direct consequences on the local hydrology; on the other hand, urbanisation had indirect consequences on the hydrology in more distant rural areas, too. These indirect consequences were probably a major factor of late medieval landscape changes, which were at the basis of the late medieval crisis. The article uses the situation in Southern Germany in order to sketch possible interrelations and demonstrate the perspective of human ecology.

It is the aim of this contribution to sketch some of the ecological aspects of urban water. There is a large body of research in both environmental history and archaeology.[1] There is, however, a fundamental problem, because basic categories, which are important for an understanding of ecological connections, are not present in the available sources. For example, the terms 'energy', 'climate' or 'water run-off' can neither be found in medieval texts nor can archaeologists excavate them. Dealing with aspects of environmental history or human ecology requires the acceptance of abstract categories and an open mind for hypotheses and interdisciplinary exchange. Otherwise, archaeologists, at least, will be stuck in a typology of sewers and water channels. For this reason, this article will not discuss the many observations on water usage within the town, but focus on a landscape perspective.

The interaction of towns and rivers has many dimensions,[2] and is characterized by complex interactions. I will use some examples from Southern Germany to provide at least a rough impression of this complexity. There are many towns in Southern Germany situated on large rivers, such as the Rhine or the Danube, going back to the Roman period or before, but the majority represents towns developing mainly in the High Middle Ages, most often also related to some rivers or creeks.

Intended landscape modification during urbanisation

At first glance, it seems quite easy for archaeology, at least, to identify planned modifications of waterscapes. At Salzburg, for example, the builders of the 12th-century Alm channel changed the local water courses by digging a tunnel below Hohensalzburg castle (Fig. 1). In this way the town was supplied with fresh water.[3] In many other towns, water courses were modified for mill races, the water supply of factories, or for flood fortification systems. In some cases, water courses were altered in order to construct navigable waterways or to prevent the risk of flooding.

However, in many cases it is quite difficult to trace anthropological changes to the landscape clearly. At Ulm (Fig. 2), for example, the river Blau passes the western bluff of the Weinhof

1 Untermann 2009.
2 Gunzelmann 2009.
3 Zillner 1864.

https://doi.org/10.1515/9783110677065-015

Fig. 1: Salzburg, the Alm channel below Hohensalzburg castle.

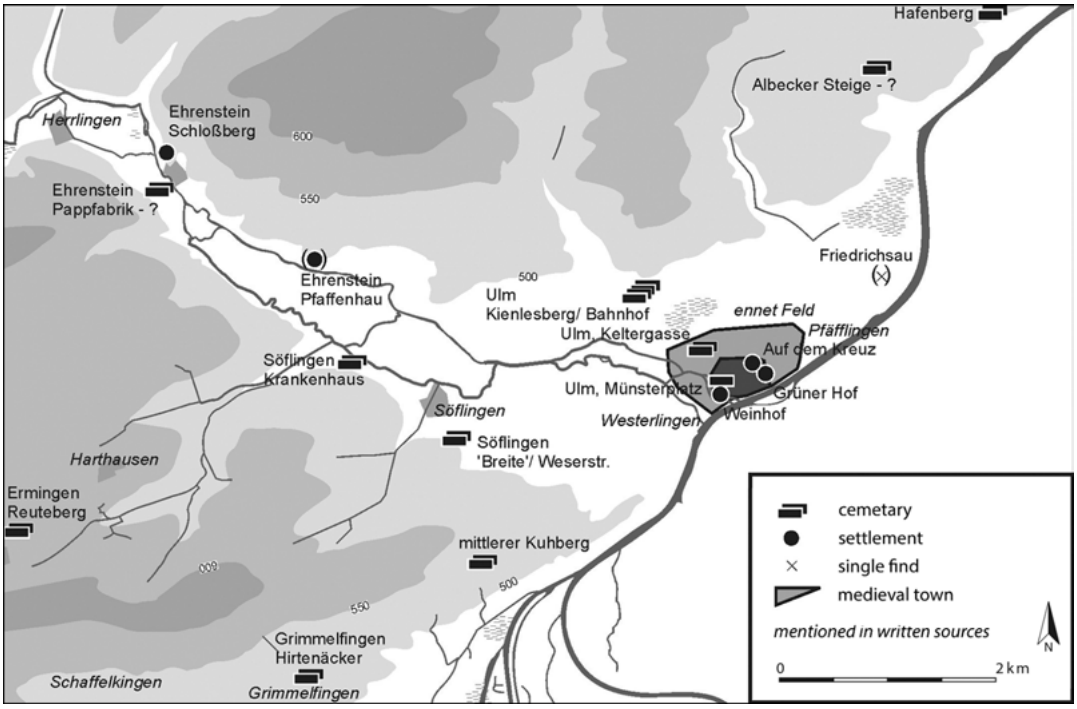

Fig. 2: Map of Ulm.

hill, where the early medieval palatium was situated. North of the town, which extends over a low ridge, there is an old river course of the Blau, still visible in 19th century maps. Occasional finds of prehistoric sherds show that there was fluvial sedimentation north of the later town at least up to pre-Roman times. However, because systematic research is lacking, we do not know when the current course of the river Blau was established and whether this happened by natural causes or by human intent. Possibly the Blau was regulated in order to establish proper locations for milling and handicrafts.[4]

4 Schmid 2007, 7.

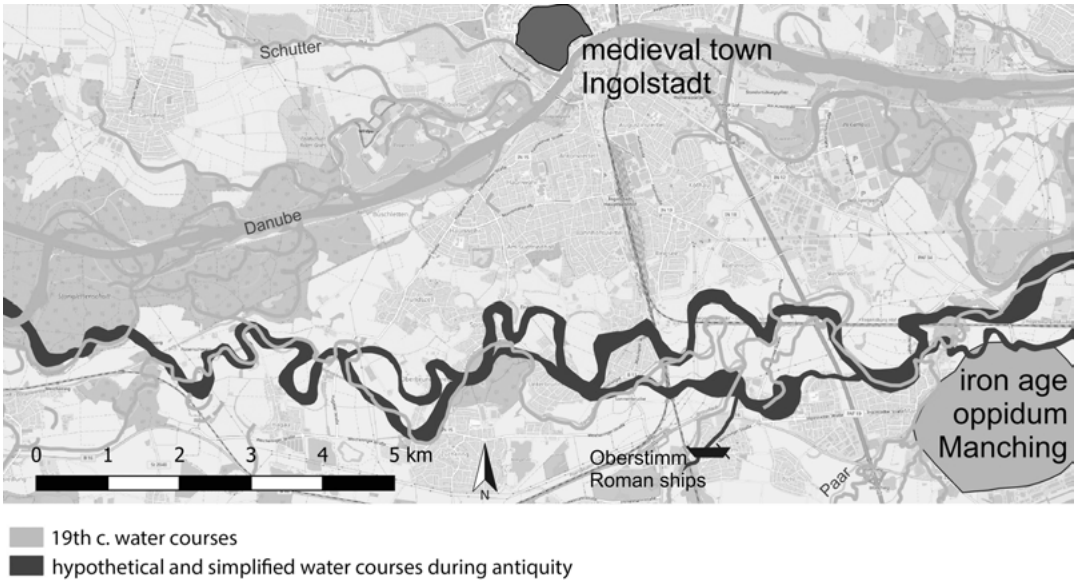

Fig. 3: Map of the Danube near Ingolstadt.

