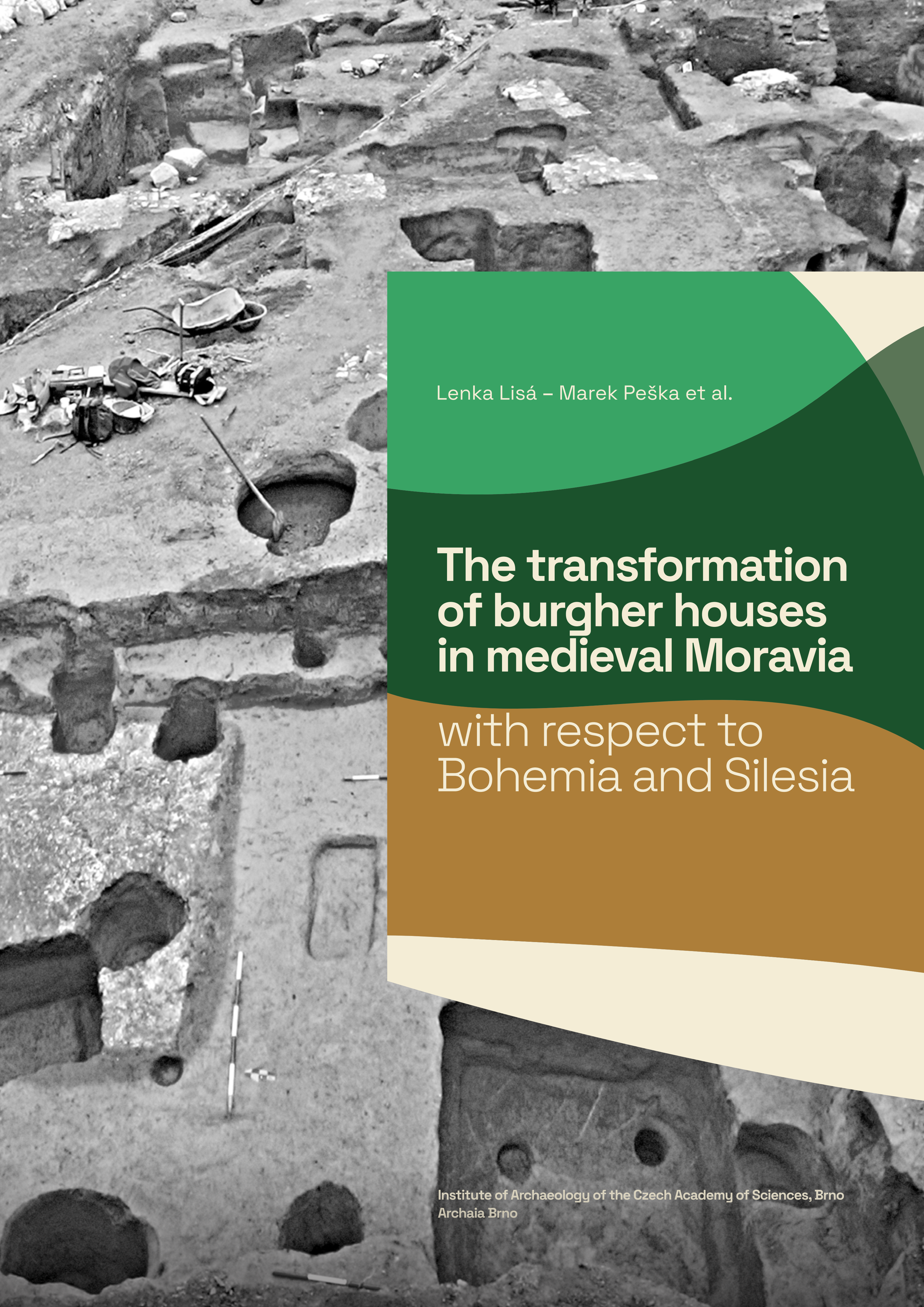


Lenka Lisá – Marek Peška et al.

The transformation of burgher houses in medieval Moravia

with respect to Bohemia and Silesia

Institute of Archaeology of the Czech Academy of Sciences, Brno
Archaia Brno

The transformation of burgher houses in medieval Moravia
with respect to Bohemia and Silesia

Spisy Archeologického ústavu AV ČR Brno 72
Editor-in-chief: Balázs Komoróczy

ISSN 1804-1345

The transformation of burgher houses in medieval Moravia with respect to Bohemia and Silesia

Lenka Lisá – Marek Peška et al.

Czech Academy of Sciences, Institute of Archaeology, Brno
Archaia Brno

Brno 2022

The preparation of this book was supported financially by the Czech Science Foundation project
entitled: Transformation of the Burgher House in the 13th Century (Brno-Prague-Wroclaw),
Grant No. GA17-23836S.

The book was published with financial support of the Czech Academy of Sciences.

Lenka Lisá's involvement was supported by the Institute of Geology
of the Czech Academy of Sciences RVO: 67985831.

Institute of Archaeology
Czech Acad Sci, Brno

Czech Academy
of Sciences

Authors in alphabetical order:
Jaroslav Bartík, David Buriánek, Małgorzata Chorowska, Tomáš Chrástek,
Tomasz Cymbalak, Petr Duffek, Petr Kočár, Romana Kočárová, Veronika Kočí Dudková,
Tomáš Kolář, Václav Kolařík, Peter Kováčik, Tomáš Kyncl, Lenka Lisá, Barbara Marethová,
David Merta, Marek Peška, Jerzy Piekalski, Rudolf Procházka, Michal Rybníček,
Michael Rykl, Lenka Sedláčková, Matouš Semerád, Jakub Šimík, Pavel Staněk,
Pavel Taibl, Jakub Těsnohlídek, † Jitka Vrbová-Dvorská, Pavla Žďárková, Anna Žďárská,
Michal Zezula, Antonín Zůbek.

Reviewers: Prof. PhDr. Jan Klápště, CSc., PhDr. Pavel Šlézar, Ph.D.

Czech Academy of Sciences, Institute of Archaeology, Brno
Archaia Brno

Brno 2022

ISBN 978-80-7524-053-8 (Czech Academy of Sciences, Institute of Archaeology, Brno) (print)
ISBN 978-80-7524-059-0 (Czech Academy of Sciences, Institute of Archaeology, Brno) (online ; pdf)
ISBN 978-80-908220-2-3 (Archaia Brno) (print)
ISBN 978-80-908220-6-1 (Archaia Brno) (online ; pdf)

DOI 10.47382/arub2022-05

ISSN 1804-1345

Content

Foreword 9

Chapter 1
Micromorphology in the archaeological context – A tool for understanding the formation history of the floor horizons of a medieval city 11

Chapter 2
On the earliest burgher houses in Prague 15

Chapter 3
Application of 'micromorphology in an archaeological context' for selected studies from the territory of medieval Prague 37

Chapter 4
Transformation of timber building construction in medieval Wrocław 53

Chapter 5
Influence of traditional building techniques on the formation of the Silesian brick townhouse 81

Chapter 6
Wood-and-clay architecture of medieval Brno 101

Chapter 7
The beginnings of masonry burgher architecture in Brno 125

Chapter 8
What is the micromorphological difference between the floors of cellars and above-ground floors in non-masonry buildings in medieval Brno? 133

Chapter 9
Dendrochronological dating of wood-and-clay houses in Brno 139

Chapter 10
Veselá Street, Brno – Results of archaeobotanical analyses 143

Chapter 11
A contribution to the beginnings of early burgher architecture in Jihlava 151

Chapter 12
The question of wood-and-clay buildings on the plot of 16 Masarykovo Square in Jihlava from the perspective of micromorphology 161

Chapter 13
Wood-and-clay buildings in medieval Opava 169

Chapter 14
Micromorphological characteristics of floors and open site areas in the context of medieval households in Opava city centre (former Radniční Street) 177

Chapter 15
Buildings in Uherské Hradiště in the town's first century 185

Chapter 16
Preserved by fire – Unique remains of high medieval wattle-and-daub architecture from Uherský Brod 219

Chapter 17
Market settlement from the 13th century, view of the interior of the house: The case study of Počátky 231

Chapter 18
The formation processes of the fills of wood-and-clay buildings in the mining settlement of Jihlava – Staré Hory 239

Chapter 19
Basements of wood-and-clay houses in Osoblaha 253

Chapter 20
A short look at the floor maintenance practices in the rural areas 259

Chapter 21
Geology of the immediate surroundings of selected medieval towns and sources of raw construction materials 267

Conclusion
The beginnings of burgher construction in Moravia 275

References 288

Selected abbreviations 309

Affiliations 310

Foreword

This book is one of the main outputs of the 'Transformation of Burgher Houses in the 13th Century (Brno-Prague-Wrocław)' project supported in 2017 by the Czech Science Foundation. The project pursued the objective of compiling an exceptional inventory of defunct burgher wood-and-clay buildings from the area of medieval Brno obtained over the past thirty years as part of hundreds of rescue archaeological excavations in an effort to better understand the character of building development at the time. While the topic of the genesis and transformation of the medieval town was periodically discussed between 2002 and 2019 at *Forum urbes medii aevi* conferences, the most recent synthesising FUMA II and III proceedings focused on the earliest burgher houses are now more than 15 years old (Merta, Peška eds. 2005). The many new findings that have been collected during that period of time promise a deeper understanding of the beginnings of burgher development in the Czech lands. In terms of geography, we concentrated on the territory of historical Moravia and the neighbouring parts of Upper Silesia, not with the aim of an exhaustive processing of the given subject in this territory but rather to present the most important research or synthesising views of the development of the oldest houses in various towns in the form of studies by a range of authors. To a certain extent, a representative research probe has been created for Moravia that includes the most important information we have today on former wood-and-clay buildings. We have also attempted to capture the remarkably diverse and unrestrained character of early urban development as well as its gradual stabilisation. And while hotly discussed questions concerning typology, the placement of buildings on plots, the existence of above-ground parts and the transition to masonry construction mostly remain unresolved, they have often been significantly expanded. Although the inclusion of a paper on the geological conditions around the selected towns may seem somewhat misplaced, it was our intention to point out the natural environment that largely determined the use of building materials, especially in the period after the founding of the town. Many shorter chapters are devoted to a micromorphological analysis of floor sandwiches with the aim of understanding the formation processes of floors and offering interpretations of the residential or storage function of analysed spaces. Since the study of the phenomenon of the medieval burgher house is one path towards searching for a common Central European past, we invited scholars from Prague and the Silesian city of Wrocław to join our team of authors. Both of these erstwhile major royal towns are crucial to our understanding of the transformation processes in 13th-century secular architecture in Central Europe. As such, they are also an appropriate comparison revealing that much of contemporary Moravia is a mere periphery of the Western world.

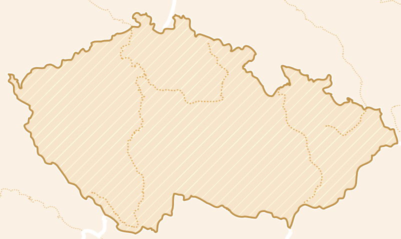
To make the collected information available to foreign scholars, the entire publication has been translated into English. Our original goal has broadened considerably since 2017 and we are therefore delighted that the book was published with support from the Institute of Archaeology of the Czech Academy of Sciences in Brno. Finally, great thanks go to Martin Ollé, who carried a substantial amount of the load on his own shoulders.

Marek Peška

Chapter 1

Micromorphology in the archaeological context – A tool for understanding the formation history of the floor horizons of a medieval city

Lenka Lisá



1. Introduction

This introductory micromorphological chapter begins by explaining what exactly is meant by the method of 'micromorphology applied in the archaeological context of a medieval city'. The results from individual cities are then discussed in separate chapters of this book and focus on the floor sandwiches of recessed and above-ground buildings in the area of medieval Brno, Prague, Opava and several examples from medieval rural contexts. The book also contains a chapter dedicated to the geo-ethnoarchaeological study of the creation and modification of floors. So, why floors? This phenomenon is often neglected along with its informative value required to interpret the practices related to the daily life of medieval society. In this chapter, the reader will be able to comprehend how sampling takes place, what must be ignored when deciding on the method and place of sampling, what information micromorphology in the archaeological context can provide, and, information about what sampling strategies were used in researching floor sediments in the area of medieval Brno.

2. What is the method of micromorphology in the archaeological context?

Micromorphology is the method used to study various types of sediments and soils at more detailed magnifications. Imagine that you can 'pull' a thin film from the sediment or the soil, which can then be studied under a microscope. This is exactly what the micromorphology method allows. The disadvantage is the limited view from one angle, so it is not a 3D view, which must be taken into account when conceiving what the sediment looks like 'inside'.

Such a 'film' is technically called a thin section. Although the preparation is not complicated, a precise production protocol must be maintained. However, the work of a micromorphologist begins long before the cut can be observed under the microscope. A micromorphologist is usually a geoarchaeologist, geologist, pedologist or archaeologist who is fully knowledgeable of the archaeological context, the parameters of the geological subsoil and has a good idea of the formation processes at the site. Sampling from specific contexts must respect pre-determined questions as with any analytical method it is necessary to proceed from the so-called macro to the micro, and it is not possible to create a basic framework for the formation processes at the site based on the study of cuts. Micromorphology in the archaeological context is therefore this method applied directly to sediments or soils that are related to the interpretation of the archaeological site (Karkanas, Goldberg 2019; Goldberg, Macphail 2006; Macphail, Goldberg 2018).

3. Collection and preparation of micromorphological samples – some practical advice

How is a micromorphological sample taken? In principle, it involves removing an intact block of sediment from the archaeological context, which can be transported to a laboratory where it will then be dried and impregnated in a vacuum with resin. As a result of the impregnation in the vacuum, the pores contained in the sediment will be filled with resin and their exact shape will thus be maintained. It will also be possible to retain the softer parts of the sample such as the organic matter in the resulting cut due to the impregnation.

Sampling methods vary depending on the type of material collected. The most suitable material for sampling is usually sorted dusty or clayey sediments (e.g. loess or fine-grained fluvial sediments). From these sediments, it is usually possible to 'cut out' a cube (Fig. 1) of the sediment without the need for any supporting sampling structure (box). In the case of sandy and gravelly sediments or sedimentary sets with changing grain sizes, it is necessary to use the so-called Kubiena box (Fig. 1). This is a sampling box named after the founder of soil micromorphology and can be made of thin sheet metal or paper, or, for example, a milk carton. If the exact shape cannot be removed, as this is prevented, for example, by the number of coarse clusters, ceramics or bones, it is necessary to remove a larger amount of material by fixing it in gypsum or gypsum dressings. A stronger bed must be created where the sample remains intact during the sampling. After each sampling, the individual samples must be wrapped tightly in clink foil so that they do not disintegrate or dry out quickly. Orientation and context must be indicated on the samples. If it is not possible to transport the samples to the laboratory, it is advisable to store them in a dry, cool place. Samples must not be mouldy or frozen.

Those samples that are transported to the laboratory will be unwrapped from the protective foils, dried for several days at a temperature of approximately 30°C and impregnated with resin in the vacuum (a desiccator or a vacuum chamber). It must be the same type of resin that will then be used to make the cuts. Therefore, if sending samples to a commercial laboratory, it is advisable to send them unpacked. The specialist in the production of cuts then cuts a flat surface of the sample from the impregnated block, which usually hardens for several weeks, and then glues it under pressure to the matted slide. After hardening, the specimen is placed in a machine where most of the sample is gradually removed with diamond wheels. The goal is that only a thin layer of the sample (the previously mentioned film) remains on the slide, which can be illuminated when studied under a polarizing or binocular microscope. A thickness of 30 µm is ideal for minerals in order to recognise and correctly identify their optical properties.

4. What information can micromorphology provide in an archaeological context?

The micromorphology method provides a detailed insight into the sediment structure. This means that it provides information on the type of pores, their relationship to the coarse-grained and

Fig. 1. The way how to sample the micromorphological blocks from the section. Photo by P. Lisý.

fine-grained components of the sediment, the type and preservation of organic and organomineral components of the sediment and, information on pedofeatures. It is a source of information about both the primary and especially the post-sedimentary processes that played a role in the formation of the current sedimentary record. It is possible to get an idea of the homogeneity of the material, its source, anthropogenic intrusions and the associated primary formation history. Pedofeatures are then another guide to interpreting the processes that took place in the sediment in the past, either during sedimentation, just after it or at a time when the context was abandoned and possibly influenced by processes entirely unrelated to the original context. A number of manuals and specialised publications have been published on the topic of micromorphology (e.g. Stoops 2003; Goldberg, Macphail 2006; Stoops et al. 2010; Macphail, Goldberg 2018; Karkanas, Goldberg 2019). However, there are many more publications on this topic and especially dedicated to the individual aspects of micromorphology and micromorphology in the archaeological context.