The Danube valley close to Ingolstadt was characterized by a meandering river course which entailed a large number of backwaters (Fig. 3).[5] Ingolstadt was mentioned at the beginning of the 9th century for the first time. It was situated on a low terrace to the north, close to the mouth of the Schutter brook. The situation provided locations for mills, but also direct access to the Danube river as an important line of transport. However, in Roman and early medieval times the course of the Danube was some kilometres south of Ingolstadt. In pre-Roman times, the oppidum of Manching[6] was located opposite the later town on the southern bank, probably also because the Danube was used as an important transportation route. This southern Danube course was navigable in Roman times, as the ships discovered in Oberstimm[7] show. Close to the Iron Age oppidum of Manching, water courses of the Danube were still active even in the Late Middle Ages.[8] It is an interesting question as to whether these changes of the regional hydrology were the result of natural floods or of artificial water channelling. However, within the southern part of the town of Ingolstadt, urban archaeology shows some intentional changes of water courses by land filling and bank stabilisation.[9]

Both examples lack detailed modern geoarchaeological data for verifying the medieval topography and landscape changes. Relevant information comes from river sediments, which are not protected as archaeological sites, because their anthropological character is often hardly obvious. Furthermore, the redirection of river systems may have taken place far away from the towns themselves and are thus outside the remit of urban archaeology.

Excavations at the Donaumarkt in Regensburg between 2009 and 2015 allow the reconstruction of the development of an urban quarter at the waterfront.[10] They showed the change from a floodplain situation, to some harbour and canal constructions and to a landfill in the 12th/13th centuries, which provided the ground for urban stone architecture. Over the centuries, there have been many floods and their sediments are partially visible in the archaeological record[11] (Fig. 4). A flood in 1304 caused basic changes to the northern waterfront opposite the city. The

5 Schmidt – Riedel 2008, fig. 206.
6 Guichard et al. 2000.
7 Bockius 2002.
8 Schramedei – Brunnacker 1992, 427.
9 Arauner 2008.
10 Nießen – Wollenberg 2019.
11 Codreanu-Windauer et al. 2008.

Fig. 4: Regensburg, sediments at the excavation of the 'Donaumarkt'.

main course of the Danube now used a riverbed close to the northern flank of the valley, causing the Regensburg town council to redirect the river back to the city. The northern bank was only partially under the town's control and therefore a long debate over the legal rights on the river started with the Bavarian duke.[12]

At Bamberg, which was situated at the foot of the old Babenburg castle within a riverine landscape of water channels and islands, we can also trace changes of urban water.[13] Within the Staufian period, the riverside opposite to the castle was fortified by a new town wall; this affected also the topography. An old river channel, where many subfossil trees had been deposited, mainly in the Roman period, was first transformed into a small ditch and later filled in completely (Fig. 5). Ground water level was rising during the Late Middle Ages, as indicated by soil marks.[14] During later centuries, the hydrological topography was adapted to the multiple uses of urban water as a waterway and as an energy source, but also as a water supply for tanneries and sewers.[15]

Today there is plenty of evidence of medieval construction in connection with water during the first millennium in Central and Western Europe, primarily coming from an archaeological interest in long-distance trade. What we can learn from this research is that altering hydrological landscapes was common practice already in the first millennium.[16] Environmental history provides a broad record of water regulation in various landscapes, but only in a few cases has archaeological evidence of this been identified.[17]

Topographies of urban water thus need to be thoroughly researched in order to identify possible landscape modifications in the course of urban development.

12 Knoll 2013, 298.

13 Gunzelmann 2009.

14 Schöpplein 2016, 51 f. 54 f.

15 Hanemann – Dengler-Schreiber 2009.

16 Kröger et al. 2017; Werther – Kröger 2017.

17 Castanet 2011; compare the ongoing research project at Heidelberg University: Land unter? – Hochwasser und Hochwasserschutzmaßnahmen am Oberrhein zwischen dem frühen und hohen Mittelalter <https://www.geog.uni-heidelberg.de/geomorph/land_unter.html> (23. 04. 2019).

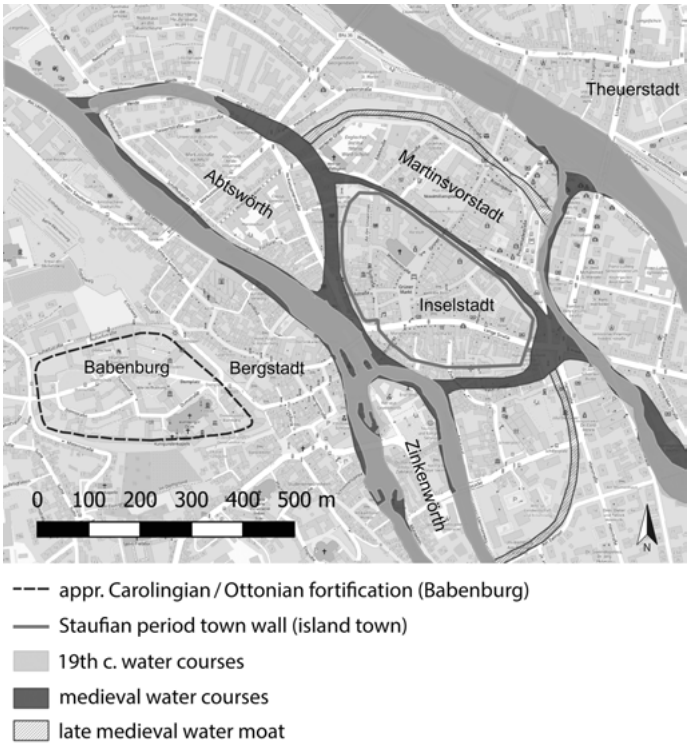

Fig. 5: Hydrotopography of Bamberg.

Changing role of waters affects urban design

In the course of time, the importance of rivers and watercourses for transportation and travelling changed. With flat boats, even rather small creeks were navigable. Transportation by waterways was much more effective than transportation on land.[18] There are some indications that inland navigation was important in the Early Middle Ages. On the river Main, for example, a line of fortified sites seems to have controlled and supported water transportation on the river. In 796, a channel was constructed, or at least attempted, in order to connect the Danube river system and the Rhine/Main river system: the Fossa Carolina.[19]

In the High Middle Ages, during the Staufian period, land transportation gained in importance.[20] The famous Tabula Peutingeriana was copied during the 13th century from a late antique map showing the Roman roads. There were also some attempts, at least in Italy, to renew the obligations of adjoining owners to take on the maintenance and repair of roads.[21] It is still a question in research as to whether there were also technical innovations in land traffic, for example, the cambered wheel, the horse collar, or horseshoes. Dating innovations is a problem.[22] Horseshoes can be found in rather large quantities at medieval sites, whereas wooden wheels and horse collars made of wood and leather are rarely preserved. A correlation of these innovation with 13th century's changes needs to be researched. There are also very few dated medieval bridges to help to clearly define periods of intense bridge construction activities. In central Europe, there are at least some bridges dating to the Staufian period, some in rural contexts, some close to towns (Fig. 6). For example, the bridge across the river Neckar at Neckar-

18 Eckoldt 1984.
19 Ettel et al. 2014; Schmidt et al. 2018; Werther – Kröger 2017.
20 Szabó 1999.
21 Szabó 1977.
22 Cf. Schreg 2003; Schreg 2013b.

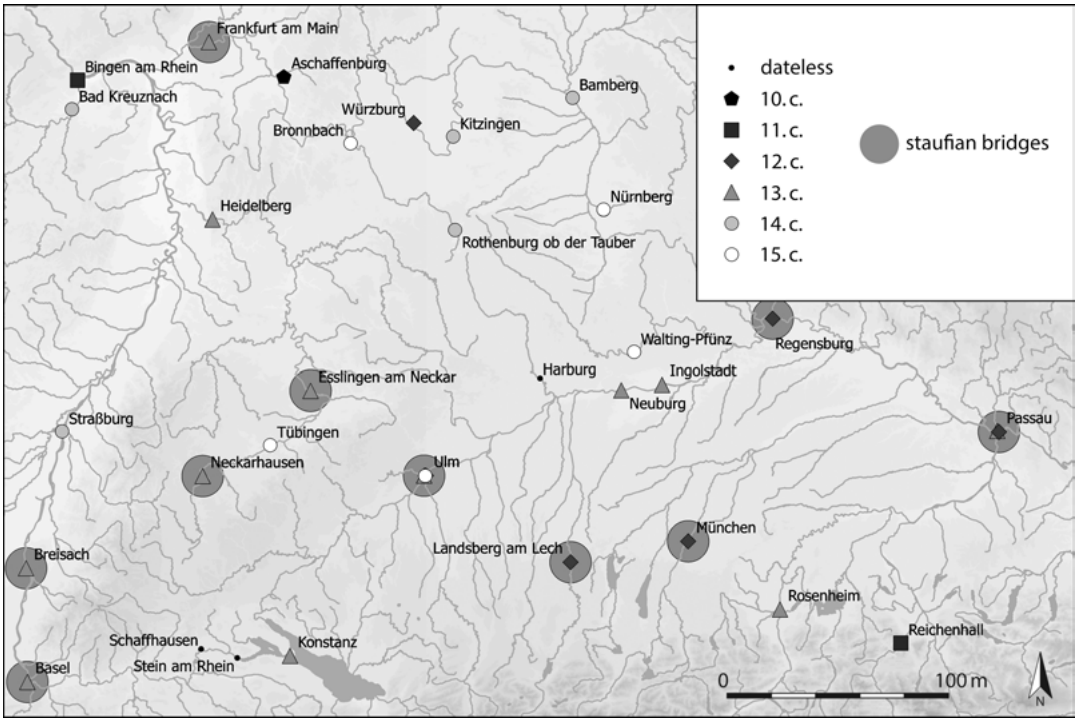

Fig. 6: Map of medieval bridges in Southern Germany.

Fig. 7: Neckarhausen, bridge built 1257.

hausen, close to Horb and still standing, has been dendrochronologically dated to 1257[23] (Fig. 7), while the bridge across the Danube at Regensburg was already constructed in the first half of the 12th century.[24]

River crossings were interesting locations for the founding of towns. They were important strategic points in the territorial politics of noble families. In Southern Bavaria, for example, the old Roman road between Salzburg and Augsburg crosses the Inn and the Isar. At both rivers, the road was relocated to new bridges and towns or markets. Munich was founded as a town by the Dukes of Bavaria trying to establish a market and toll station in competition with the previous Isar crossing at Oberföhring, some kilometres downstream.[25] In the 13th century, the old Roman bridge, the Pons Aeni, at modern-day Pfaffenhofen was replaced by one at Rosen-

23 Ungerer-Heuck 1989.
24 Knoll 2013, 294–297.
25 Schwarz 1989, 180 f.; Päffgen 2013, 149–156.

Fig. 8: Tübingen and the Neckar River from south. Close to the Stiftskirche are the buildings of the university. Left of the Neckar bridge, timber rafts are visible.

heim, where a castle and a market were established to control the river crossing. In 1276 the bridge is mentioned for the first time.[26]

Within the close surroundings of towns, transportation of consumer goods towards the town increased. With some possible exceptions in specific topographical situations, such as in delta areas or coastal lowlands,[27] this traffic relied on roads and streets, and only to a lesser degree on local waterways. This is especially true for landscapes in Southern Germany, where most agrarian production areas were not close to water courses.

However, the transportation of firewood and timber, often over long distances, was carried out by floating or drifting. The supply of towns with timber therefore affected urban architecture and topography. Market places for timber can often be found at a situation easily accessible from the river, close to a town gate, sometimes outside the oldest urban centre within an area of later urban expansion.

The importance of timber rafting is visible in the town of Tübingen and its surroundings. The nearby Schönbuch forest has been intensively used at least since the 10th/11th centuries, when iron production and pottery kilns needed large quantities of firewood. It is not possible to calculate how much forest has been cleared. In the Late Middle Ages, however, some areas were left in the neighbourhood of Bebenhausen monastery, where a hermitage was founded. In other parts, however, clearing caused soil erosion and gullying in the 14th century. In the 15th century, there was even a glass factory in the Schönbuch forest, requiring wood for energy and potash.[28]

Timber for house construction in Tübingen was thus rare. When Herzog Eberhard von Württemberg intended to establish the University of Tübingen in 1477, he first had to solve the problem of timber supply. He signed a treaty with neighbouring territories to open the Neckar River for floating. Buildings such as the Stiftskirche and the first university building (Fig. 8) were built with long tree trunks, imported from the Black Forest on the Neckar river. Researchers have discovered the holes for joining together the single logs to large rafts in many late medieval and early modern buildings. The treaty of 1475 was not the first one related to rafting on the Neckar

26 Schwarz 1989, 71 f.
27 E. g. Gawronski – Veerkamp 2017.
28 Schreg 2018.

River, but the huge building programme established timber rafting on the Neckar even downstream of Tübingen. The availability of long logs triggered changes in the regional church architecture, when the basilica type was replaced by hall churches requiring bigger roof constructions.[29]

Unintended effects of urbanisation on hydrology and landscape

To illustrate the possible interactions between urbanisation and hydrology, the Swabian Alb provides a valuable example, even if many questions are still open. The Swabian Alb is a karst landscape, where there was travertine formation, especially in the valleys along the northern bluff during the Holocene. Travertine deposits often were several tens of metres thick and they formed terraces, swamps and even lakes within the valleys (Fig. 9). In prehistoric times and even in the Middle Ages, many valleys remained hardly usable. The old traffic routes could not use the lower gradient in the valleys, but had to surmount the steep slopes on the bluff of the Alb directly.[30] This situation explains why archaeological sites, such as the late Iron Age oppidum at Heidengraben[31] or the migration period hillfort at Runder Berg, both close to Urach, were situated at what are today rather remote places.