5. What is a floor?

The floor is an integral part of every house. In the archaeological record, the floor is an integral part of the stratigraphy of the house and in some cases, it may be the only remnant delimiting its living space (Karkanas, Goldberg 2019). Clay and clay floors detected in prehistoric or medieval contexts were usually made of homogeneous materials of local origin (Macphail, Goldberg 2018), whether untreated or slightly modified, by, for example, adding organic matter or manure (Karkanas 2006; Boivin 2000). Examples include the study of Viking houses in Iceland using volcanic ash (Milek 2012) and prehistoric and medieval buildings in the United Kingdom using diatomaceous earth and tills (Macphail 1990). To date, the Neolithic floors from the Turkish Çatalhöyük have been the subject of the most attention (Boivin 2000; Matthews 2010; Lisá et al. 2020b).

In the loess areas of Central Europe, loess was the most suitable type of construction material (Lisá, Lisý 2019; Lisá et al. 2020a). Application of loess material has been documented from the United Kingdom (London, Guildhall site) for the purpose of the cleaning function (Goldberg, Macphail 2006). Similar structures have been documented on our territory, for example, in the Hallstatt earthworks in Modřice near Brno (Jarošová et al. 2010) and medieval residential buildings (Lisá et al. 2020b). In some cases, these 'sanitary' layers are covered with a thin layer of humus-rich material indicating a walkable layer (Macphail, Goldberg 2018). The previously mentioned types of sediments are deposited in a walking area with an obvious purpose and are referred to in the literature as constructed floors (Macphail, Goldberg 2018; Karkanas, Goldberg 2019). They often have a sandwich structure where these 'sanitary/preparatory' layers alternate with dark-coloured layers rich in carbon and decomposed organic matter. Such layers were then formed by tread or waste disposal and were not applied for any particular purpose. Therefore, it is not a 'constructed' part of the floor in the true sense of the word (Macphail et al. 2004). In the English literature, they are referred to as 'beaten floors' (Macphail et al. 2004).

Courty et al. (1989) and Gé et al. (1993) introduced a micromorphological concept by which floor horizons can be described. They distinguish a total of two, more precisely three, zones that usually merge into each other. The base of the floor consists of the so-called passive layer, which can be a geological subsoil unaffected by humans, an older cultural layer, a structural part of the floor or material laid on the floor (wooden floor). Above the passive layer is the so-called reaction layer, which essentially only deforms the passive zone. The uppermost part is the so-called active zone, formed by the tread itself (Macphail, Goldberg 2018). Therefore, how does archaeological research distinguish whether it is a structural floor, i.e., a passive or reaction zone, and to what extent is it a tread layer that was not intentionally created? The answers to these questions can be found in case studies that document vanishing approaches to modifying walking horizons, especially using the method of micromorphology in the archaeological context (Goldberg, Macphail 2006; Stoops 2003; Stoops et al. 2010; Macphail, Goldberg 2018; Nicosia, Stoops 2017; Karkanas, Goldberg 2019). Contemporary open-air museums with expositions of folk architecture featuring a village house usually use a clay floor, i.e., a dusty clay material spread over a walking area. The methods of formation do not usually have a specific procedure as it is the application of clay mixed with water. A type of manual was created for the Rožnov open-air museum, composed of recordings of local inhabitants, which were taken in the first half of the 20th century. In contrast, notes from local chronicles were used to create a reproduction of the floor of a country house from the second half of the 19th century (Novotný 2014). Unfortunately, the ethnographic sources for this part of folk architecture are negligible. Most of the work only addresses the building elements, which do not include floors.

6. Notes on the strategy of taking micromorphological samples from the floor contexts of a medieval city

The method of micromorphology of floor horizons has to date been statistically best developed in the territory of medieval Brno. In addition to the results of this study (Holub et al. 2021; see Chapter 8) concerning the type of floor composition and the formation processes in the context of recessed or above-ground structures, it was possible to assess various strategies of micromorphological samples. A long-term goal of geo-archaeological cooperation is to evaluate the extent of the information potential of micromorphology depending on the sampling strategy.

The methodological approach to the study of floor horizons has temporal and spatial pitfalls. Given that the presented samples were taken over approximately ten years and that it is still a relatively new methodology, we tried to reach a consensus about the contexts in which to take samples and to what extent to obtain sufficient information for an acceptable price and energy invested in the consumption and processing. However, how to take floor sandwiches is not only related to the financial demands but, above all, to the interpretative possibilities of the archaeological context. The most suitable situation for consumption concerning the following interpretation is a large-scale research in which the spatial relationship to the location is obvious both to the plot location and to the links to other buildings and the use of open space. The ideal situation is when the type of building and the spatial relationship to the surrounding area can be interpreted based on archaeological clues. The micromorphological analysis then clarifies the information about the use in a specific context.

Sampling is more difficult for basements because they are usually formed by a repeated set of microlayers interspersed with sanitary layers. To understand the situation, it is necessary to sample a larger number of samples vertically. In the case of the above-ground floor sandwiches, which are not very thick, the problem is the opposite. The thickness of the floor sandwich is relatively small but spatially variable. In this case, if the situation allows, it is advisable to take a larger number of samples in the vertical plane. Regardless, it is necessary to take larger samples of at least 4 × 7 cm.

Chapter 2

On the earliest burgher houses in Prague

Tomasz Cymbalak – Michael Rykl

1. Introduction

Prague is the historical capital of Bohemia through which the River Vltava flows. It was the seat of the ruling dynasties residing at Prague Castle and at end of the 11th century also at Vyšehrad, situated on the opposite river bank than Prague Castle. Recessed houses excavated within its territory not only count among the oldest ones discovered in the present-day Czech Republic, but their variability belongs to the most elaborate in the whole country (Klápště 2012; 2016).

Archaeological research in the historical core of Prague has over a century-long tradition. At the outset, the researchers focused on the earliest chapters of Bohemian statehood and, within the narrower theme of the history of the Prague agglomeration, on the most important sites and areas within the later metropolis (Kuna et al. 2019). In contrast, the interest in early secular architecture and the wide range of settlement activities that accompany it from the proto-urban or early urban milieu can be registered in Bohemia from the late 1950s (Kavan 1956, 378, 383; Richter 1963, 206; Hrdlička 1972; Klápště, Muk 1988, 199). A more systematic examination of these issues within the broader settlement or the chronological context of medieval Prague has only been conducted at a few sites (Republiky Square; Karmelitská Street; COPA/QUADRIO; Národní–Mikulandská streets / DRN). All these projects were excavations carried out over the past two decades. The individual fieldwork took the form of large-scale excavations related to investor projects. They all concerned unique sites whose position within the spatial arrangement of the medieval agglomeration promised significant findings. From the earlier excavations that represent a cornerstone for the issue presented in this text, we must not omit the work by Ladislav Hrdlička and the results of his excavation in Klárov (Hrdlička 1972) and in U Sladkých House in Husova Street, Prague Old Town (Hrdlička 1980; 1983, 625, Fig. 6).

The most noticeable evidence of the beginnings of permanent occupation on both banks of the River Vltava has the form of large rectangular features recessed into the surrounding terrain that are interpreted as remnants of structures built without the use of stone. Their number rose considerably with a surge of excavations in the centres of Bohemian towns in the 1970s and 1980s, and the earlier designation ‘residential cottages’ was replaced by the term ‘pit houses’. The following decade, with a rush of renovation of the historical town cores in Central Europe after 1989, brought new finds and new interpretations of these features, which were ascribed to the function of cellars within larger above-ground structures (Donat 1993; see Vařeka 2002, 252).

The earliest structures in the core of the early medieval Prague agglomeration are represented by slightly recessed log features with an area of less than 20 m^2. Their occurrence has been documented in the part of the continuously settled *suburbium* of Hradčany in the territory of present-day Lesser Town, and they can be dated to the 10th century. A brand new type of dwelling is registered in this area around the beginning of the 12th century – larger non-masonry features whose above-ground structure was mostly based on wooden load-bearing posts. Their outer walls, recessed or semi-recessed into the surrounding terrain and geological subsoil, were made of wooden boarding or secured by a stone lining

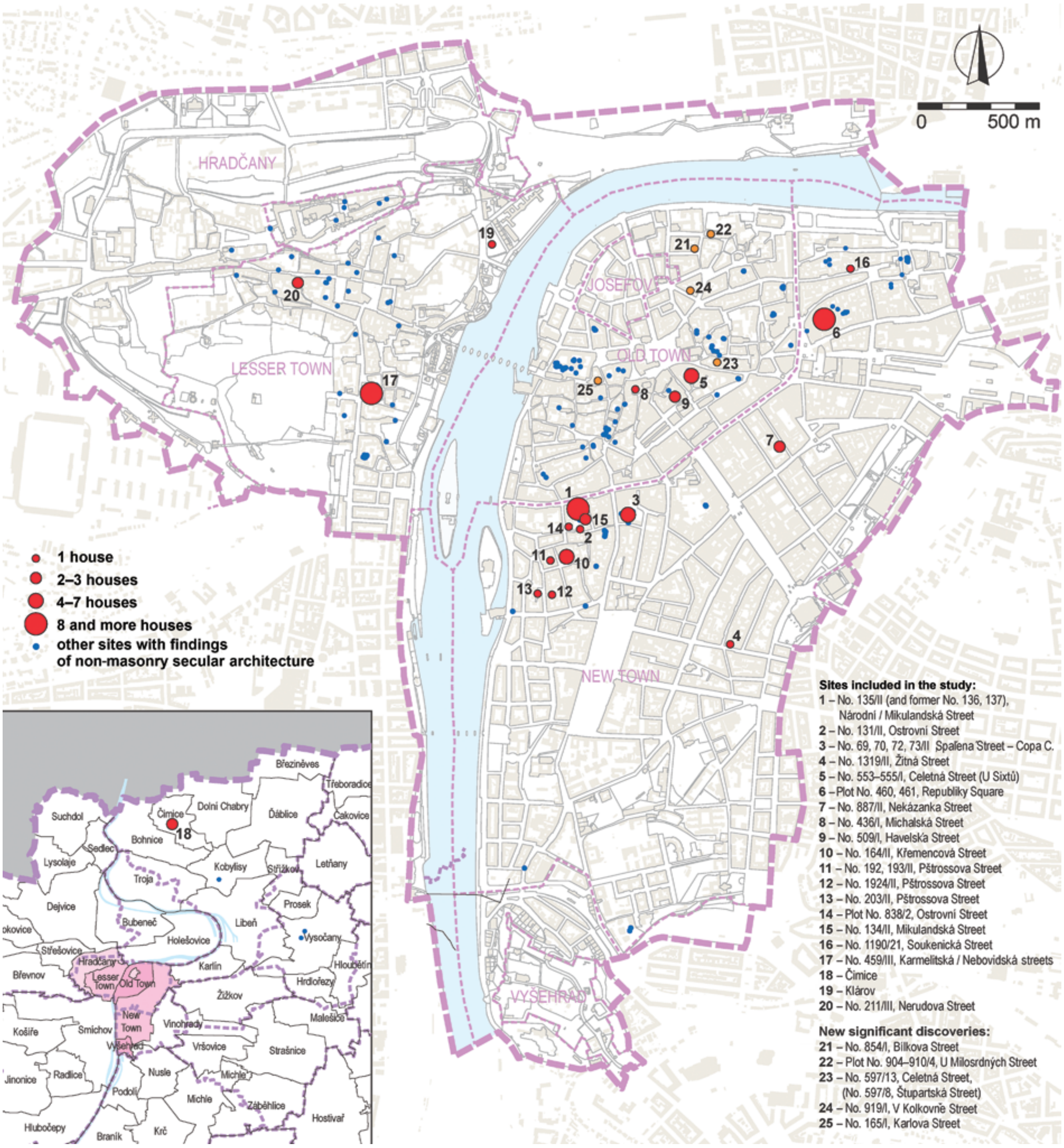


Fig. 2. Prague – the Prague Conservation Area. The historical core of the city with sites containing finds of the earliest remnants of burgher architecture (recessed and semi-recessed structures) marked. Theme: authors. Graphics by S. Babušková.

(Čiháková 1999, 19; most recently Piekalski 2014, 136–140). For the later period, their presence has been documented by archaeological excavations throughout the extramural settlement of Prague Castle (Fig. 2).[1] Basic information concerning the localisation of early to high medieval non-masonry structures and their remnants have been drawn from an overview of archaeological fieldwork carried out in the historical core of Prague that is published biannually in the Prague Historical Review (*Pražský sborník historický*).

Even after the arrival of 'so-called' small-ashlar houses built of marlstone (late 12th and early 13th centuries), these buildings continued to co-form the character of the densely settled area on both banks of the Vltava, including the high-prestige areas of the settlements, such as the main roads and marketplaces (e.g. Bureš et al. 1997; 1998; Boháčová, Podliska eds. 2018; Cymbalak, Rykl 2018 including references).[2]

The definition of a 'recessed' or 'semi-recessed' house is purely technical, based on exact findings yielded by archaeological excavations in medieval towns. These building remnants are most often revealed within the fieldwork. The result is that in professional practice, the terms sunken and semi-sunken structure are almost automatically assigned to non-masonry houses from the medieval period. Despite this, buildings with basements or cellars are also registered from later periods. When determining whether a structure is completely or only partially recessed, the decisive factor is the level of the lowering of its lowermost storey compared to the surrounding terrain at the time of the origin of the building – hundreds of years ago.

Given the occurrence of these old structures for which we can presume the existence of a complete or partial lowering within the building's layout, we should also extend the definition of recessed and semi-recessed structures from the vertical to the horizontal level. An illustrative example of the outlined situation is provided by features examined in the late 20th century in the core of the Old Town and the northeastern part of the New Town. In the depth of the plots of the Old Town House U Sixtů (553–555 Celetná Street), square features recessed into the original terrain with an area of 30–40 m^2 were revealed that were interpreted by the authors of the research as cellars of larger houses, granaries or craft workshops dated to the late 12th or early 13th centuries (Bureš et al. 1997, 205). An illustrative example of the use of the construction pit for the needs of a basement of an above-ground house was documented almost 20 years ago in the eastern part of the former George of Poděbrady Barracks in Republiky Square (Juřina et al. 2009, 49–51).

However, a more complex assessment of recessed or semi-recessed houses from the territory of the historical core of Prague has not been carried out yet. This text does not set itself such an ambitious task either. The objective is to outline the most distinctive directions discovered within archaeological research that should be paid further attention. This is why we focus on a selected section of the right-bank part of the city centre[3] where, it appears, the most distinct examples of the evolution of burgher houses in Prague can be illustratively shown. This approach was chosen due to the rather large territorial expanse of the medieval agglomeration that would have to be taken into account in a complex and time-demanding analysis and also due to the quantity and institutional fragmentariness of the information from archaeological fieldwork activity.

2. Settlement activities with the focus on the left-bank part of Prague

Early medieval settlement activities on the right bank of the Vltava and the related first evidence of its permanent use need to be linked to the development of the core of the pre-urban agglomeration after the second half of the 10th century (Ječný et al. 1984; Čiháková 1999, 20; Čiháková et al. 2000;

1 The results of bibliographic research accompanied by information from available literature and the conclusions of archaeological reports on rescue excavations imply the following ratios of the finds of recessed structures in the individual cadastral areas of Prague: Old Town 39%, New Town 36%, Lesser Town 19%; Prague Castle and Hradčany 3.5%, Vyšehrad and sites outside the Prague Conservation Area 2.5%.

2 Although information about the age of recessed and semi-recessed features and the related buildings is incomplete, reflecting the current state of the processing of the fieldwork projects, a certain trend can be observed indicating the dominant position of a group of basements dated to the 12th and 13th centuries (52%). Of the total number of 226 features recorded to date, as many as 20.5% have not been assigned to a particular period, and 7% of these structures were dated broadly to the High Middle Ages. A more detailed analysis shows that 4% were dated to the mid-10th century, 9% to the 11th century, 8% to the 12th century, 16% to the period between the mid-12th and the mid-13th centuries, 29% to the 13th century, 6% to the 14th century and 0.5% to the 15th century.

3 To provide a full image of the form and changes of the earliest secular medieval architecture in Prague, naturally, the most important findings from the left-bank part of the city will also be taken into account.

Dragoun et al. 2002, 349–351; Hrdlička 2000a, 198; 2000b, 50; Klápště 2005a, 340–354). The later growth of this part of Prague (early/mid-11th – mid-12th centuries) reflects the occupation boom along the road connecting newly founded Vyšehrad with Prague Castle (Cymbalak, Podliska 2008, 309–310 including references) or in the area of the most easterly situated settlement of Na Poříčí, which prospered due to its advantageous position near an ancient east-west route leading from the centre of the earliest part of the later Old Town up to Bubenský Ford (Kašpar 2018b, 208, 211).