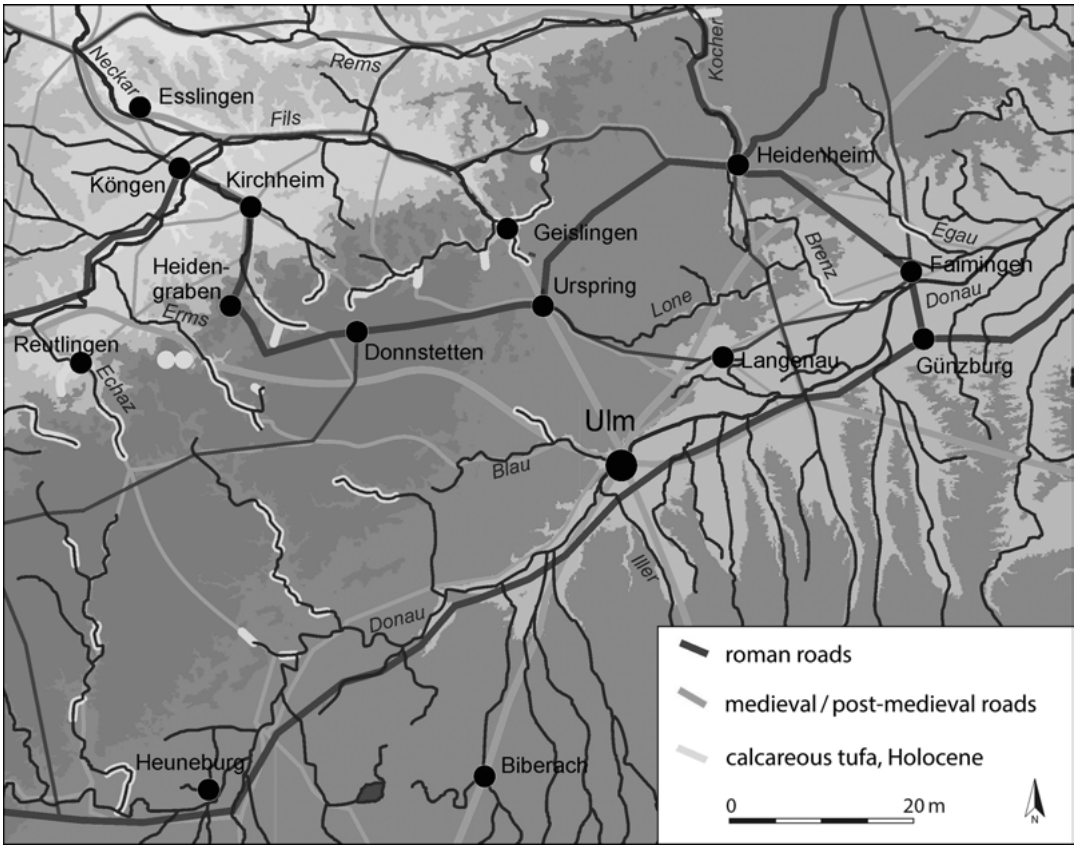

Fig. 9: Roman and medieval traffic lines in the karst landscape of the Swabian Alb. Holocene travertine blocked many valleys at the northern bluff of the Alb.

29 Marstaller 2009; Marstaller 2012.
30 Schreg 2009d; Schreg 2009e.
31 Stegmaier – Wahr 2009.

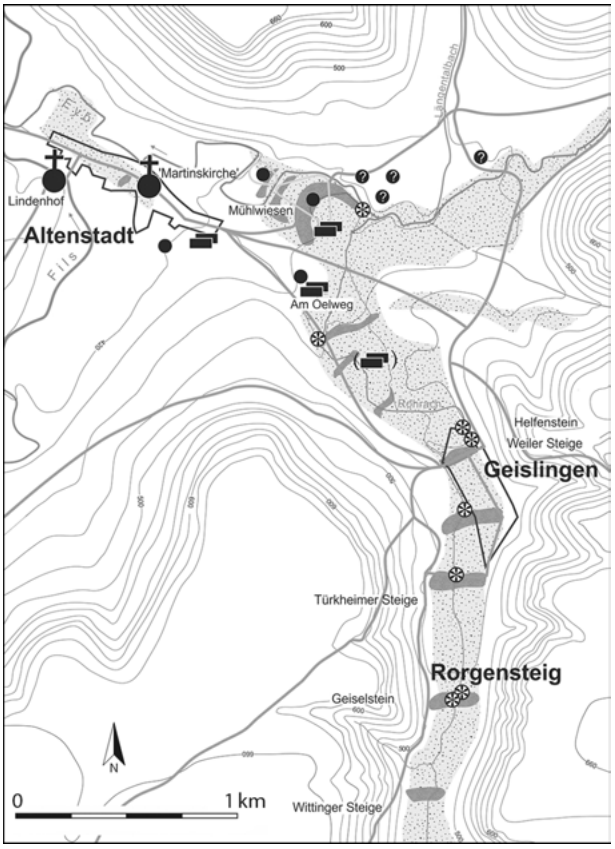

Fig. 10: Map of Geislingen with travertine terraces, roads, mills, and the late medieval town.

In most valleys, late medieval towns can be found, such as Geislingen, Urach or Pfullingen. The exact chronology of valley drainage and founding of the towns is still unclear. It is thus not certain whether water management in the Alb valleys was a consequence or a precondition for urban development.