The western part of the centre of the Prague Basin with the Lesser Town extramural settlement and the agglomeration of medieval settlements around it is of an earlier origin (Čiháková 1999, 15–18). This relatively small and morphologically varied area compared to the Old or the New Town (Čiháková 1999, 11–12) saw other, more intricate settlement processes, of which no traces are known on the opposite bank of the Vltava: a complex evolution of the fortification system, a communication network bound to the close proximity to the ruler's residence and a point where the river could be crossed.

No 12th–13th-century medieval building built of flammable materials has survived there to this day. Features or parts using other than stone structures are known from only a few places in the historical core of the city, although these were dwellings from the High Middle Ages.[4] The pre-urban houses of the inhabitants of early medieval Prague were mostly represented by wooden structures.[5]

A separate chapter in the architectural development of the town's secular buildings is represented by residential houses made of stone, the small-ashlar houses, which started to appear in the second half of the 12th century in the southern part of the settlement below Prague Castle on the left bank of the river (most recently Havrda, Tryml 2013, 69–70, 326–327 including references) and in the area of the later Old Town (Dragoun et al. 2002) and New Town (Juřina et al. 2009, 42–51; Dragoun 2018). More than 80 of these buildings in the Romanesque style are known today. These represent a virtually independent category in the history of Prague, Bohemian and even Central European architecture and archaeology (Dragoun et al. 2002).

Later structures, or rather their preserved remnants, which belong to the subsequent stylistic category, are more numerous and represent the core of many buildings that exist to this day. This Gothic, or rather foundation wave, can be linked to the time of the establishment of early Prague towns in the 13th and 14th centuries (Cymbalak et al. 2011, 40; Hauserová 2003; 2011; Rykl et al. 2003; Rykl 2004).

Bibliographic research of the available professional literature and selected archaeological reports from excavations carried out in the historical centre of Prague has yielded, for the first time within the study of local medieval secular architecture, information about 226 non-masonry residential buildings. Although we are aware that this figure says nothing about the precise number of houses situated on the left and right banks of the Vltava, we can state that the mentioned buildings represent the most convincing evidence of permanent occupation within the early medieval Prague conurbation. In each of the documented cases, archaeological contexts revealed by the excavations indicate that all these structures vanished during the transformation of the local settlement units into a residential town. Even so, the traces of these structures make it possible to study crucial moments in the development and the most important attributes of urban non-masonry secular buildings in the centre of the Prague Basin.

3. The phenomenon of 'recessed' houses

The 'phenomenon' of recessed buildings can be encountered in the period preceding the 'age of small-ashlar houses' as well as in the time when these buildings were at the height of popularity. The low time and acquisition demands of recessed and semi-recessed buildings made of flammable materials were undoubtedly the decisive factors behind their popularity, which even continued during the Gothic period.[6]

The study of the evolution of townhouses in the early phase of their history is complicated for many reasons: similar processes took place in various places with various time shifts; earlier structures

4 An example of these buildings is a fragment of a feature examined by Matouš Semerád and Pavel Taibl in the currently reconstructed house at 887 Nekázanka Street, New Town. We thank the authors of the research for information about the structure, which was built using trampled soil. A similar, albeit earlier structure of the same age, was documented at 135 Mikulandská Street, see below, and at 131 Ostrovní Street (Cymbalak, Semerád 2013).

5 Even so, structures in which stone pre-foundations or foundation walls have been recognised occurred in the Lesser Town as early as the 10th century (Čiháková 1999, 19).

6 The same is true of above-ground structures built of wood that lacked recessed parts.

were often replaced by later buildings without leaving any traces of their existence. The addition of cellars to earlier buildings or the different density of buildings in built-up areas, formed over centuries and gradually replacing earlier structures, were also considerably important factors in this context. Only exceptionally does a single plot provide the opportunity to observe the evidence of an almost complex transformation of early urban buildings. A model example of such a metamorphosis similar to that of Most (Klápště 2002, 184) has been studied most recently in Mikulandská and Spálená streets, New

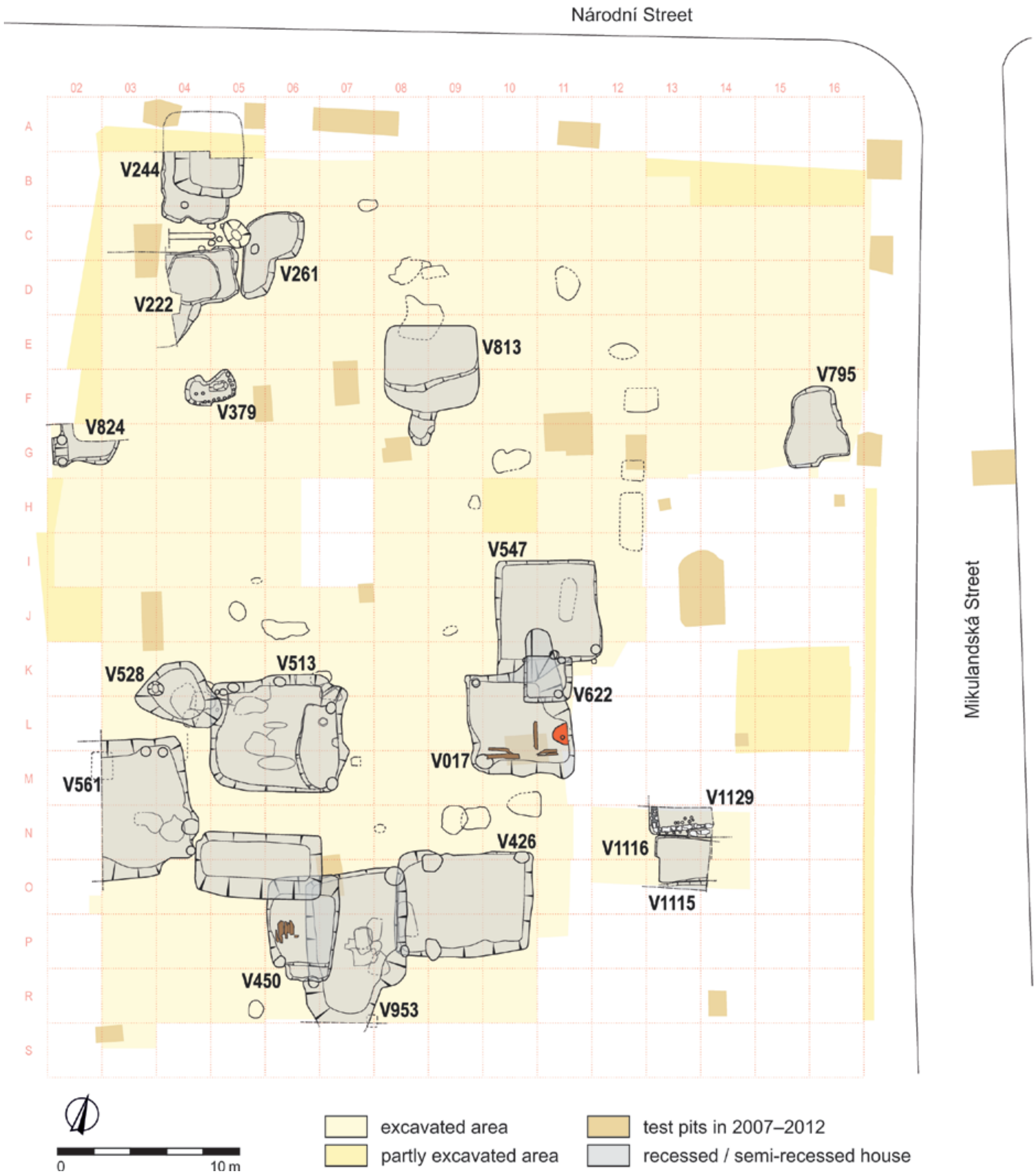


Fig. 3. Prague 1 – New Town, Mikulandská Street, plot No. 843, House No. 135/II, Národní Street, plots No. 841 and 842. The context of pre-urban semi-recessed buildings of a residential character discovered during the excavation at the Národní Palace / DRN construction site. The examined area – light and dark yellow; earlier semi-recessed houses and accompanying recessed structures – grey. V222, V244, V261, V379? – Phase A – pre-urban I; V017, V426, V450, V513, V528, V547, V561, V622, V953 – Phase A – pre-urban II; V1115, V1116, V1129 – Phase B – pre-urban III. Compiled by H. Kovářová, P. Kaplan, M. Hájková, J. Švach, E. Ditmar.

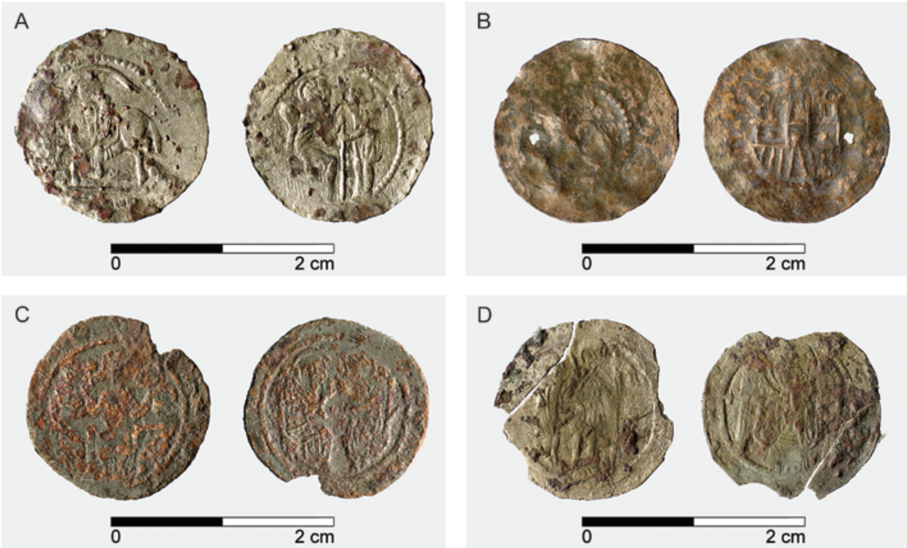


Fig. 4. Prague 1 – New Town, Národní Street, plot No. 841, selection of coinage of the denarius period from the northeastern part of the area of the rescue excavation by the National Heritage Institute in Prague, No. 2013/33.
A – Vladislaus I (1120–1125), Šmerda 1996, 290;
B – Conrad I? (1061–1092?), Šmerda 1996, 434c;
C – Sobeslaus I (1125–1140), Šmerda 1996, 222b;
D – Sobeslaus I (1125–1140), Šmerda 1996, 218c/d.
Identification of coins: J. Militký, M. Müller. Photo and graphics by M. Kalíšek.

Town (Cymbalak, Rykl 2018; Cymbalak et al. 2011) and within a block of houses in Karlova Street (Hauserová, Rykl 2003; 2011; Rykl et al. 2003; Rykl 2004), where a transformation took place in the second half of the 13th century and after a fire in 1316 (Fiala ed. 1976, 298), which probably destroyed several houses in the Gall Town (Rykl 2012).

In the area of the plots situated near the intersection of Národní and Mikulandská streets, this process is manifested by the earliest settlement horizon (late 11th and early 12th centuries) with the occurrence of fragments of pottery vessels with advanced/later forms of chalice-shaped rims accompanied by representatives of archaic swollen rims and numerous various shaped features (stake, post and bar holes, small trenches). Large structures, most probably residential, are characteristic of the later development phase of early medieval occupation (Fig. 3). Their preserved remnants have the form of 1–1.2 m deep square or rectangular pits. Post holes discovered in the corners and along the circumference of the individual features indicate that they were recessed or semi-recessed structures built with the use of wood. The features were recessed into earlier anthropogenic contexts and the surface of the Vltava terrace; their area was 20–42 m^2. The post-built structure bore the roof of the building and, at the same time, formed the framework for the outer walls. The remnants of wooden planks or boards were discovered on the bottom of the features in two cases; these can be interpreted as floors, collapsed ceilings or wall fills. No stone foundation frame walls or other stone structures were discovered for any of the features examined within the framework of this phase of the occupation at the site. Similar archaeological contexts have also been documented in recent years in the immediate vicinity.[7] Dating material gathered from their destruction phases is represented by numerous pottery assemblages with archaically and classically swollen accompanied by a smaller number of fragments with large upward-pulled rims (mid-12th to mid-13th centuries) and denarius coinage (Fig. 4). In accordance with the results of the most recent historical bibliographic research (Musílek 2015, 3–6 including references), the remnants of the original dwellings can be interpreted as the northern part of the early medieval settlement of Opatovice (Wallisová 1998), whose core was formed by the more southerly situated Romanesque Church of St Michael (Baťková ed. et al. 1998, 125).

4. The founding of the Old Town of Prague and its reflection in the form of secular houses

The constitution of the Old Town and the construction of its fortification system with elements preserved to this day represent an important turning point in the medieval development of the studied territory. This deed considerably changed the form of local early medieval occupation and established

7 160/II Opatovická Street (Cymbalak 2013, 17–18), 164/II Křemencová Street (Vyšohlíd 2017; Vyšohlíd, Zavřel 2019, 71–72), 192/II and 193/II Pštrossova Street (Wallisová, Tryml 1995), 1924/II Pštrossova Street (Podliska 1994), 203/II Pštrossova Street (Cymbalak 2007a; 2007b; 2008), Ostrovní Street, plot No. 838/2 and 134/II Mikulandská Street (the results from the last two streets have still not been unpublished; I thank Radek Široký for the information).

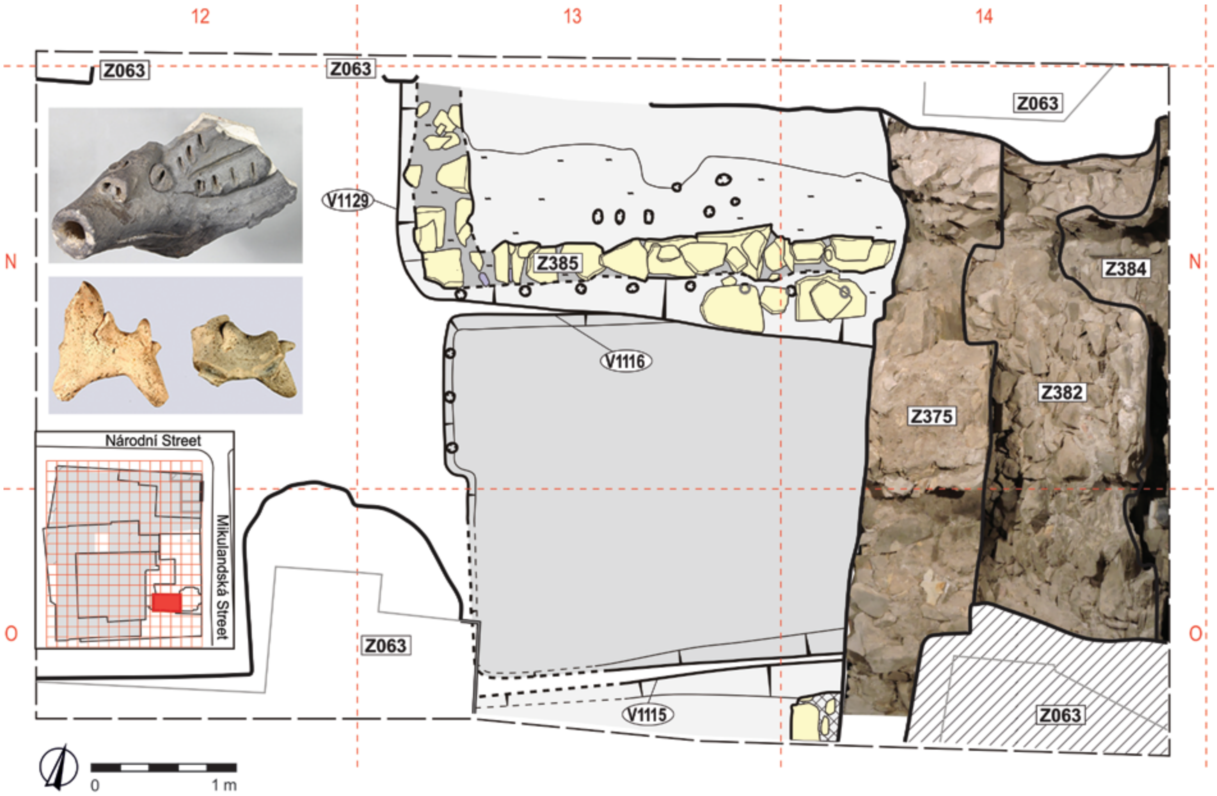


Fig. 5. Prague 1 – New Town, Mikulandská Street, plot No. 843, House No. 135/II. The context of fragments of the lowest parts of residential (?) buildings from Phase B (pre-urban III) excavated in the area of the passageway of Schönkirch Palace. Based on fieldwork documentation made by J. Švach, E. Ditmar, M. Kalíšek, 2015–2017; photos of finds (fragment of a ceramic aquamanile, zoomorphic ceramic sculptures of horses) by M. Kalíšek.

new conditions for the local population for several decades to come. Finally, it set the basic urbanistic framework for the historical core of right-bank Prague with its final phase in the form of the foundation of the New Town. The construction of the fortification during the reign of Wenceslas I gave the inhabitants of the Old Town a sense of security; on the other hand, it delimited its spatial development and represented a radical intervention in the life of earlier settlements. In the area of present-day Národní Street, part of the built-up area, along with local activities, was transferred further to the south (Cymbalak, Staňková 2014, 162). Analogous phenomena were also recorded in other places along the route of the newly built walls. At least four Romanesque structures of a residential character, including a palace from the second half or the end of the 12th century, ceased to exist in the eastern part of the Old Town, close to St Benedict Gate (the area of present-day Republiky Square; Juřina 2009, 66–71; Juřina et al. 2009, 44–48; Omelka 2009, 442). A radical intervention in the form of the settlement structure on the right bank of the agglomeration is reflected in the emergence of dozens of pyrotechnological features that were detected in the course of the excavation, especially in the places of vanished or controllably removed semi-recessed buildings.