At Geislingen an der Steige, we may assume that the end of travertine deposition already predated the development of the town.[32] The town itself, along with the earlier settlements in the Geislingen basin, was situated at the rim of travertine terraces providing rather dry ground, on the one hand, and ideal locations for milling, on the other. Whereas the town was founded sometime in the later 13th century, the early medieval village of Geislingen, some kilometres to the northwest, was already related to a road crossing the Swabian Alb. In any case, there are Merovingian cemeteries with precious grave goods. In 1237, Emperor Frederic II signed a charter *apud Giselingen*, when he was on his way from Vienna to Speyer, travelling through Ulm and Geislingen. It is not sure whether at that time the town of Geislingen already existed. There was probably already an access yard, some mills and probably some other small-scale settlements, as indicated by high medieval pottery sherds. Certainly, by then there was some settlement activity in the Rohrach valley, which today has given way to the road and the railway (Fig. 10). Oral tradition, at least, remembered the landscape of the Rohrach valley as characterized by lakes, where one of the children of a local noble family was said to have drowned. Excavations within the town of Geislingen have revealed the remains of fences, representing a first phase of occupation, maybe the remains of pre-urban land use for husbandry in a rather wet area.[33]

However, mills, water regulation, irrigated meadows, flooded urban fortification ditches and the channelling of the Rohrach, flowing partially through the town, were important factors

32 Schreg 2009b.
33 Lang – Schreg 1997.

in the cessation of travertine formation. The deposition of travertine depends on oxygen transfer to the calcareous water. When water courses were regulated, limescale became increasingly rare. The reduced travertine formation probably opened the Geislinger Steige, crossing the Rohrach valley, already prior to the founding of the town. Whereas the Roman roads bypassed the Rohrach valley for large distances, the Geislinger Steige became an important route during the Early Middle Ages, altering the main lines of traffic in such a way that the topographical situation of Ulm gained in importance.[34]

Urban water and big history

The example of the karst landscape of the Swabian Alb referred to a specific regional phenomenon of the interaction between urbanisation and hydrology. However, there is a more general interdependence between urbanisation and hydrology, which was probably, in some ways, valid for the majority of old agrarian landscapes in Central Europe. Urban water is not only related to specific urban infrastructure, but is also part of wider ecological changes and possibly also a factor in the late medieval crisis.

Beyond urban water: indirect consequences of urbanisation on the hydrology of more distant rural landscapes

The typical medieval village in most parts of southern Germany developed only in the 10th to 13th centuries. Within this complex process, urbanisation was certainly an important factor, even if we still do not understand the interrelation in all details.[35] The discovery of medieval settlement areas outside the later villages – abandoned in Southwestern Germany in the 12th/13th centuries, in Southern Bavaria probably already in the 10th/11th centuries – give a clear indication of basic changes of rural settlement structures.[36] It becomes clear, however, that the medieval village formation was a long lasting, complex process with many regional differences. The background of these changes within the rural settlement pattern is characterised by social and economic changes, such as the restructuring of the aristocracy (rise of the gentry, establishment of castles), urbanisation, and the intensification of land use. Marginal landscapes, such as the low mountain ranges of the Palatinate Forest, the Black Forest, the Spessart region and the Bayerische Wald (Bavarian Forest) gained in economic importance. There is increasing evidence of early medieval activities causing soil erosion by local clearings, as these mountainous landscapes became more and more important as energy sources for firewood and watermills. Within the old agrarian landscapes, we may presume that the establishment of regulated three-field crop rotation (*Dreizelgen* or *geregelte Dreifelderwirtschaft*) was a major element in village formation. Whereas a simple crop rotation was already known, the innovation of the High Middle Ages was compulsory crop rotation (*Flurzwang*), which required an equally distributed landholding over the three areas of crop rotation. Regulations were controlled by the farmers' community (*Markgenossenschaft*/*Gemeinde*) which now evolved, partly in imitation of urban administration.

34 Schreg 2009a, 86–89.
35 Schreg 2013a.
36 Schreg 2006, 323–328; Schreg 2009c.

But with regard to our topic of urban waters, the ecological consequences are far more important than the social ones. Prior to the introduction of regulated crop rotation, there was a small landscape mosaic of enclosed plots cultivated individually by farmers. Settlements themselves often shifted over small distances, enabling an alternating land use so as to prevent soil degradation. The introduction of the open field system saw the removal of field walls and hedges, which in general had been necessary because of the grazing during fallow periods. But the cooperation and coordination of crop rotation superseded the enclosure of every single field, because within regulated crop rotation, herds belonging to different owners were kept together in the larger field blocks. This removal of hedges changed the microclimate by increasing heath emission over large grain fields, by increased evaporation, and by increasing water run-off. Thus, a transformation of the rural landscape triggered by the growth of towns had far-reaching effects, among others on the hydrology. Geo-archaeological research has yielded some evidence for increased soil erosion, resulting not only in gullying, but also in changes in the valleys. The sedimentation of alluvial clay reduced stream velocity, enlarged the meandering of creeks and rivers, and raised the ground water level in the valleys and the drier situations on the surrounding slopes.

Increasing risks by hydrological changes

The high medieval landscape changes, for which urbanisation was one factor among others, resulted in some risks for the local society.[37] The increasing exposure of an open landscape with fewer hedges to soil erosion and the changing microclimate were accompanied by some disturbances of the biotopes of small animals like rodents or birds. At the same time, yields of agrarian land may have declined, rather than increased, because the gain of land by the introduction of the open field system may have been offset by the losses caused by the more permanent cultivation of single land plots. We need to remember that the formation of the village marks the end of a shifting settlement system, which may have contributed to sustainable soil management through the alteration of land use by settlement activities, gardens, agrarian fields and sometimes maybe even wood-cutting. Within the open field system, husbandry meant that herds were held in common and therefore the risk of animal diseases became more serious. Looking at the 14th century, just a few generations after these fundamental changes within the agrarian landscape, we can, in fact, see an increase in animal diseases, soil erosion and the subsequent abandonment of many rural settlements. This even raises the question of whether the outbreak of the Black Death may have had an anthropogenic component, as the extreme weather of 1342 including the flood around St Mary Magdalene's day in July may have had some consequences for rodent populations, including the rats, which were an important reservoir of *Yersinia pestis*.[38] New studies show that there was a genetic mutation of this pathogen shortly before 1349 and that the introduction of *Yersinia pestis* may have been more complex than hitherto assumed.[39]

There is a lot of speculation in this scenario by now, and we are far from a consistent picture of all the interconnections of the late medieval crisis. We need to verify or falsify the hypothesis of these long-term consequences of high medieval landscape changes by establishing more facts: 1) on the history of *Yersinia pestis*, because genetics indicate its presence in Europe already in the 6th century. This raises the question if the 1347 outbreak spreading from the east interacted with plague germs present in central Europe before 1347, 2) on the changes of biodiversity and the living conditions of small animals, 3) on the physical outline of fields and field

37 Schreg 2013a.

38 Schreg 2019.

39 Bos et al. 2011; Namouchi et al. 2018.

Tab. 1: Consequences of urbanisation in the Late High and Late Middle Ages related to hydrology.

Economic and social consequences	Ecological consequences

local
– more intensified and more diverse use of watersheds
– increasing water management
– Water construction
  ◦ milling and industrial channels
  ◦ flood protection
  ◦ fortification (moats)
  ◦ fresh water channels
  ◦ waterways and harbours
  ◦ …
– conflicts of interest related to
  ◦ drinking water vs. industrial water
  ◦ river transportation vs. land transportation (bridges)
  ◦ river transportation vs. fishing
  ◦ milling and water distribution
regional
– increasing demand for products of rural landscapes
– village formation
– intensified agriculture
increasing need of energy
– increasing construction of water mills
supra-regional
– market economy
– specialised production
– growth of forest-based economy (e. g. glass production, charcoal burning etc.)
	local
	– changing hydrology (raising or sinking ground water levels)
	– effects on biodiversity
	regional
	– intensified agriculture
	  ◦ removal of field walls and hedges
	  ◦ open fields
	  ◦ fewer long-term fallow periods
	– changing microclimate (heath emission/ Albedo effect)
	– increased water run-off
	– soil erosion
	– reduced biodiversity
	– declining yields
	changed metabolic cycles
	– problems in manuring the agrarian fields (only solved by the introduction of dung manuring in the 14th c.)
	supra-regional
	– changing hydrology
	  ◦ landscape changes, e. g. in valleys
	– new risks
	  ◦ floods
	  ◦ epidemics

boundaries, and 4) on the hydrology and soil erosion. We need a precise chronology of these assumed changes, as this is a precondition for any correlation with urbanisation, for example.[40]

Catastrophic flood events – long-term consequences of urban water?

An important part of the late medieval crisis mainly in the 14th century was climate change. At that time, the beginnings of the Little Ice Age caused falling temperatures connected with extreme weather events. There is some chance that anthropogenic factors were involved also at that time, but at the global level this climate change was triggered by natural factors. The risks for human life, however, were dependent on cultural factors, such as land management strategies and settlement patterns.

In July 1342, at the time around St Mary Magdalene's day there was one of the heaviest rains causing floods and soil erosion, labelled by modern research as a millennium event.[41] We have written evidence, for example, from Mainz, Frankfurt, Würzburg, Bamberg and Regens-

40 Schreg 2013a.

41 Bork et al. 2011; Bauch 2014; Herget – Zbinden 2017.

burg of high water levels within the towns. At the site of Regensburg, where the Danube bridge had been destroyed, there is a thick layer of river deposits dating back to the 14th century.

Though the flood of St Mary Magdalene was by far the most severe one, there were other inundations during the 14th century. At the deserted town of Münster in the southern Black Forest, archaeological excavations also showed thick water-transported deposits dating to the 14th century. According to the current state of research, the Upper Rhine and the Southern Black Forest were outside the catchment of the flood of St Mary Magdalene.[42] There is, however, evidence from Esslingen, where written sources report of a landslide within the fortification walls in the summer of 1342. A vineyard glided off and damaged one of the urban monasteries.[43]

It is quite hard to link archaeological traces to one specific event. For this reason, the dating of soil erosion by radiocarbon dates in the Schönbuch forest to the 14th century cannot be linked to events of the summer of 1342, but is nevertheless a document for the clearance of forests discussed above.

Conclusions

Looking at urban waters requires a perspective going beyond infrastructures. It is interesting to see the interrelation between urbanisation and landscape changes. The urban needs for food, energy and water had far-reaching effects, especially on the hydrology, which was, in turn, an important factor for late medieval landscape changes. In order to understand the complete picture, we need the perspective of human ecosystems, which allows us to address the right questions and to develop appropriate research strategies.

Illustration Credits

Fig. 1: Photo by Bahnmoeller [CC BY SA 3.0] via WikimediaCommons <https://commons.wikimedia.org/wiki/File:Almkanal_Schacht_zum_Buergermeisterloch.jpg> (4. 7. 2019).
Fig. 2: Graphic by Rainer Schreg.
Fig. 3: Graphic by Rainer Schreg, after Arauner 2008 and early 19th century cadastral maps [Urpositionsblätter]; base map: © OpenStreetMap-contributors.
Fig. 4: Courtesy of the Museum der Bayerischen Geschichte 2012–2015 [M-2012–1989–1_0]; photo: Archaios GmbH.
Fig. 5: Graphic by Rainer Schreg, after Schöpplein 2016 fig. 60 and early 19th century cadastral maps [Urpositionsblätter]; base map: © OpenStreetMap-contributors.
Fig. 6: Graphics by Rainer Schreg.
Fig. 7: Photo by Rainer Schreg.
Fig. 8: Picture from the Stammbuch des Georg Pfinzing von Henfenfeld (1601–1653) (PD, via WikimediaCommons <https://commons.wikimedia.org/wiki/File:T%C3%BCbingen_-_Stammbuch-von-Georg-Pfinzing-von-Henfenfeld-1601-bis-1653.jpg> (4. 7. 2019).
Fig. 9: Graphic by Rainer Schreg.
Fig. 10: Graphic by Rainer Schreg.

42 Jenisch 2019.
43 Schreg 2013c.

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Gabriel Zeilinger

16 Water as an Economic Resource and as an Environmental Challenge Within the Urbanisation Process of the Rhine Valley in the 13th Century

Abstract: The medieval urbanisation of Europe, not least in its manifestation in the region presented here, embraced the whole natural landscape as well as the social landscape. Water – as an indispensable prerequisite for human settlement – was a recurring topic for urban magistrates – even in the relatively humid regions north of the Alps. In this contribution, exemplary aquatic aspects of the urbanisation of the Upper and Middle Rhine Valley in the 13th century will be examined. The analysis shows once more how many facets and forms of water had to be made use of, regulated and negotiated in political conflicts – between town lords and townspeople and within the communes. But also the environmental challenges which particularly floods (in themselves often a fallout of deforestation for urbanisation) posed for towns are taken into account. In doing so, the methodological problems with the scarcity of given sources in this relatively early urban era of the Middle Ages (in this region) are weighed throughout.

Water was – and still is – an indispensable prerequisite for human culture and settlement,[1] even more so of denser settlement in towns. To provide for the dietary, commercial, and the transport-related demand for access to water was a major task for medieval urban magistrates – even in the relatively humid regions north of the Alps. But water was not only a source of energy of different kinds to be used, it was also a natural force to be reckoned with and to be confined. And, thirdly but not least, water, or rather the rights to make use of it, was also a battlefield for powers on different levels of society.[2] Thus, water is – or rather should be more of – a core aspect of pre-modern urban history.[3] The medieval urbanisation of Europe, not least its manifestation in the region presented here, which is – more concisely – the Upper and the Middle Rhine Valley (i. e. between Basel and Bonn), included in many ways the whole natural landscape as well as the social landscape.[4] This is not only a postulation by modern research; even the medieval contemporaries could see that connection: around 1300, an anonymous chronicler within the ranks of the then still relatively young Dominican convent in Colmar wrote a fascinating report in Latin on the 'conditions in Alsace at the beginning of the 13th century'.[5] In this quite remarkable description, which intends, not least, to point out the positive effects of the Dominicans' arrival in that historic landscape on the left bank of the Upper Rhine, the Anonymous covers a whole range of topics from Intellectual and Ecclesiastical to Cultural and even Environmental History. Among many other things, he points out that Strasbourg and Basel – the old Roman and Episcopal cities, respectively, on the River Rhine – were still 'poor in their walls and buildings' around 100 years previously, 'still poorer in terms of private homes'. There were few fortified houses and hardly any windows there which would carry the light into them. He goes on to state that Colmar, Schlettstadt (Séléstat), Rufach (Rouffach), Mülhausen (Mulhouse) and other smaller settlements 'were not even cities then' – around 1200 – implying (and for everyone to be seen) that they were now, around 1300. This passage captures in a nutshell the rapid and relatively dense urbanisation of his region, Alsace, where, in the course of the