For the period between the second half of the 13th and the first half of the 14th centuries, a rise (ca 0.3–0.4 m) was documented in the historical overburden and the occurrence of several subsurface (0.2–0.5 m) features in a square or rectangular shape interpreted as mutually arranged lower parts of above-ground residential (?) buildings that respected a nearby road.[8] The occurrence of the

8 Some were accompanied by a stone foundation wall (ca 0.3–0.4 m wide, ca 0.15 m high) built of pieces of quarry marlstone bound by clay. The accompanying negative imprints of bar holes detected in two parallel lines (one in the interior and one in the exterior part of the structure) indicate that it might have been a building with a wattle or rather a compacted soil wall structure. Regrettably, the greater part of the building was damaged by later interventions, and it is very difficult to ascertain its area. The minimum depth of the feature was 0.35 m. An earlier feature with a minimum area of ca 7.3 m² situated in the close vicinity of the structure described above was slightly recessed (0.3 m) into a settlement layer of a similar age; its western edge was lined with bar

aforementioned remnants of above-ground structures detected near the west frontage of present-day Mikulandská Street represents evidence of the repeated permanent occurrence of residential buildings. The mutual arrangement and concentration of these structures along the road may prove a crystallisation phase of the organisation of spatial relations in the area south of the Old Town walls. The gradual stratigraphic development of historical overburden in the period under study is confirmed by frequent finds of fragments of red painted pottery and later coinage,[9] which occurred in the fills and the immediate vicinity of the individual structures. The hectic transformations registered in the examined area evidence the rising potential of the territory in front of the town wall[10] and can be considered a harbinger of the approaching foundation of Prague New Town in the reign of Charles IV (Fig. 5).

5. The foundation and secular houses of Prague New Town

The transformation of the area summarised above culminated in the foundation of a new urban unit by Charles IV in 1348 (Lorenc 1973; Kašpar 2018a). The most distinctive element of the early urban architectural phase at the site had the form of an almost rectangular corner. It was comprised of the foundation wall of a square or rectangular building, which was most probably dry-built from wood and stone. Marlstone, quartzite, pebbles, slate, fragments of bricks and lumps of mortar were found in the excavated foundation part of the house as a secondarily used building material. In terms of position, the structure documented in the passageway of Feature No. 135/II (Fig. 6) replaced structures belonging to the previous period. The absence of mortar as a binder, both within the foundation wall structure and in the form of crusts or casts in its immediate vicinity, indicates that no masonry techniques were applied during the construction of the house (?). Its destruction falls into the late 14th or early 15th century. Its localisation, the collected material suitable for dating and the stratigraphic relations indicate that it might have been the house of the 'first' New Town settlers, who built their dwelling in the place of earlier buildings. This discovery indicates an earlier origin of local spatial relations, which were confirmed in the later period (accepted into the newly founded New Town).

A later phase of stone architecture on the burgher plot after the foundation of the New Town was represented at the building site by the outer walls of an apparent multi-storey house. Its cellar spaces were at first covered by a flat beam ceiling, which in the subsequent phase of the existence of the building was replaced by a barrel vault built of quarry marlstone bound by lime mortar. This change to the house construction is documented by a window with a chamfer inner sill walled-up by the vault,[11] excavated in the western outer wall of the building. The vault was lowered in the modern period in connection with the joining of the houses and to ensure a comfortable passage to the courtyard (Fig. 6). The construction of this new masonry house in the examined area can be dated to the early 15th century (?). The shift of its main mass ca 3 m to the east from the above-described remnants of earlier buildings reflects an attempt to straighten the 'newly' delimited but not yet respected (?) street line (Fig. 7). The newly built burgher houses and their land plots then developed continually to the present day. The exceptions are two vanished buildings (136 Deym House, plot No. 842 and 137 Mitrovice Palace, plot No. 841), which were demolished in connection with an extension of Národní Street in the second half of the 1960s (Cymbalak, Musílek 2017, 141).[12]

holes situated in the interior part of the structure. The smallest section of the recessed space was recorded once again in the southern neighbourhood of the previous feature; besides an almost identical level of depth (ca 0.25 m), it was characterised by an uninterpretable fragment of masonry built of quartzite, quarry marlstone and brick fragments bound by mortar. Rare evidence of everyday life and the equipment of the homes or workshops of the local inhabitants (a fragment of an aquamanile, small figural sculptures of horses, moulds) was gathered from the fills of the mentioned structures.

9 Inv. No. 2013/33-N12-039, hollow heller of John Henry from 1350–1375, Brno mint; Inv. No. 2013/33-N12-052, two-sided heller of Wenceslas IV from 1383–1384, Kutná Hora mint; Inv. No. 2013/33-N13-014, parvus of Charles IV from 1356–1378 (?). The coins were identified by J. Militký and M. Müller.

10 On the property affiliation and character of use of the land south of the Old Town wall in the second half of the 13th and the first half of the 14th centuries, see Tomek 1855, 238; Janská 1979, 165–196; Cymbalak, Staňková 2014, 162.

11 A window with a chamfer inner sill.

12 Burgher houses themselves were only partially uncovered due to the localisation of the excavation (except for the completely preserved, original Gothic cellars at 135/II Schönkirch Palace). Two 'newly uncovered' Gothic cellars were documented in the northern section of the west frontage of Mikulandská Street. Both spaces belonged to an original medieval building that was subsequently incorporated into the core of a later corner house (No. 136). The vaults of the uncovered ceilings were broken, and the interiors filled during the demolition of the above-ground part of the local buildings in 1966.

Fig. 6. Prague 1 – New Town, Mikulandská Street, plot No. 843, House No. 135/II. Almost rectangular foundation wall in the corner of a residential building (Phase C – early urban) made of recycled building material (marlstone, quartzite, pebbles, slate, brick fragments and lumps of mortar). Grey transparent – eroded clay walls built by the rammed earth technique; stratigraphically earlier brick substructure in a mortar bed (remnant of a heating device?) – bottom; masonry structures of an urban house situated near Mikulandská Street – right. Based on fieldwork documentation, created by E. Ditmar 2016. Coin found in the destruction horizon of the building (double-faced heller of Wenceslas IV from Kutná Hora from 1383–1384, silver, ø 14 mm, Bohemia, Kutná Hora, Inv. No. 2013/33-N12-052). Identification of coins: J. Militký, M. Müller. Photo by M. Kalíšek.

A summary idea of the form and types of residential buildings in early medieval Prague is made more complicated by the fact, confirmed by discoveries from archaeological research, that buildings with above-ground structures (frame/half-timbered, post-built, log) were documented in several places. No more distinctive traces of these structures have survived, with only a few exceptions.[13] This was due to the use of flammable materials in the technology used in the construction (the structural elements left no traces or only unrecognisable ones) because of reconstruction or intentional demolition. However, more favourable circumstances and thorough fieldwork documentation, for example at 1190/21 Soukenická Street, made it possible to detect remnants of a rectangular building from the second half of the 12th or the early 13th century. The feature with a ground plan trace of ca 50 m^2 had a load-bearing structure built from wooden posts and an unidentifiable number of storeys (Ježek et al. 2009). The building ceased to exist in connection with the founding of the New Town (mid-14th century) in a non-violent manner, which is evidenced by the extraction of the parts of the load-bearing wooden structure (probably for secondary use elsewhere). Observations with identical phenomena can also be extended to the above-described western part of this self-governing unit founded by Charles IV (Cymbalak, Musílek 2017, 141).

Judging from the density of the remnants of these structures at the individual sites, there is no doubt that the representation of these buildings was significant. On the other hand, we must accept the fact that our ideas concerning their form and number must be based on hypotheses. Suitable analogies to the above-ground parts of archaeologically examined structures known from Prague should be sought in other similar old medieval towns (Wrocław, Opole, Poznań, Brno, Kraków) or the medieval village milieu.[14]

13 For instance, New Town, Republiky Square – Omelka, Podliska 2004, 42–44; Spálená Street – Cymbalak, Staňková 2014, 155; Mikulandská Street – Cymbalak, Musílek 2017, 129, 134, 140–141; Lesser Town, Nebovidy – Havrda, Tryml 2013, 139–149, 380–390.

14 Most recently, a careful attitude to this statement was assumed by Jerzy Piekalski (see Piekalski 2014, 118).

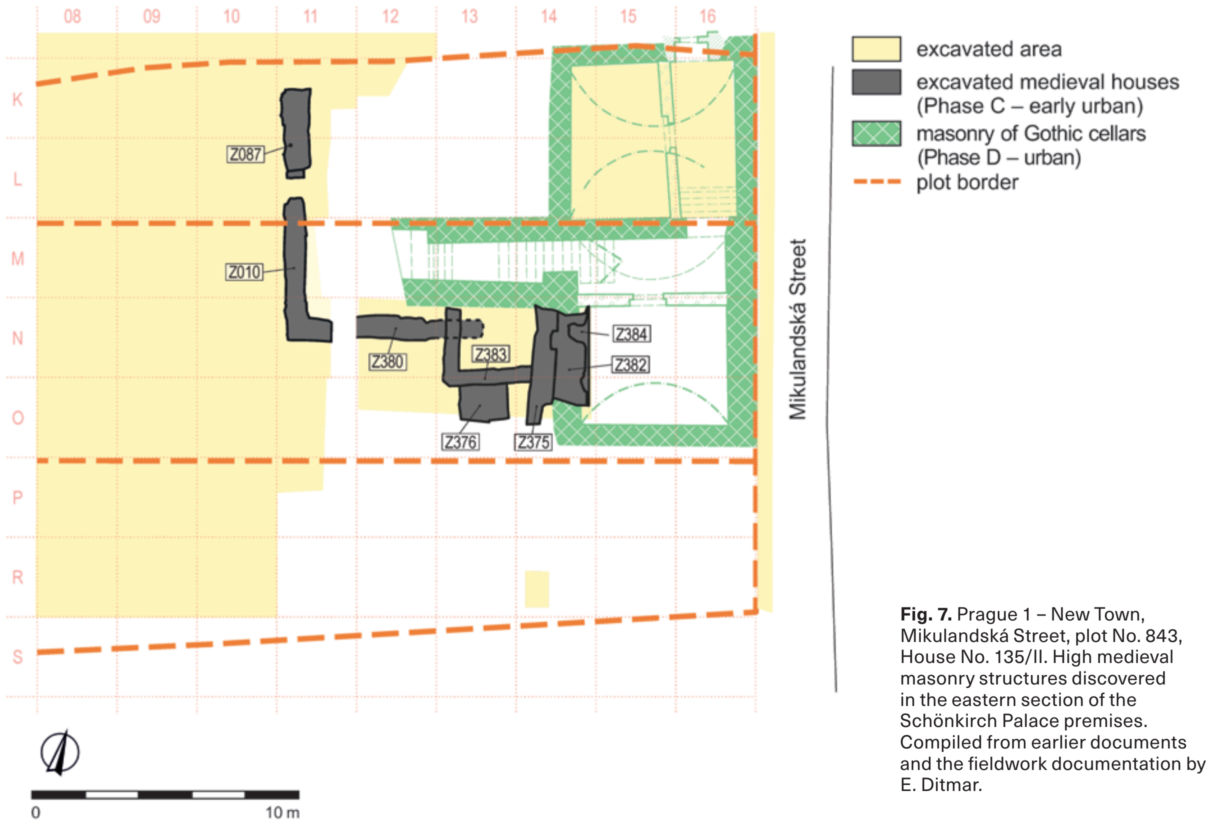


Fig. 7. Prague 1 – New Town, Mikulandská Street, plot No. 843, House No. 135/II. High medieval masonry structures discovered in the eastern section of the Schönkirch Palace premises. Compiled from earlier documents and the fieldwork documentation by E. Ditmar.

6. What was the appearance of a medieval recessed or semi-recessed house in Prague? How should we visualise it?

When looking at these buildings from the builders' viewpoint, when building a house, the foundation pit would first have to be dug. Its dimensions were 10 to 30 m^2, as needed.[15] The depth of the pit, which would be subsequently used as the basement or semi-basement, would be adapted to the local hydrological or geological conditions; according to the documented finds, this might have been 1–2.5 m. The building's load-bearing structure would probably take the form of wooden posts,[16] the amount depending on the building's area, the number of above-ground storeys and the structural possibilities of the building material (the diameter of the posts).[17] Floor contexts of the individual basements indicate that walking surfaces were comprised either of a wood layer[18] or packed material (resulting from the operation of the building or intentionally created at the time of its origin).[19] The interior of the lowermost storey was delimited by the outer walls, whose form was interpreted as wooden in a predominant number of the excavated structures (in the case of buildings documented in Prague, it is impossible to determine more precisely whether they were round logs, half-round logs, log beams or planks. The character of

15 The floorage of the lowered ground floor of the houses that were documented within an excavation in George of Poděbrady Barracks in Republiky Square was between ca 40 m^2 (Kašák et al. 2009, 37) and 70 or 90 m^2 (Juřina et al. 2009, 49).

16 Although other types of structures (e.g. frame-like, trench-like) can also be taken into account, there is absolutely no convincing evidence of their use so far. A quite different technological approach, stone lining, was used in the later period (second half of the 12th–13th centuries).

17 The variability of the numbers and dimensions of archaeologically detected post holes is very wide in Prague, and the available data does not allow any firm conclusions. On the other hand, several examined buildings enable only a general reconstruction (e.g. Huml 1998, 9; Juřina et al. 2009, 49; Havrda, Tryml 2013, 51, 138, 146–147).

18 Even though available literature includes mentions of walking surfaces of wood (e.g. Omelka, Podliska 2004, 42), it is often very difficult to distinguish a wooden floor from a fallen wall, ceiling or partition (Cymbalak, Musílek 2017, 134; Cymbalak, Rykl 2018, 413).

19 Admittedly, the archaeological contexts studied during excavations in the recessed interiors of the buildings represent at least the secondary form of the original basements.

the structure – the trench-like, frame-like or other – is also unclear).[20] A rarely preserved example of the design of the outer part of a semi-basement has been documented in the northern section of the east frontage of Spálená Street in the New Town. A 1 m long remnant of a wattlework wall represented by three post holes placed at a uniform distance (0.3 m) on the bottom of a ca 0.1 m deep narrow trench running in parallel with the edge of the foundation pit was documented in the yard of former House No. 70 (Cymbalak et al. 2013, 679–680). Stone masonry along the circumference of the basement is recorded in the next development phase of this building. The recessed space of the dwelling founded in the same place as the wood-and-clay house with a wattle wall was built of slate, quartzite and, in places, marlstone. Clayey soil was used as the binding material. The almost flat floor of the recessed room was comprised of a ca 3 cm thick layer of grey clay. The maximum depth of the partially preserved building was 1 m, and its outer dimensions were approximately 4.8 × 2.4 m. The almost rectangular interior was delimited by outer walls oscillating around 0.5 m in width. Their structure was characterised by layered levels of larger stones deposited along both the inner and outer face. Quartzite and slate fragments were added to the core of the wall (Cymbalak et al. 2013, 679–680).

Natural conditions are of decisive importance for the preservation of wooden structures in Prague's archaeological contexts.[21] The character of the local geological subsoil does not contribute to the preservation of the evidence of carpenters' work. An exception is represented by contexts documented in the left-bank area below Prague Castle in the territory of the present-day Lesser Town (Čiháková 2008). Within this context, we should not forget the possibilities of the secondary use of building material. For instance, when a dwelling ceased to exist in one part of the town, the individual structural elements could be used for construction at another place in another part of the town (e.g. Ježek et al. 2009, we are inclined to the option that transport was simpler between the Old and the New Town).

Larger spaces might have been segmented both vertically (partitions) and horizontally (different floor levels). Such a design would secure corresponding temperatures for the storage of food and goods (see Vařeka 2002, 271–272 including references). A separate factor concerning the use and functional furnishing of basements is represented by the advantages of cold rooms that are necessary for the storage of wine and perishable goods (meat, milk) or the medieval technology of beer production. A model example of the fulfilment of this basic privilege of burghers with full rights stemming from the foundation provisions (Hoffmann 1992, 182; Winter 1906, 423–424) can be studied in Świdnica, Silesia (Chorowska et al. 1998).

Flat wooden ceilings represented a necessary element in multi-storey buildings. Log structures[22] supported by a beam or beams probably predominated. Beams and board joists or log vaults cannot be ruled out either (see Škabrada 2003, 83–91).

Regardless of whether the houses were slightly or more recessed, if they were single-storey then they lacked any ceiling, and the inner space was enclosed and protected from the weather only by the roof. Flammable materials – wood, straw or reed – were commonly used to make roofs, both the truss and the covering of these dwellings. The use of non-flammable pantiles (see below) can only be considered for later periods and only sporadically. We are uncertain whether shingles had a dominant position because the use of planks, boards and slabs as roofing cannot be ruled out for smaller buildings. Saddle-shaped roofs probably dominated the medieval Prague horizon accompanied by simpler shed roof structures.

Due to the lack of sufficient exact evidence, we can only believe that the interior equipment of the individual buildings was very simple and did not differ much in form from smoky rooms in rural dwellings known from later periods. Besides several remnants of heating devices recorded within the archaeological excavations in the interiors of non-masonry buildings in the territory of Prague (e.g. 135 Mikulandská Street – Cymbalak, Musílek 2017, 134, 139; 387 Karmelitská Street; 459 Nebovidská Street – Havrda, Tryml 2013, 139–149, 387; Ostrovní Street – ZIP;[23] Čimice – Huml 1988, 353–368; Klárov – Hrdlička 1972, 654; 211 Nerudova Street – Čiháková 2004, 33), there are no further indications of their internal furnishing. The function of post and

20 See Čiháková 2004, 31.

21 Similar conditions were also recorded at other sites, see Čapek, Netolický 2014, 94.

22 Rough-hewn round logs whose profile might have been identical to the profiles used in a log wall. Their upper side might have been made of daub (Škabrada 2003, 83).

23 I thank R. Široký of ZIP o.p.s. (West Bohemian Institute for the Protection and Documentation of Monuments) for the preliminary information.

stake holes that have been documented in the interiors of the individual buildings can only be assumed.[24] Most probably, they might have represented benches, tables or sleeping places, or possibly shelves elevated to a relatively dry height.

The localisation of recessed spaces on the examined plots in Prague documents a considerable variety in the possible forms of connecting their basements to above-ground structures. The three basic variants are as follows: recessed spaces near the street frontage under the main building (16%); a basement in the deeper sections of above-ground buildings whose narrower (gable) part is facing the street (44%); the lowermost parts of separate buildings (economic or residential) that were situated in the rear part of the plot (11%). Other variations may be considered (Radová-Štiková 1991b).[25]

Provisional houses, whose design and interior furnishing need not have been impressive due to their temporary character, occurred in the pre-urban Prague, as in the early phases of other Bohemian towns.[26] Given the limited time and resources, the newly arriving inhabitants had to content themselves with the basic advantages of buildings recessed below the level of the terrain (Muk 1991, 88; Michna 1988, 265–266; Klápště et al. 1996, 148). The low number of examples of buildings with such a design, however, indicates that dwellings with a saddle roof based on two load-bearing posts and the surface of the terrain (pit houses) were rather sporadic or, more precisely, most of them were replaced by later buildings or activities at the time of the transformation of proto-urban settlement agglomeration into later organised self-governing units.[27]

Remnants of houses with basements have been documented on both the left and right banks of the Vltava in Prague and are among the oldest.[28] It needs to be pointed out, however, that the slightly recessed log structures characteristic of the earlier period were used besides more modern buildings that were equipped with basements (Čiháková 1999, 21).[29]

This transformation has been documented in several places in Prague (e.g. Spálená Street – New Town, Nebovidy – Lesser Town) and confirms the stability of the occupation that was reflected in the additions to the structures or layouts of the individual buildings. Stone linings start to gradually appear along the circumferences of the basements and semi-basements (Cymbalak et al. 2011, 30). The earlier design of the entrances is replaced by masonry entrance staircases called entrance necks (e.g. Republiky Square, see Juřina et al. 2009, 49).

An interesting but not unique example of a residential building designed in this manner from the close vicinity of Prague Old Town was examined by Michal Tryml in the area of the ancient settlement of Na Rybníčku (Prague 2, New Town, 1319/II Žitná Street – Tryml 2000; 2001). The original village, one of many similar settlement units surrounding the core of the right bank of the agglomeration before the founding of Prague New Town, was absorbed by the town founded by Charles IV after the mid-14th century. Using pottery vessel fragments, the whole period in the development of the site can be dated to the 12th and 13th centuries. An approximately 1 m deep rectangular feature, most probably a remnant of a multi-storey building, was examined there within the framework of the pre-urban settlement horizon that consisted of a low stratigraphy of typical settlement features, shallow pits, fireplaces, small furnaces and post holes. The almost perpendicular walls of the orthogonally designed basement were surrounded by a stone lining built of small, carefully laid stones. The recessed space with internal dimensions of 5 × 4.5 m was accessible from the west along four stairs of the entrance neck partially situated outside the layout of the house (Fig. 8). The feature belonged to the latest phase of the pre-urban horizon. The excavated part of the settlement can undoubtedly be linked to

24 Here, we do not mean negative imprints situated along the circumference of the described buildings, which most probably belonged to the wall structures.

25 For 66% of the analysed features, it has been impossible to determine closer localisation more precisely within the plots.

26 Cf. Škabrada 1978, 363, Fig. 17.

27 Several years ago, Pavel Vařeka presented a more detailed reflection on the economic demands, functionality and appearance of provisional houses in Bohemia and Moravia (Vařeka 2002, 262–266).

28 Buildings that already ceased to exist during the 12th century were recorded both in the very core of the Lesser Town (1/III and 258/III Malostranské Square) and in the earliest part of the Old Town settlement area (261/I Liliová Street) or along the ancient road connecting Prague Castle with Vyšehrad (1924/II and 203/II Pštrossova Street). See Čiháková 1995, 227; 1999, 21; Čiháková, Zavřel 1997, 15–16, 24–25; Cymbalak, Podliska 2008, 314, 323–324.

29 Similar conclusions concerning the later developmental phase of medieval buildings in the core of Prague Old Town, i.e. a coexistence of non-masonry houses with recessed spaces and masonry small-ashlar houses, were reached by Hrdlička more than a decade earlier (see Hrdlička 1980; 1983, 623–625).

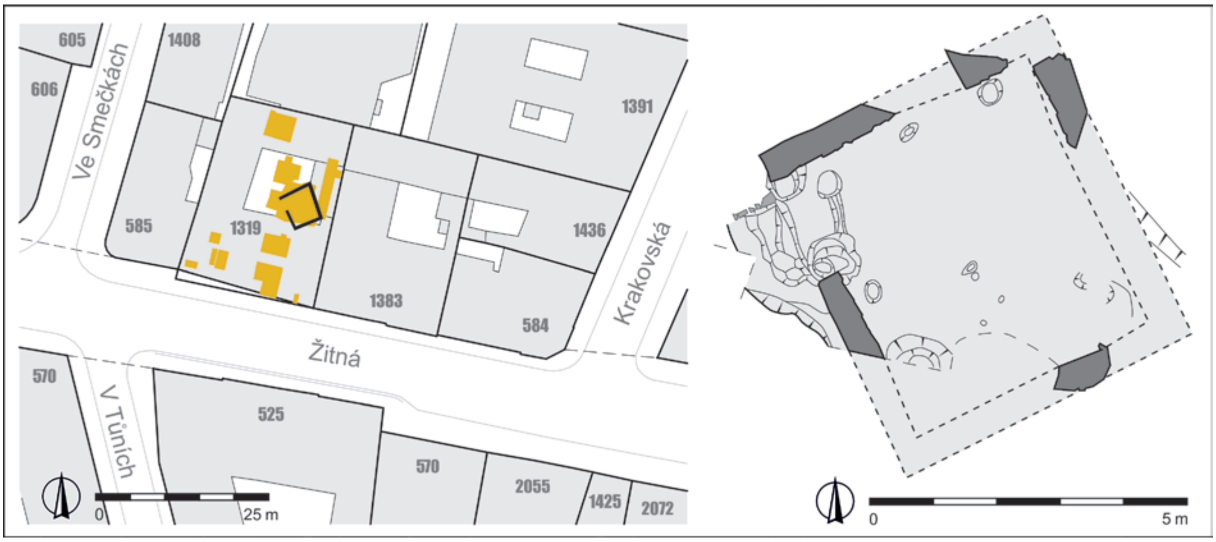


Fig. 8. Prague 2 – New Town, 1319/II Žitná Street. The context of the lowest storey of a vanished pit house from the area of the original village belonging to the agricultural hinterland of pre-urban Prague. Created by S. Babušková and J. Vachuda, based on M. Tryml's fieldwork documentation.

the settlement whose crystallisation core was the nearby rotunda of St Stephen (now of St Longinus). The complete absence of 14th-century finds testifies to the fact that no structures were situated on the plot after the foundation of the New Town, and the prospective activities left no traces.[30]

The state of preservation of the historical terrains makes demonstrable reconstructions of the appearance of the above-ground parts of the buildings almost impossible. The attempts made to date, although with maximum effort on the part of the authors, with the application of available analogies and a wide empirical apparatus, are merely the outcome of the application of archaeologists' and building historians' notions on the detected negative imprints of the original archaeological contexts. Only exceptional contexts enable a visualisation of selected structures (e.g. Huml 1998, 9; Havrda, Tryml 2013, 50, 138, 146–147; Juřina 2005, 154; Juřina et al. 2009, 49). The function of most recessed spaces, which represent the most conclusive evidence of the building, is often unclear. As stated above, it remains questionable whether they were used for housing or the storage of goods. It is often problematic to ascertain the nearest archaeological context of the features or to answer the question of whether these features represented a separate unit or part of a larger structural whole. With dissatisfaction, we need to state that the current state of the functional interpretation of secular buildings from the period between the 12th century and the first half of the 14th century in the urban milieu is the consequence of the development of anthropogenic overburden (the removal of its upper parts) and, in most cases, of the emergence of later buildings in the same place.

The main features of the transformation of medieval Prague's secular architecture were summed up in a study devoted to the beginnings of organised construction on the right bank of the Vltava in Prague (see Cymbalak, Rykl 2018, 411–412). The results of archaeological and building-historical surveys indicate that the most distinctive signs of the evolution of the occupation and, therefore, of the transformation of the building appearance of the Prague conurbation can be characterised by four phases that may be dated to the broad framework of the 12th–15th centuries (Fig. 9).

Phase A – pre-urban I/II – 'earlier/later settlement' – a built-up area without demonstrable foundation or parcelling; it follows directions of routes (they definitely cannot be called streets) and, at the same time, respects other settlement and natural elements (such as cemeteries, public spaces – marketplaces or the configuration of the terrain).

Phase B – pre-urban III – 'suburbium' – the settlement unit is not delimited by walls; the structure of the territory is stabilised in a certain manner, the

30 The results of excavations carried out in the close vicinity (e.g. in Krakovská Street) point out the necessity of revising the previous hypotheses, according to which the beginning of a continuous built-up area there has its roots in the second phase of construction after 1380 (see Tryml 2000, 386).

routes and public areas are already traditionally anchored and the built-up areas of various compactness respect them; in some parts, there are readable attempts at organisation or reorganisation of the territory and street lines or at more systematic, surveyed parcelling.

Phase C – early urban – 'young town' – a town within walls that have been established *de iure* and are gradually being built *de facto* – the structure of the (so far relatively free) territory is parcelled out into plots in a controllable and geometrical manner; the activity complies with the sovereign's foundation

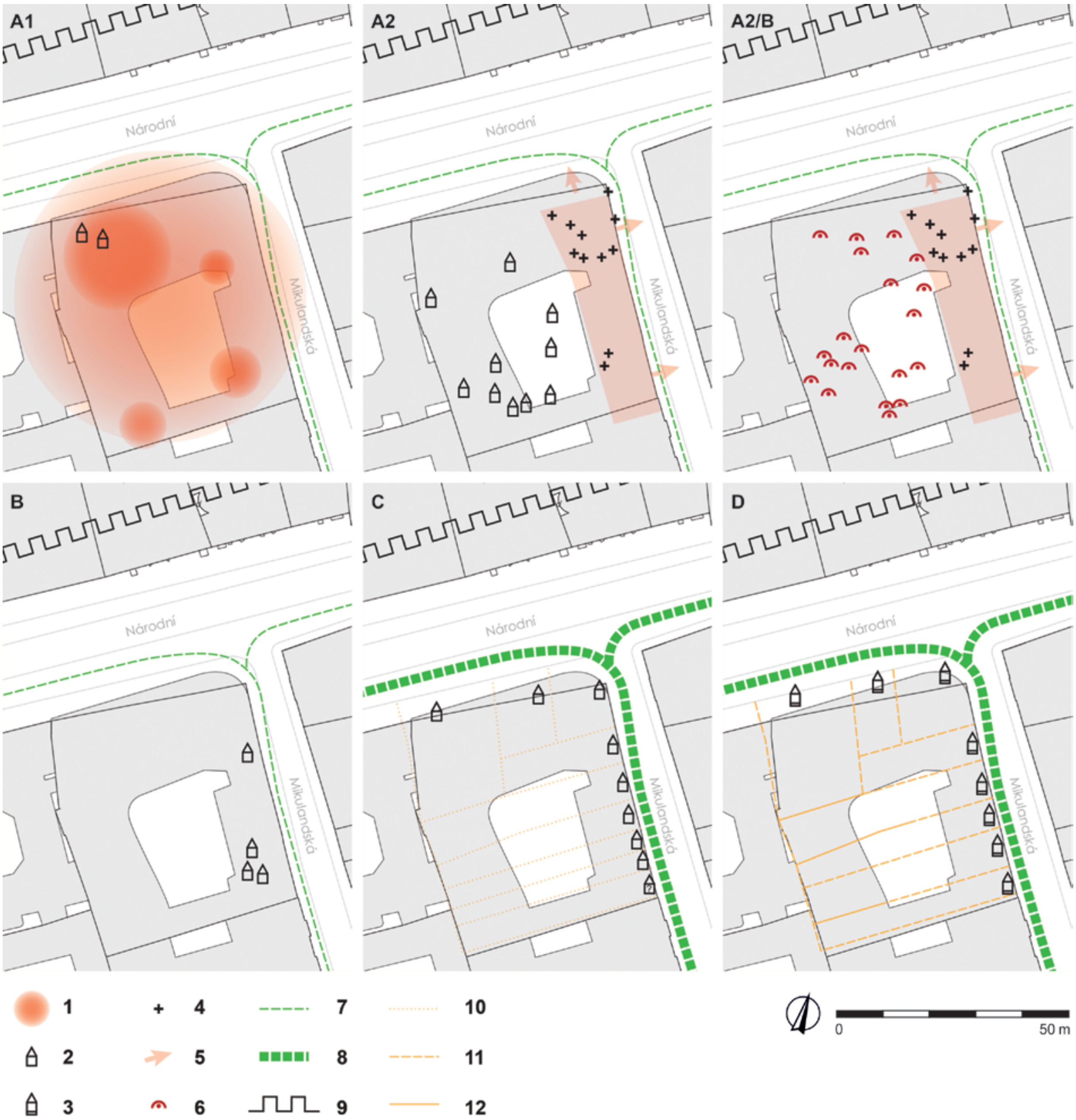


Fig. 9. Prague – New Town, area of the crossroads at Národní and Mikulandská streets (section of the cadastral plan of the city, state as of 2013). Generalised scheme depicting selected manifestations (see legend) of the transformation of medieval occupation at the boundary between the Old Town and the New Town. A1 – pre-urban phase I, 'earlier settlement'; A2 – pre-urban phase II, 'later settlement'; A2/B – pre-urban phase II, 'earlier settlement' / pre-urban phase III, '*suburbium*'; B – pre-urban phase III, '*suburbium*'; C – early urban phase, 'young town'; D – urban phase, 'town and reparcelling'. Legend: 1 – extent and intensity of the oldest settlement; 2 – wood-and-clay and wooden buildings; 3 – cellared stone buildings; 4 – burial ground; 5 – presumed extent of the burial ground; 6 – ironworkers / pyrotechnological structures; 7 – presumed communication / route; 8 – route / path; 9 – Old Town fortifications; 10 – hypothetical plot boundaries; 11 – presumed plot boundaries; 12 documented plot boundaries. Based on the authors' concept. Created by M. Kalíšek, 2017–2018.

act; the basic outline of the construction is represented by the main roads connected to the town gates; not all the plots are built-up; the street line has been stabilised for a long time; the development is compact, mostly of a row character, everything is affected by the foundation of the town walls and directive measures (Lorenc 1973, 98); a spontaneous or systematic construction of residential buildings of various quality takes place on the plots, changing in reaction to the alternating owners/tenants of the individual properties.