1 Huber-Rebenich et al. 2017.

2 Schubert 2002, 65–107.

3 Cf. e. g. the older publication Maschke – Sydow 1978.

4 Cf. e. g. Schreg 2013 for the supra-local, even rural consequences of urbanisation.

5 'De rebus Alsaticis ineuntis saeculi XIII', in: Pertz 1861, 232–237. The following quotes in English are the author's translation of the Latin edition.

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13th century, some 60–70 towns emerged, in addition to the relatively few already in existence before (particularly Strasbourg). But the monk did not leave it at that. Although not directly adjoint in the text, he also describes the enormous deforestation of the landscape and its effects. For now, around 1300, rivers and floods were supposedly much stronger than before, when the roots of the trees 'would still retain the humidity of snow and rain within the mountains for a longer period'. While, as mentioned, the Dominican chronicler does not draw a direct line between urbanisation, deforestation and floodings, we do know about it – and I suppose some contemporaries would have done so, too.

On the basis of an intensive study on the early urbanisation of Alsace between the 12th and 14th centuries,[6] in the following I will firstly (and mainly) point out the relevance of water as a material resource in the building and maintenance of early towns, and secondly, take a shorter look at the environmental challenges of water for and in towns of that era. Due to the scarce source material for that time span and region, I cannot provide plenty of insight into the nutritional aspect of water need, as the problem of clean water is mentioned only implicitly in the written sources of that time and place. That issue is discussed and tackled more amply in the later 14th and particularly in the 15th century.[7] Yet, another aspect of fluvial nutrition ought to be added: the Dominican chronicler from Colmar claims that, around 1200, there had supposedly been 1500 fishermen doing their business on the river Ill, a conflux of the Rhine, which also streams through Colmar. The relevance of urban fishermen is also portrayed by the fact that just about every city in the region had its fishermen's guild.[8]

Water and the building, maintenance and domination of medieval towns

Having stated that water is an indispensable prerequisite for human settlement, even more so for towns, the importance of waterways for the transport of building materials has to be underlined. The increasingly intensive use of the river Rhine, and its tributaries for that matter, precedes the period of our examination by more than a millennium – due to the scarcity of settlement and broader overland routes up to the High Middle Ages.[9] Therefore, landing sites or harbour areas were often pre-urban nuclei and later on developed distinct infrastructures[10] – thus figuring as step stones of and for urbanisation itself. To examine urban construction with regard to water in the 13th century, I want to take a short look beyond Alsace to Koblenz, some 200 km to the north at the – eponymous – confluence of the Rhine and the Moselle. At the site of modern Koblenz, there had already been a Roman *castrum*, then a territorial stronghold, later a town of the archbishops of Trier, who, as ecclesiastical lords, started to have the walls expanded and fortified from around 1250. From this development, there are several accounting rolls preserved for the years 1276–1289 which show the expenses, the seasonal operation, and more. It is significant throughout these rolls that the costs for the quarrymen are equal to that for the transport. Often, the cost of transport was even higher than the cost of labour – quite different to today. That does not even include any charge for material, which was obtained perhaps from Winningen quarry, 5 km up the Moselle river, which may have been in the hands of the archbishops (attested only later).[11]

6 Zeilinger 2018.

7 Fouquet 1999, 224–250; Schott 2014, 109–123.

8 See note 4 and Zech 2017.

9 Preiser-Kapeller – Werther 2018; Himmelsbach 2017; Maschke – Sydow 1978.

10 Hirschmann 1998; Matheus 1985; for the concept of 'harbourscapes' (with regard to Northern Germany), see Müller, this volume.

11 Sander-Berke 1997.

The reason for the establishment and traditing of the account roles probably lies in the quarrels between lord and local commune over the excise tax imposed by the town's elite for the purpose of financing the construction work. Upon that act, probably pre-existing tensions erupted and were later resolved – for the time being – by co-management of the excise tax, which resulted in shared accounting. Still, the archbishops built a fortress, soon to be *intra muros,* and after years of occasionally even violent struggles, they prevailed. Yet, the communal efforts in constructing and financing the wall were a major building block, so to speak, in the process of forming the commune as a body politic and municipal institution.[12] Granted, these accounting rolls are rather situative, standing quite alone in tradition, unlike the serial municipal account books of later centuries, but certainly the series of eleven consecutive rolls on the same matter is remarkable for the 13th century – and they are among the earliest in the Empire – and they are equally certainly relevant to our interest here.

While, at Koblenz, we observe a rather indirect linkage of water, town and political conflicts between commune and lordship, we have more explicit material on that triangle for some Alsatian situations in the 13th century. We therefore return to that region and its intense urbanisation process, increasing in the 13th century, mainly with medium and small sized towns, which is largely due to wine-growing and the wine trade, and the successful export of this.[13] In 1236, King Heinrich (VII) granted the Teutonic Order the right to build a water mill close to his relatively young *civitas* of Mülhausen in Upper Alsace. At first sight, there might be nothing extraordinary about this grant by the royal court, but the local townspeople – who had a ministerial elite adhering to the royal party – became quite enraged over it. For they had just experienced the King and the Bishop of Strasbourg (the former manorial lord there) quarelling over the dominion of that stretch for two decades – and they certainly did not want a third feudal factor 'on site'. So, they called a town assembly in the church and – upon *communi omnium consilio* – built their own mill right at the place designated for the Teutonic Knights. What a power grab by the urban commune! To understand that action, one has to take into account that mills were not only places of food processing then, but also inevitable places of power, and not least for levying fees, namely the mill tax.[14] Furthermore, in this case the supposed site was probably part of the common land, to which the commune had rights of use, if not of appropriation – and which was a, if not *the* important factor in the development of the commune as a political actor, not only in Mülhausen, but in several developing towns of the region. Water expanses were, indeed, often an essential part of the commons and often managed by the commune. It is quite significant that the documents relating to this quarrel represent the very earliest ones of the Mülhausen city archive. In the end, the commune had to give in to the will of their lord, the king, but at least they had the Teutonic Knights pay for the right to the mill in cash. Another example for water or waterways, respectively,[15] being contested between lordship and commune stems from the small territorial town of Rappoltsweiler, where, in a partition treaty agreed to among the noble family of Rappoltstein, it is mentioned that the commune had to maintain the roads through town, but it is further claimed, too, that the lordship alone had the right to use the water that runs through town, for their seigneurial mills only. In this second case, the town lords were just too powerful – and too close in space – to grant the commune this right.