Phase D – urban – 'town and reparcelling' – the parcelling process is completed; reparcelling occurs – the division or joining of plots or regrouping of buildings within the already (more or less) stable structures; some alleys vanish secondarily.

Besides the documented and briefly characterised phenomena and patterns, there were certainly numerous examples of structures whose development cannot be simply categorised within imaginary typological frameworks. An example of such a building may be the newly excavated house at 134 Mikulandská Street. Although its documented form most probably comes from the 15th century, it can be predicted with much certainty that its roots can be traced back to the third quarter or the end of the 14th century.[31] An excavation revealed a larger fragment of a corner cellar space that belonged to the street wing of the medieval house. The southwest corner of the recessed room was not orthogonally closed; instead, it had the form of a marlstone portal, carefully built askew to the perimeter masonry. It ensured access from the outside; more precisely, it might have led to a neighbouring room situated in the basement of the building. The external masonry technology was not the same in the whole extent of the structure. The excavated contexts document that the northern section of the house's outer wall was not built of stone but comprised of a wooden structure that was most probably interlinked with a non-flammable part in the immediate proximity of the portal.[32] The reasons for this design can only be speculated on. There may be several causes, and when attempting to answer the question, we should not forget the most prosaic ones – financial difficulties during the construction; a change of the owner of the house; a provisional/temporary solution that complied with the requirements present at that time; or, last but not least, the construction of the building in the place of an earlier house with a wooden basement.

The historical core of the capital city may provide more examples of similar situations (for instance, the design of the eastern part of external masonry in the cellar areas of former House No. 72, Spálená Street – Cymbalak et al. 2011). The outlined situations evidence a hectic development both within the individual plots and within the broader scope of the town. The interpretation presented above can also be applied to the earlier period (12th–13th centuries) and contexts from the Old Town, the Lesser Town (Čiháková 2005) or from the territories of the traditional settlements incorporated in the area of the later Prague New Town. Therefore, it can be stated that the construction intensity from the initial phase of the permanent medieval occupation on the right bank of the Vltava in Prague shows similar signs of activity to those documented at the time of Charles's foundation in the mid-14th century or of the second construction wave in the late 14th century.

7. Rural estates of Prague burghers

The issue of the earliest burgher architecture in medieval Prague must not neglect an important specific phenomenon that can be observed in the later phase of the Middle Ages (14th–15th centuries) through excavated archaeological contexts as well as records in historical sources. One of the characteristic features of rich people from Prague in the late 14th and early 15th centuries was the purchase of rural estates, on which many of them regularly lived.

The ownership of farms was one of the attributes of Prague's rich middle class in the 14th and 15th centuries. At that time, Prague was surrounded by a relatively dense network of these estates and manor houses. Many members of the urban elite turned them into their family residences and a means of manifesting their position on the social ladder. Exceptionally preserved archival sources or archaeologically examined features from this category of residences prove that these properties formed an inseparable part of Prague's economic hinterland. Besides their main role – agricultural production offering new sources of income for their owners – they represented a recognisable manifestation of the rise in the aspirations of the most affluent inhabitants of the town.

A building, or rather a complex belonging to a representative of the rich strata of Prague burghers has been recently uncovered by a rescue excavation in

31 Based on analogies from the immediate vicinity (e.g. 135 Mikulandská Street, see Cymbalak, Musílek 2017, 140–142).

32 I thank R. Široký of ZIP o.p.s. for the preliminary information and the opportunity to study the site.

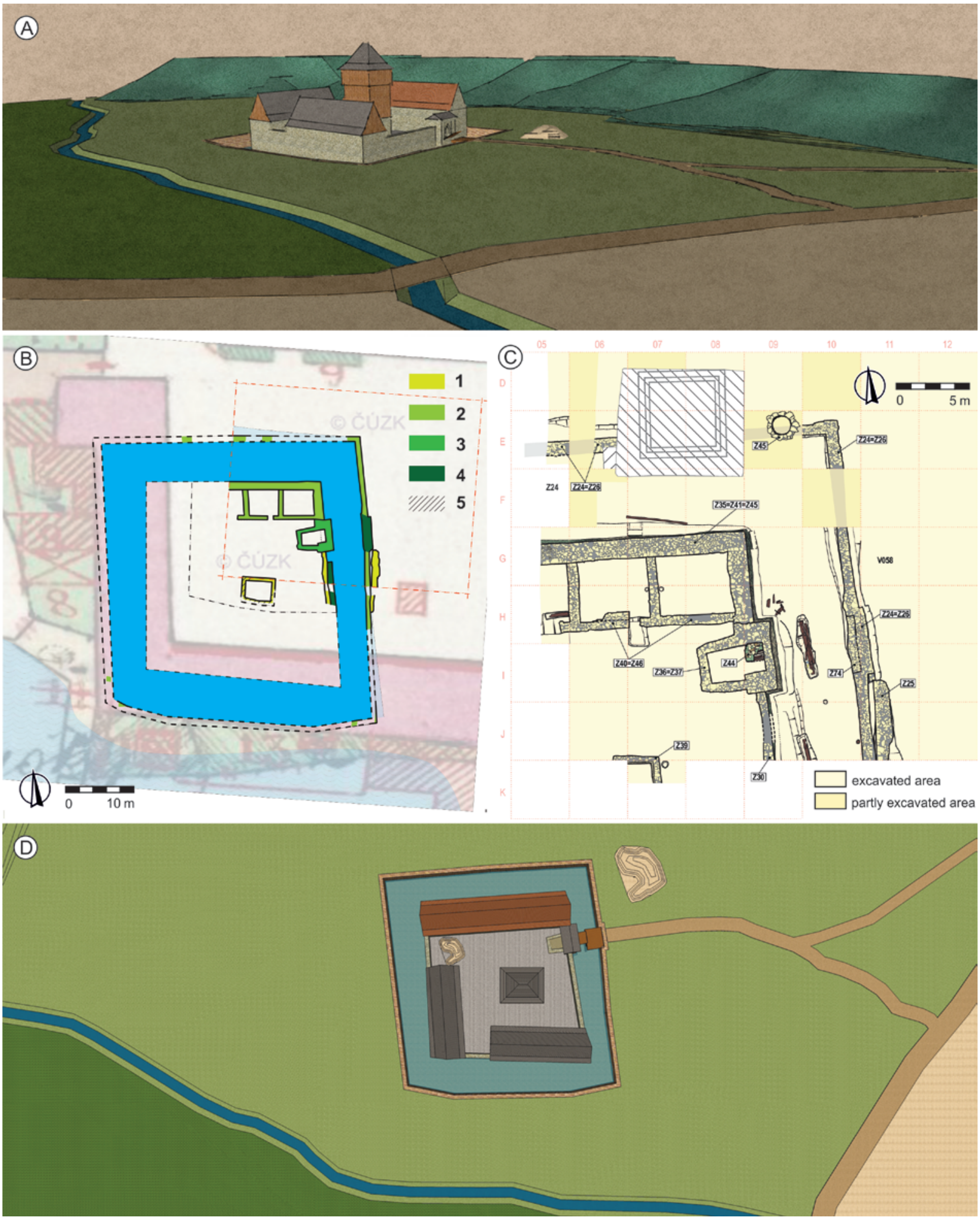


Fig. 10. Prague 5 – Jinonice. The context of remnants of a high medieval manor house with a defensive function in the form of a moat. A, D – 3D and 2D visualization of the most advanced phase based on preserved masonry sections and wooden bridge elements; B – assumed construction phases based on the map of the Stable Cadastre (© CUZK, Jinonice); C – plan of excavations of walls and building structures. Created by M. Kalíšek, E. Ditmar, T. Cymbalak, M. Semerád based on the authors' materials and fieldwork documentation.

Jinonice (1 Na Vidouli Street, Prague 5 – Jinonice). The origin of the manor house was predetermined by a favourable location in a narrow valley in a traditional agricultural area near an ancient road connecting Prague with its broader vicinity. The residence was first owned by Prague burghers, and in the modern period by representatives of the nobility (Cymbalak, Kašpar 2019; Cymbalak, Musílek 2021, 165–168).

The remnants of the high medieval manor house have been assigned to three phases of a larger complex from the 14th–15th centuries (Fig. 10). The construction quality of the earlier phase of the building, which was very solidly built, including a moat surrounded by a wall,[33] is documented by pantile roofing, which was unique in the manor houses of this period (the first half of the 14th century). The second development phase of the residence (ca mid-14th century) is characterised by a change in road patterns and an increase in the proportion of structures built using stone. The third phase, datable to the time immediately following the Hussite period (1430s), is documented by quality stonemason work represented by a discovered late Gothic window whose fragments belonged to a building with clear self-representation ambitions. This final phase of the existence of the original medieval manor house indicates the work of a technically advanced building workshop.

The area of the original manor house might have been 1,950 m^2, of which the excavation uncovered ca 30% in its northeastern part. The remnants of the entrance building, a gatehouse with a space that is tentatively interpreted as a trapping pit and two standalone structures were documented in the core of the manor house. The function of the more northerly situated three-compartment (?) rectangular building (min. 14 × 6.5 m) that was attached to the northern escarpment of the complex can be tentatively linked to the core of the residential building ('palace'). The area of the two rooms that have been fully excavated amounted to approximately 20 m^2. A recessed square structure in the form of a small masonry cellar or basement with internal dimensions of ca 4 × 3 m (detected depth: 1.2 m; width of the predominantly marlstone lining: 0.5 m) was uncovered in the presumed central part of the core of the manor house. It cannot be ruled out that this was the location of the above-ground part of the tower or granary (most probably wooden or half-timbered). Remnants of two bridge structures built from carefully worked oak beams were found in the lower parts of the moat. The localisation of earlier (early 14th century) and later (mid-14th century) wooden elements of the two bridge structures indicates that the core of the complex was accessible from the east (from the direction which most probably led to a road connecting Prague with nearby villages). The original manor house most likely ceased to exist in the early modern period (late 15th? – mid-16th century), possibly in connection with a change in property relations. A new Renaissance building was erected in almost the same place several decades later (late 16th – early 17th century), replacing the original medieval residence situated further to the south (Cymbalak, Kašpar 2019; Cymbalak, Musílek 2021, 165–168).

8. The appearance of street fronts

To add more information concerning the appearance of Prague's street frontages in the late 12th and early 13th centuries, we need to point out a context, examined several years ago, of a vanished wooden structure with a basement that is usually listed as 436 Michalská Street in the professional literature (Dragoun, Rakušan 2006). However, its position must be clearly bound to buildings in the eastern frontage of Jilská Street. Remnants of a pit house or small cellar of a wooden residential building with minimum dimensions of 3.2 × 3.1 × 1.3 m and a 1 m wide entrance neck in the northwest corner of the recessed space were detected in the southwest corner of the layout of the present-day house. Remnants of the building's wooden structures were visible in undisturbed parts of the excavated basement near the north, west and east walls. A detailed observation of the best-preserved northern outer wall of the room revealed a structure formed by small beams linked to stakes in the corners and the centre.[34] A similar design was most probably also applied to other walls. Based on the character of the fill layers and a rich assemblage of pottery material, it is likely that the recessed space was filled during a short time in the first half of the 13th century (Dragoun, Rakušan 2004, 37).

33 The well-bound chamfered masonry of the core of the complex in the direction of the moat was precisely worked, which is especially evident in the shaping of the edges and thus the silhouette observable at that time. Limestone was used in contact with water or in areas with high humidity and marlstone higher in the dry zone.

34 An analogical but somewhat larger (5.4 × 4.3 × min. 1 m) structure was uncovered 50 years ago by Hrdlička during an excavation in Klárov (Hrdlička 1972, 653–654).

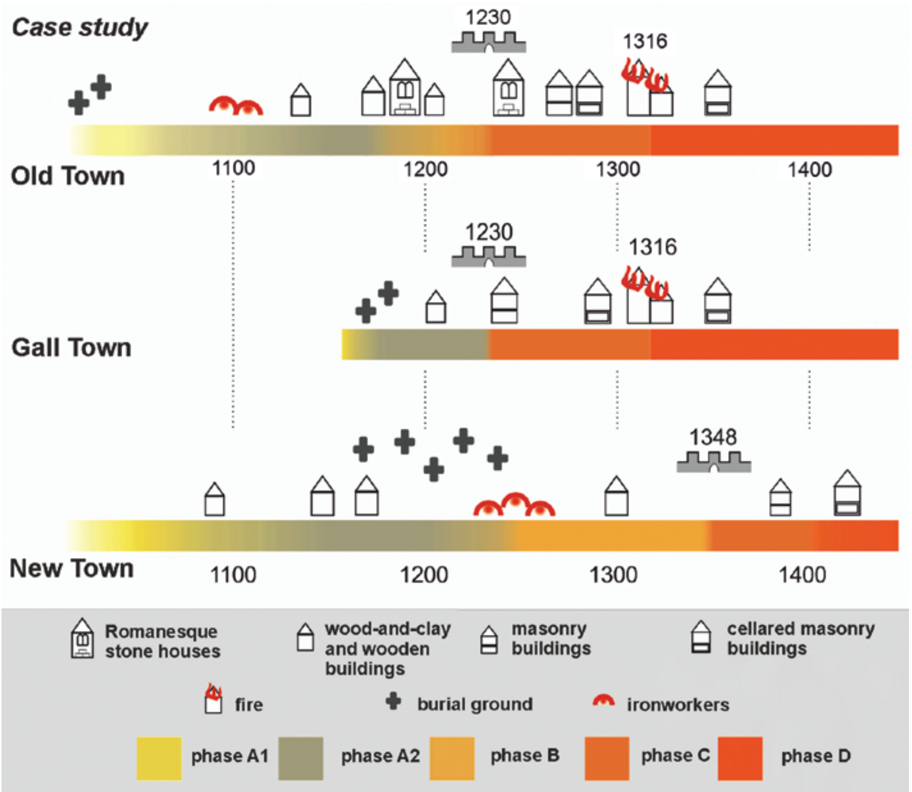


Fig. 11. Comparative chronological scheme of selected settlement phenomena applicable to reference case studies. Based on the authors' concept, created by M. Kalíšek.

A fragment of a similar structure, with a minimum discovered depth reached at ca 2 m and a minimum width of 2.2 m, was documented further to the east. The remnants of wood documented along its longer sides can be interpreted as relics of a structure that spread out into the free space upon its destruction, as visible from the profile and the character of the fill of the lower part of the feature. A rich find assemblage, from which light pottery decorated in a red earth was absent, 35 included whole pottery vessels (pots called technical bowls) and a rich slag collection. The authors of the excavation date the destruction of the structure to the time around the mid-13th century (Dragoun, Rakušan 2004, 37). Both of these briefly characterised structures were interpreted as parts of wooden buildings along Jilská Street: they inspire consideration of their row character and a stabilised street line at least in this place. They were replaced later by stone houses although probably not before the late 13th century (Dragoun, Rakušan 2006).

The findings from 436/I Jilská Street are crucial to the study of the transformation of the earliest burgher houses in Prague, as not very distant examples of similar contexts from Husova Street document that rather than a unique case, they represent the coexistence of two building approaches/ techniques.

Nearly three decades earlier, discoveries from an excavation in House No. 352/I in Husova Street documented that basements (pit houses) of wooden houses neighboured stone residential buildings built in the Romanesque style (Hrdlička 1983, 621, 625, Fig. 6; more recently, see Havrda et al. 2014, 68, Fig. 3). According to the results of this excavation, the eastern frontage of Husova Street was stabilised as early as the first half of the 13th century (Hrdlička 1983, 621, 625, Fig. 6; more recently, see Havrda et al. 2014, 68, Fig. 3). It consisted of both the stone Romanesque house and the more northerly wooden buildings (Hrdlička 1983, 621, 625, Fig. 6). It is symptomatic that the Romanesque house had no entrance openings in the direction of the wooden structures and it is, therefore, likely that the wooden buildings were not part of it. Although the author of the excavation only pondered evidence of a stabilised street line, we will, given the facts stated above, consider not only the street line but also the possibility of row houses coming into existence as early as the first half of the 13th century in the immediate vicinity.

35 Its occurrence in Prague can be dated to the second half of the 13th and the early 14th centuries (most recently Havrda, Matějková 2014, 38–41 including references).

An approximately square space in the central part of the southern wing of the built-up area is usually considered the earliest part of the architecture preserved on the plot of House No. 436/I. This might represent the remnants of the earliest stone house, which was a relatively fireproof structure situated in the depth of the plot (Dragoun, Rakušan 2004, 37). However, the entrance to this masonry basement was situated from the east, which most likely indicates that it was part of the buildings oriented to the parallel Michalská Street. Based on this and the situation outlined above, it is acceptable that the above-described recessed wooden basement structures, which most probably belonged to multi-storey half-timbered buildings, also neighboured stone houses there, together forming the joint east frontage of Jilská Street.

Whether this represents the earlier period when the dwelling was situated in an extramural settlement (Čiháková 2005, 158; Cymbalak, Rykl 2018, 412–420) or the form of a fully developed burgher house built in a newly founded town (Cymbalak, Rykl 2018, 429–436), its transformation was the gradual outcome of several factors. We believe that at least two of them appear to be decisive. First, we need to name the initiative of the sovereign who initiated new or reorganised earlier land conditions to strengthen his administrative and economic interests: these changes affected the town's economy as a consequence (Ježek et al. 2009, 134–135). This evolution can be best studied in those parts of the historical core of Prague that had existed as suburbs before the founding of self-governing units; for instance, in the New Town before 1348, Opatovice, Újezd sv. Martina, the area east of St Benedict Gate (e.g. Ježek et al. 2009, 122; Cymbalak, Rykl 2018; Cymbalak, Staňková 2014, 162). The situation in the territory that was delimited and protected by the town wall, i.e. after the foundation of the Old Town (first half of the 13th century) or later the Lesser Town (second half of the 13th century) was different, depending on the circumstances that were in effect a delineated and an organised space (Cymbalak, Rykl 2018, 441–443).

Another important impulse for change was the reaction to tragic events (fire, flood). Their impact on the original built-up area was considerable in the confined environment of medieval and even early modern towns, and their frequency was certainly by no means exceptional.[36]

An archaeological example of the mentioned conversion is a situation that has been recorded in the Lesser Town extramural settlement. Contexts evidencing an earlier dwelling that vanished towards the end of the 13th century; a later structure with a basement near the street frontage (14th century);[37] and a high medieval masonry house (mid-15th century) corresponding to the already established notions of a fully-fledged townhouse (Čiháková 2005)[38] were documented in the plot of present-day 211 in Nerudova Street, Lesser Town.

Both factors mentioned above led to a change in the building procedures, the introduction of new, more permanent structures and technical innovations. For each change that occurred in the newly arisen situation, we need to take into consideration the space for the application of a new architectural style that was a welcome attribute of social standing in the urban milieu (see above). The pragmatic attitude of the owners of the individual properties, who sought the highest possible functionality of the house, needs to be taken into account in these considerations. The buildings and their land plots had to fulfil the function of a craft workshop, merchant storehouse or shop, as well as a home for their family (Klápště et al. 1996, 163, 165; Piekalski 2014, 118).

This is why we should accept Vařeka's idea of an economic or rather utility function of recessed parts of medieval houses, which is linked to the building culture of the newly arriving inhabitants of the earliest towns (Vařeka 2002, 268, 270). Their foundation opened up space for foreign inhabitants whose arrival enriched the local situation with a new

36 A brief summary of fires and floods documented, among other events, by the archaeological research of the historical core of Prague was published several years ago by Zdeněk Dragoun (Dragoun 2002a including references). For a detailed list of great floods in the lower reaches of the Vltava and above all the catastrophic centennial floods (1272, 1273, 1336, 1342, 1359, 1367, 1370, 1373, 1374, 1387, 1432), which swallowed the whole floodplain and also rose to the adjacent, densely populated terrace, see Kotyza et al. 1995, 56–59.

37 The most probable multi-storey house was built using a new construction technique in the form of a half-timbered structure. The whole building with a heating device in the form of a tiled stove from vessel-shaped tiles that was situated on the ground floor (?) was destroyed by fire (most probably during the Hussite Revolution – 1420; see Čiháková 2004, 30; 2005, 158, 162–163).

38 Although no direct archival sources are available concerning the events on this plot during the great fire in the Lesser Town and Hradčany in 1541, we can accept almost with certainty that like other houses in its neighbourhood, this first masonry building on the plot was destroyed and replaced by a new Renaissance building, later named 'Valkoun House' after one of its owners (see Vlček 1999, 315 including references and sources).

conception of a dwelling, which had to fulfil several functions at once given the rather small and predetermined area of an urban plot.

As stated above, the transformation in the sphere of materials, building techniques, approaches to the use of the area for the dwelling and its internal spatial organisation (larger density of buildings, new inhabitants of the town, changes in the spatial arrangement of the plot) took place in Prague's early medieval agglomeration during the wider period of the 12th–13th centuries and overlapped into the following century (Fig. 11). Similar processes, characterised by a condensation of the plots, an increase in the number of buildings on their area or the situation of residential buildings next to the stabilised (or emerging) street network, among other things, also took place concurrently in other parts of the continent. Besides settlement agglomerations in the western part of the southern shore of the Baltic Sea (e.g. Lübeck, Haithabu), these manifestations have been recorded in towns of Central and Eastern Europe (Kaliningrad, Gdańsk, Kraków, Poznań). We cannot oppose the statement made years ago that the effort to introduce order in the area of land plots and buildings in earlier settlement units reflects their economic and demographic transformation, which resulted in the emergence and development of fully developed towns (cf. Fehring 1997).

Houses with recessed basements evidence a major transformation that took place in the Bohemian Basin at the end of the Early Middle Ages. Based on the results of archaeological research, we can state that their occurrence can be linked to the transformation of earlier extramural settlements/*suburbia* surrounding the sovereign's residences or, more precisely, with the birth of new settlement organisms, early towns.

The presented material makes it evident that the earliest horizon of townhouses in medieval Prague is firmly linked to orthogonal semi-recessed and recessed structures that were part of above-ground buildings. What we know about them is almost exclusively due to archaeology, depending on the state of preservation of the undamaged anthropogenic overburden in the historical core of the city. The outlined examples indicate that these structures might have had various functions, depending on the context and period. The not very convincing signs of inhabitation (the absence of interior furnishing, sporadic heating devices)[39] support the hypothesis of their storage function.

9. Conclusion

The present chapter represents the first more complex attempt at addressing the issues related to early buildings of a secular character in the territory of the Prague agglomeration. Bibliographic research of the available professional literature and selected archaeological excavation reports carried out in the historical centre of Prague has yielded, for the first time within the study of local medieval secular architecture, information about 226 non-masonry residential buildings. It needs to be pointed out that this is data about the most distinctive evidence of architecture that can be studied using archaeological procedures. We are aware of the fact that above-ground structures (hardly provable today), semi-recessed features and buildings containing small cellars existed there at the same time.

Within the historical core of the city (a territory where a settlement/urbanistic transformation and the related excavations have been taking place since the beginning of its existence), the evidence of past human activities is continually disturbed, redeposited and destroyed. The source base for the studied issues thus depends on the level of preservation of the anthropogenic overburden and the archaeological contexts concealed within it.

More systematic examination of these issues within the broader settlement or chronological context of medieval Prague has only been conducted at a few sites (Republiky Square – Juřina et al. 2009; Karmelitská – Havrda, Tryml 2013; COPA/QUADRIO – Cymbalak et al. 2011; Cymbalak, Staňková 2014; Národní–Mikulandská / DRN – Cymbalak, Musílek 2017; Cymbalak, Rykl 2018). All these projects were archaeological excavations that have taken place over the past two decades. The individual projects took the form of large-scale excavations related to investor projects. They all concerned unique sites whose position within the spatial arrangement of the medieval agglomeration promised significant findings. Of earlier fieldwork that represents a cornerstone for the issues

39 At this point, we need to mention once again the exceptional example of a quite different situation in Hradišťko near Davle, a place not far from Prague, where rare and rich assemblages of everyday material culture and finds belonging to the equipment of the individual dwellings were documented in the remnants of a mining settlement (Kavan 1956; Richter 1982).

presented in this text, we must not forget excavations by Hrdlička and the results of his projects in Klárov (Hrdlička 1972) or in U Sladkých House in Husova Street, Old Town of Prague (Hrdlička 1980; 1983, 625, Fig. 6).

The latest fieldwork whose results promise to add new facts to the existing knowledge includes projects at 854 Bílkova Street, 553/2 Celetná Street (Sixt House; Kašpar, Vyšohlíd 2020 including references; Vyšohlíd 2022) and in the place of an undeveloped gap site in U Milosrdných Street (plot No. 904–910/4) in the Old Town carried out by Archaia Praha. With impatience, we can await the publication of more information about a find made by Labrys organisation at 597/13 Celetná Street (597/8 Štupartská Street). Superposition contexts of several half-timbered above-ground structures with the preserved floors and the stone heating devices in the corners revealed by Jan Havrda's excavation in the cellars of 919 in V Kolkovně Street (Havrda 2022) or within the project carried out in Husova Street (in front of House No. 236/4; Havrda 2021) are most interesting. Similarly, important knowledge has been acquired through an excavation carried out by Semerád and Taibl in the courtyard of 165 Karlova Street (Semerád, Taibl 2021). The constant monitoring of the latest events in field research in the historical core of Prague still brings new information. Their basic assessment and subsequent publication are preconditions for a complex study of the issues in question.

Although the time frame of the research questions addressed in the present text falls into the initial phase of the formation of the local conurbation (12th–14th centuries), it was clear that when studying the presented issues, we encountered evidence of earlier settlement structures. Their origin in part of the studied area (the Lesser Town extramural settlement, the neighbourhood of Vyšehrad) falls into the Middle and Late Hillfort Periods. Within the natural development and as a consequence of the gradual growth of the local population, three self-governing units gradually developed there: the later Lesser Town – *Nova civitas sub castro Pragensi* /1257/, Old Town – *Major civitas* /1232–1234/ and New Town – *Nova Civitas*, also known as *Nova Locis* /1348/. The origin and subsequent development of each of these reacted to different geomorphological conditions, earlier built-up area layouts and road networks or had a different area under the new buildings. All these factors influenced the density of secular architecture in the individual parts of the agglomeration.

The presented issue, or rather the areas of addressed questions, need to be perceived as an introduction to further study of the earliest secular architecture in Prague. We believe its continuation is important for the knowledge of the process of the formation of towns in this country. We can state that archaeologized traces of non-masonry medieval houses from Prague represent the most numerous evidence of early architecture in Bohemia. Even though only fragments are available for a great majority of the examined buildings, the verified localisation and summarisation of the data nevertheless provide us with a more precise image of the beginnings of the local agglomeration.

Chapter 3

Application of 'micromorphology in an archaeological context' for selected studies from the territory of medieval Prague

Lenka Lisá – Tomasz Cymbalak –
Anna Žďárská – Matouš Semerád – Pavel Taibl

1. Introduction

Although 'micromorphology in an archaeological context' is now a widely used methodological approach throughout the world, there are no micromorphological studies published from the city of Prague. The one available study is related to the detection of the formation processes of Prague sunken houses from the 5th century at Roztoky near Prague (Novák et al. 2012; Kuna et al. 2013). The sampling strategy applied to medieval excavations in Prague differs from that previously published for the area of Brno (Lisá et al. 2020b; 2021; see Chapter 8). The reason is the long-term cooperation between geoarchaeology and archaeology in Brno, which dates back to 2006. The chapter on the application of micromorphology to archaeological contexts in medieval Prague provides views on three very different sites (Fig. 12). The Nekázanka site provided a sample that was originally thought to have been possibly a trampled corridor (Semerád et al. 2020). The Národní–Mikulandská site provided three examples of possible house floors and the Kaprova site brought together three laminated contexts aimed at discovering if it is a floor or not.

Even though the few case studies introduced in this chapter provide interesting information about the similarities and differences in house maintenance in medieval Prague in contrast to medieval Brno, the micromorphology also provided information about the different provenance materials used in the Prague construction activities. This comparison also provides important information on how the sampling strategy can influence the general view on the site.

2. Results

2.1 Nekázanka

Immediately after the demarcation of the new Nekázanka Street at the end of the 14th century, during the secondary parcelling of the New Town of Prague, a deep-oriented house was founded on the examined plot. It is first mentioned in sources in 1386 and is among the oldest buildings on the street. The layout consists of two equally deep parts, which are defined by a relic of a transversely oriented wall (Z58).

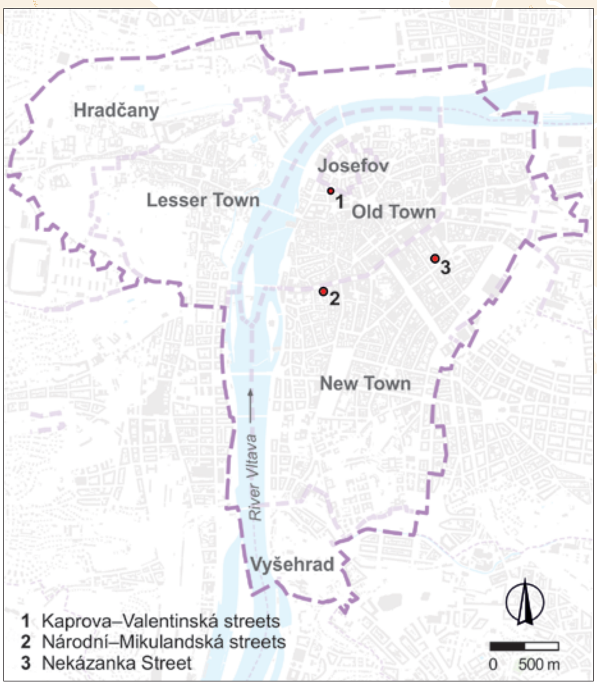


Fig. 12. Location of the studied sites in the historical centre of Prague. Author S. Babušková.

The construction level of the house was located at the level of 194.38 / Baltic height, i.e. approximately 10 cm at the level of the geological subsoil (soil type surface). The perimeter walls and the partition were shallowly laid into the soil type surface, the depth of the foundations is 0.4 m and preserved to a height of 0.6 m, which reflects the increase in the terrain from the construction of the house to the mid-16th to 17th centuries when the house was demolished or significantly rebuilt.

Fragments of the eastern outside wall facing the street, the southern wall 1.05 m thick and approximately 15 m long, and the west wall (Z20) were only preserved from the house. While the outside walls were built of fractured quartzite bonded with lime mortar, the inner transverse wall was formed by a 0.56 m thick structure made of clay loam (crown of the wall at 194.79 / Baltic height), which from first impressions did not differ from the layer of geological subsoil (soil type). From this wall, however, only the southern half, approximately 4 m long, was preserved and connected to the southern outside wall by stone grits. In the north, it was terminated by a relic of marlite masonry. The faces of the clay wall, including the perimeter structures, were given one layer of lime plaster, whitewashed with a red-painted plinth.

A sample of building material was taken from the crown of the transverse wall (Z58).

The microstructure of the sample is complex. The prevailing pores are compound packing voids, cracks, vughs and different-sized vesicles. The sample is unsorted with porphyric-related distribution. The grain size distribution corresponds to sandy silt with $C/F_{(50\ \mu m)}$ = 50 : 50. The coarse fraction is composed of two main subfractions. The coarse sandy fraction is composed of subangular weathered clasts of quartz, plagioclase, rock fragments (sandstones, metamorphic rocks), and occasionally daub or ceramic sherds. The fine sand coarse fraction is primarily composed of subangular and angular weathered quartz, plagioclase, mica and opaque minerals. The matrix is brown, with crystalline and locally stipple-speckled birefringence.

The organic matter is represented by fine-grained black dotting and decomposed dark brown organic matter locally distributed within the matrix without any preferred orientation. Microcharcoal was present, but not abundant. No bones or other organomineral features were recorded. The pedofeatures detected within the study sample are the local presence of Fe/Mn nodules, occasional fragments of clay coating, and Fe/Mn hypo-coating of pores infilled with decomposed fragments of organic matter.

Interpretation: the internal structure and composition of the studied sample most probably reflect a construction feature composed of unsorted material, most likely overbank deposits mixed with organic matter and partly compressed.