Now on to Colmar, which later would become the leading Imperial city in Upper Alsace and which, in some ways, is a sister town to Mülhausen in terms of its early development.[16] Here, the space between three adjacent manors of different ecclesiastic landlords was, in the 11th and

12 Fouquet forthcoming. See the study specifically aiming at communal building around and over water by Gruber, this volume.

13 The following apud Zeilinger 2018, 108 f. 173–175.

14 Cf. Petersen – Reitemeier 2017.

15 Cf. Schenk 2018; Himmelsbach 2017.

16 Again after Zeilinger 2018, 72–100.

12th centuries, filled by mercantile activity and settlement that is archaeologically recorded. The bailiwick over these manors, most prominently the exercise of high justice, was taken over by the Hohenstaufen king, later emperor, Friedrich II and his local men around 1212/1214. The diplomatic tradition shows the presence of *ministeriales* and other officials of all of those 'external' rulers at the place in the decades before and after, many of whom would settle down there and form the first urban elite. In 1212 and again in 1214, the *burgenses* (not yet citizens by full right) of Colmar sold parts of their commons – which probably included stretches of water – in order to use the revenue to enclose their churchyard. For these acts, the emerging community of *burgenses*, obviously headed by followers of the Hohenstaufen, first had to legally, politically and socially appropriate the commons and then persuade the landlords proper to consent to the sales – which they did, or rather had to. In the following 3 to 4 decades, Colmar was encircled with the first comprehensive wall, grew substantially both in population and central functions, and maintained its role as a stronghold for the Hohenstaufen kings and their partisans in the region. It attained the status of a royal city through this, something which it managed to retain far beyond the end of this dynasty – with increasing municipal autonomy. Unfortunately, we do not find much mention of water in this early phase – except for the aforementioned hints in the chronicles, and the catastrophic ones to be treated of later. There is lots of timber dealt with in the sources, though. But this aquatic deficit in the tradition was mended towards the end of the 13th century.

The internal growth and the development of several suburbs at Colmar made necessary two extensions of the city wall, one around 1250 and again around 1287. This led to all sorts of structural re-arrangements within the (new) walls, too: in a charter of May 14th 1295, the Prior of the Dominicans in Colmar declared that the city council had granted an extension of the convent's grounds and buildings beyond the 'old' wall and trench and the construction of buildings for its needs.[17] Yet, this was to be done in a way *daz wir die flusse sollen lassen fliessen in aller der friheit, als die burger vnd och die stat bedorfent* (that we should let the streams flow in all freedom, as the citizens and the city need). Also, over those streams the Dominicans were to build two open chambers with four seats, to which all townspeople would have free access – to take care of their (in this case 'special') necessities.

By the way, for the years 1292 and 1302 *the Annales Colmarienses maiores* – a tradition alongside the above-mentioned Dominican – find it noteworthy, that in the first-named year, a 'technician invented a machine to pipe the water through the streets' of Strasbourg, and that, at the latter date, the citizens of Colmar were able to channel water to all city quarters. In the year 1293, as the *Chronicon Colmariense* records, the king (or anti-king) Adolf of Nassau was besieging Colmar in his fight for sole power against Albrecht of Habsburg. One of his troops' measures was to divert the *Mühlbach*, the mill creek, which supposedly led to a blatant shortage of flour in the town and to people having to push the mill wheel – with a meagre outcome.[18]

Water as an environmental hazard for towns

But with that, we move on to cover, if only briefly, the hazardous aspects of water and urbanisation. Having initially portrayed the large-scale environmental effects of urbanisation[19] (not least by deforestation) – which even the contemporaries were able to discern – and having introduced the problems of sanitation and sewage[20] with the last-mentioned episodes, the cata-

17 CAOU 5, 515.

18 Pertz 1861, 165 f. 219. 226 (the Latin again translated).

19 For an eco-archaeological perspective, see Schreg, this volume.

20 See Arndt, this volume.

strophic incidents related to water have to be mentioned here as well: besides earthquakes, fires, droughts, storms and so forth, there are also plenty of references to the hazards of water in the chronicles of the Upper Rhine in the Late Middle Ages.[21] Leaving aside the aspect of ice jams,[22] I want to point to the regularly occurring floodings by the rivers Rhine and Ill and the damage done not least to bridges – with an often huge loss of human life. Another equally interesting instance is reported in a passage of the *Annales Colmarienses maiores* relating to the year 1281, which had supposedly been particularly cold and humid not only in Alsace, but well beyond. As the *Annales* tell us, the torrents flowing down the slopes of the outliers of the Vosges mountain range flooded and ravaged the entire small town of Sulz in Upper Alsace, filling it with sediment. At the same time, the close-by town of Gebweiler was hit by a huge landslide caused by the same event.[23] So, water not only helped in building new or growing towns, but – as we know from other regions and traditions, too – might also destroy urban life. The re-building of towns after catastrophic incidences, of 'Städte aus Trümmern',[24] is another interesting aspect, very apt for inter-epochal and inter-disciplinary research. Interestingly, the remarks on arid years, in which shipping on the Rhine was very limited, is enriched by the chronicler's report that there was plenty of wine in Alsace which could not be shipped and exported, and was thus abundant and cheap at home.[25] As so often in medieval accounts, there had to be an upside to extreme occurrences.

Conclusion

With these remarks, the outline of which 'aquatic' aspects an examination of the early medieval urbanisation of the Rhine Valley may provide should be clear. They should also stress that water is – or rather should be more of – a core aspect of premodern Urban History, too, and why this is so. Admittedly, it is mostly 'snapshots' that are presented here, which are in any case the empiric normality for historians of the High Middle Ages, but which are also – ever so small – windows into that time, that still grant us important hints of the contemporaries' perception and handling of water and town. As we could see in the presented documents and episodes, there was often a link in content between waters and walls, bridges and mills, and so forth. All considered, water was not only a matter of biological and economic livelihood, but also an eminently political aspect of urban development and town life within the decades covered here. Water certainly was a regular matter of concern, often a conflicted matter in the fluid interactions between the social and political actors in towns. Water was thus not only a natural element and economic transmitter, but also a frequently negotiated, occasionally embattled, matter. In this way, research on water and town is right at the interface of Environmental History, Economic and Social History, Political History, Archaeology, Art History, and even Limnology.

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21 Cf. Schenk 2012; Fouquet – Zeilinger 2011, 20–34.

22 See Rohr, this volume.

23 Pertz 1861, 207.

24 Ranft – Selzer 2004.

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