2.2 Národní–Mikulandská

The examined site was located in the area of the building block delineated by the streets of Voršilská, Ostrovní, Mikulandská and Národní třída. The local historical overburden was, in accordance with the latest methodological trends, examined by a multidisciplinary team of specialists (archaeologist, geologist,

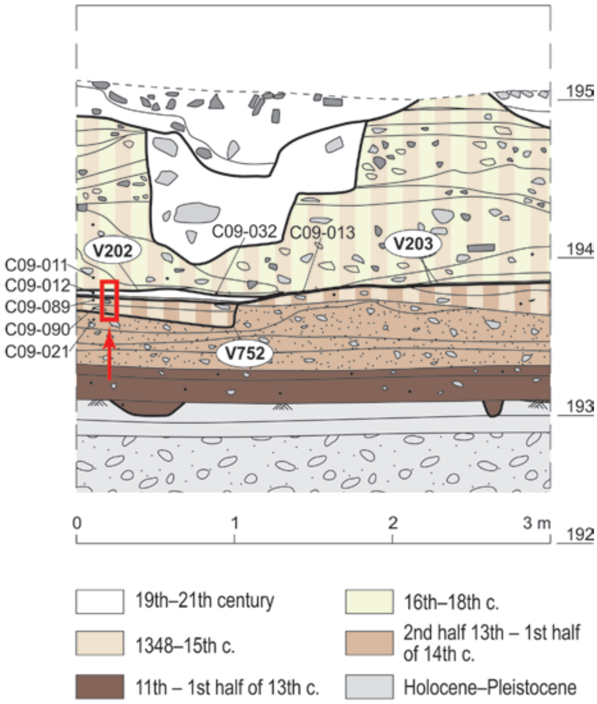


Fig. 13. Location of Sample 1 from the Národní–Mikulandská site; north part of the excavated housing block. C09-011 – light grey loose clayey sand, filling of demolition trench (V202), which was most likely made in connection with the reconstruction of the early modern cellar; C09-032 – green-grey medium-lying clay sand, random pebbles up to 0.5 cm; the bottommost part of the filling of the trench (V202); C09-012 – rusty brown medium sandy loam, occasional pebbles up to 3 cm, fragments of brick up to 3 cm, coals, demolition trench (V202); C09-013 – wooden floor, filling of the Baroque building (V203; a narrow cellar or entrance to the cellar); C09-089 – grey plump sandy clay, slightly pebbled up to 5 cm, random coals, filling of the high medieval building (V752), probably only a relic of its lower part, the upper part was removed by an excavation of Cellar V203, the reconstructed floor plan was rectangular with dimensions of 1.28 × 0.95 m, reaching a depth of up to 0.1 m, walls – sloping; bottom – convex, oblique, dating: mid-14th–15th centuries; C09-090 – wooden floor, filling of the high medieval building (V752), dating: mid-14th–15th centuries; C09-021 – grey-brown crumbly strongly sandy clay, slightly pebbled up to 2 cm, occasionally charcoals, fragments of bricks up to 2 cm, daub up to 6 cm. Authors O. Hájek, E. Ditmar, S. Babušková.

building historian, archivist, numismatist, anthropologist and archaeobotanist).

The set of samples from the Národní–Mikulandská site come from two different contexts. The first (Sample 1) comes from the superposition of two contexts observed in the northern part of the studied area (Cymbalak, Musílek 2017). In the case of Samples 2–4, they come from the lower part of the defunct (residential?) building, which fell into the late phase of the pre-urban occupation at the location, the 'late settlements' (12th – first half of the 13th centuries), when larger, partly recessed and fairly regular shaped structures appeared. Their mutual arrangement indicates the existence of dispositional multi-part buildings (Cymbalak, Rykl 2018).

Superpositional relations between the individual parts prove the gradual cessation of the empty area. However, depending on the current state of the development of the location, this process can be included in one developmental phase of the settlement. The preserved relics are 1–1.2 m subsurface features in the shape of a square or rectangle. In accordance with most previous findings and valid opinions (Vařeka 2002), this is a typical feature of the Czech environment. Post holes discovered in the corners and around the perimeter of the individual structures indicate that they were recessed, or rather semi-recessed, structures built from wood. The houses were sunken into older anthropogenic contexts and the surface of the Vltava terrace. The area of individual houses ranged from 20 to 50 m². The dimensions of the smaller houses were a minimum of 2 × 2 m and a maximum of 7 × 3 m. For relics of larger features, dimensions in the range of 7.5 × 5.5 m to 9 × 5.5 m (max. 8 × 9? m) were recorded.

In two cases, remnants of wooden planks were discovered at the bottom of the structures, which can be interpreted as fragments of floors, collapsed ceilings or wall fillings. To date, no convincing evidence of the treatment of walkable surfaces within the exposed interiors has been found. Fifteen to eighteen of these structures have been identified within the examined area to date. Only two of these can be described as residential for work, based on the presence of simple devices working with fire, which were found in their interiors. However, it cannot be ruled out that these were traces of unspecified production facilities equipped with a fireplace, which were located within the structures. The dating material, obtained from the extinction phases of the recessed basements/semi-basements of the houses from Mikulandská Street, represents numerous sets of ceramics with archaic and classical rims, accompanied by a smaller number of fragments with large upwardly drawn profiles (mid-12th – mid-13th centuries) and several excavations from the 12th century (exceptionally, the second half of the 11th century, see Cymbalak, Musílek 2017, 134). Per the results of the last building-historical survey (Musílek 2015, 3–6), the relics of these features can be interpreted as the most significant northern part of the early medieval settlement of Opatovice (Wallisová 1998), the core of which was located south of the Romanesque church of St Michael (Baťková ed. et al. 1998, 125).

2.2.1 Sample 1 (33/1) Národní–Mikulandská

Sample 1 comes from the superposition of two contexts observed in the northern part of the examined area (Fig. 13). The upper part of the sample could correspond to the relics of the modern cellar (V203). On the other hand, the lower part of the backfill/fill of the high medieval building (V752) without further characteristics was located in the middle part of the burgher plots.

The microstructure of the study sample is complex and the sample can be divided into several subfacies (Fig. 14). At least two phases of plastered floor and two different types of active layers were detected. The layers in between could be called passive layers although it is not clear if these originated due to trampling or not. For simplicity, the subfacies will be described more generally.

The passive layers are typical of the complex microstructure, where the prevailing types of pores are compound packing voids, vughs and cracks. The material of these layers is always unsorted and porphyric with the grain size distribution related to sandy silt with $C/F_{(50\ \mu m)}$ = 50 : 50. The coarse sandy fraction is composed of highly weathered subangular quartz, plagioclase and rock fragments (limestones, sandstones, siltstones and metamorphic rocks), daub and mortar fragments. The fine sandy coarse fraction is composed of subangular quartz, plagioclase, mica and opaque minerals. The matrix has the usual brown to light brown colour with crystalline birefringence. The organic matter is principally composed of black dotting and locally presented brown decomposed organic matter. The most significant type of organic matter is charcoal, which is widely distributed all over the passive and active layers of the sample. Phytoliths were also detected. The main type of the detected pedofeature is strong bioturbation including the passage features and microfauna excremental features (Fig. 14a). No signs of

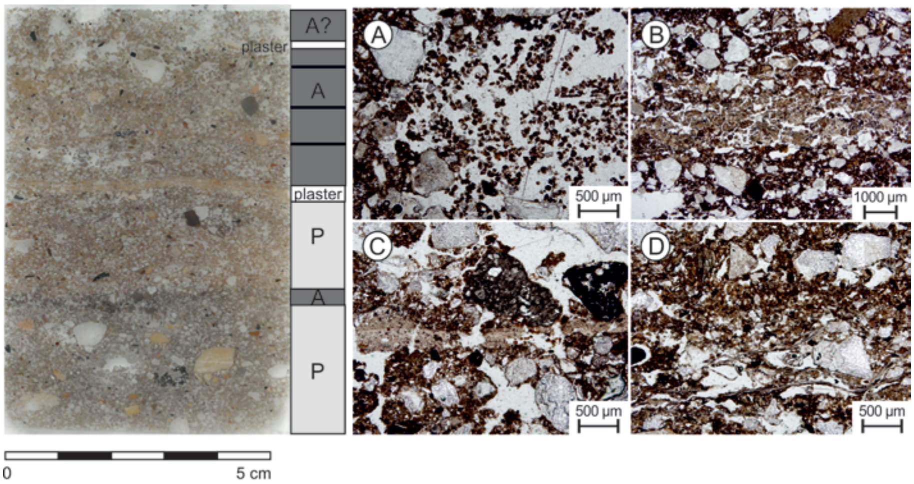


Fig. 14. Micromorphological documentation of the microstratigraphy of the sample as well as chosen features. A – bioturbation (PPL – photo taken in plane-polarized light); B – anhydrite layer (PPL); C – gypsum layer (PPL); D – active layer with fragments of organic matter and articulated phytoliths (PPL). Author L. Lisá.

leaching, fine grain matrix accumulations or impregnations were recorded.

The plastered floors were detected in the studied sample twice. In the older phase, the thickness is approximately 1 mm, and the floor is composed of cracked fragments of anhydride, originally probably applied as gypsum mixed with organic matter and charcoal (Fig. 14b). The layer also contains phytoliths. The later phase of the plastered floor is even thicker, but is composed of gypsum and does not contain any additional inclusions (Fig. 14c).

The easily detectable active layers composed of grass or straw accumulations were detected between the older and later phase of the plastered floor (see Fig. 14). These layers are approximately 1 cm thick, and their internal composition greatly varies. The typical features of these layers are the presence of horizontally layered organic matter with well-preserved articulated phytoliths and the presence of horizontal pores connected with organic matter (Fig. 3d). The microstructure of such an active layer is complex and the main types of pores are horizontal pores and compound packing voids. The mineral and organomineral composition of these layers are comparable with the composition of the passive layers described above. The organic part of that composition is typical of the presence of decomposed or partially decomposed organic matter connected with the presence of articulated phytoliths. The pedofeatures are represented by bioturbation connected with the presence of microfauna excrements. No leaching or impregnations related to the presence of water were observed.

One more active layer located in the lower part of the sample was detected. This layer does not have any specific orientation and is not strongly distinguished from the above and below layers, but it is typical of the dark brown colour, the presence of microcharcoal and humus and the massive microstructure inside the aggregates. The general microstructure of this active layer is complex, with the pores represented by cracks and compound packing voids. The layer is moderately sorted with double-spaced porphyric-related distribution. The main mass is composed of a silty fraction with $C/F_{(50\ \mu m)} = 30 : 70$. The coarse fraction is composed of anhydrite fragments probably representing mortar. The matrix is dark brown with crystalline birefringence. The organic matter as mentioned above is composed of black dotting representing buried decomposed organic matter and microcharcoal. The pedofeatures observed are represented by slight bioturbation.

Interpretation: the sample represents the set of passive and active layers of a constructed floor. The passive layers are always unsorted, and it is a question of whether they represent only passive layers or if they can be called reactive layers. In some parts, slight orientation is sometimes visible although this may be the result of the beating from above. There were two phases of plastered floors detected. The older phase is typical of the presence of anhydrite fragments mixed with the microcharcoal and decomposed organic matter, while the later phase is typical of pure gypsum. In the context of the location and due to the thickness of this layer, it is also possible to interpret thin gypsum plaster as fallen plaster from the wall during the latter phase of the use of the house. It is preserved in between a nicely developed active layer. This active layer is typical of trampled grass and straw with visible orientation. The lower part of the sample (the first stages of the floor construction) is represented by a slightly developed trampled layer of humus mixed with fragments of decomposed organic matter and microcharcoal plus fragments of anhydride. A possible interpretation based on micromorphological observations could be that it reflects the construction of passive layers interspersed with the trampled layer during the construction of the house. The use of the house is probably recorded with an older and later plastered floor and an active trampled layer in between. This part of the house was very dry with no wet sweeping applied there.

2.2.2 Sample 2 (33/2) Národní–Mikulandská

In Sample 2, the filling/backfill of the interior of the oldest semi-sunken building (house?) was documented in the southern part of the examined area. The maximum preserved depth of the building was 1.2 m. The building is dated to the beginning of the 12th century (Fig. 15).

The sample covers two passive and two active/reactive floor layers (Fig. 16). The bottom and the uppermost part of the sample (i.e. passive layers) are composed of unsorted sandy loam with a complex microstructure. The main types of pores are represented by the compound packing voids, vughs and cracks. Part of the sample has an even granular microstructure. The material is unsorted with porphyric-related distribution with $C/F_{(50\ \mu m)}$ = 70 : 30. The coarse sand fraction is composed of angular to subangular highly weathered clasts of quartz, plagioclase and rock fragments (sandstones and metamorphic rocks). The fine sandy fraction is composed of angular to subangular weathered quartz, plagioclase, mica and opaque minerals. The matrix is brown to grey-brown with a crystalline birefringence. The organic matter is preserved only as black dotting. The main type of pedofeature is bioturbation including the excremental features after microfauna.

Two active layers were recorded, sitting one over the other with the passive layers below and above. These were divided into two single active layers because they significantly differ in their composition. The lower active layer has a complex microstructure with the main types of pores represented by compound packing voids, horizontal pores, cracks, vughs and chambers. The material is unsorted

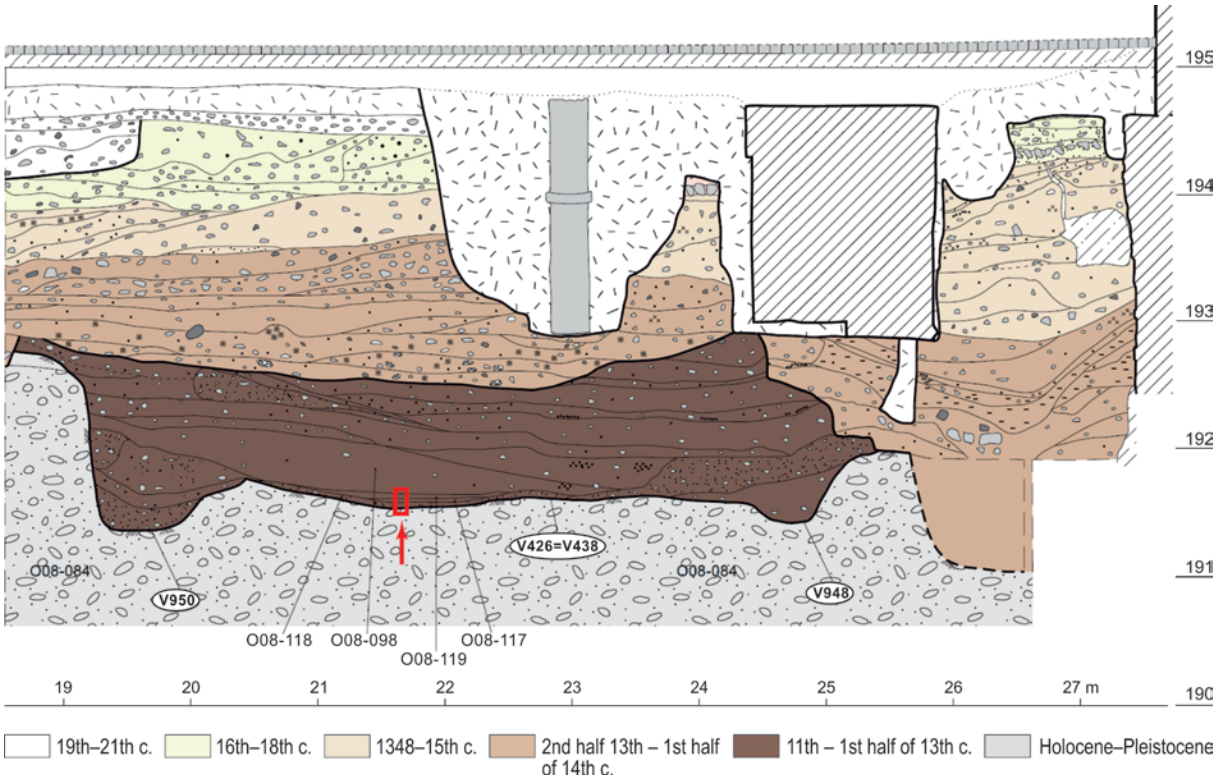


Fig. 15. Location of Sample 2 from the Národní–Mikulandská site; south part of the excavated housing block. O08-084 – yellowish to light ochre clayey sandy gravel; Pleistocene gravel-sand Vltava terrace; O08-098 – medium brown-grey plump sandy clay, slight boulders (up to 7 cm), crumbs of fragments (up to 0.5 cm), remnants of ground wood; filling/backfill of the recessed house (V426=V438) of a rectangular layout in whose NW and NE corner there were post holes (V950 and V948). Documented dimensions 6.8 × 5.8 / 2.2 m, walls – vertical, bottom – flat; O08-118 – rusty ochre loose coarse sand, including boulders (up to 5 cm); filling/backfill of house (V426=V438); O08-119 – light brown crumbly sandy clay, random boulders up to 3 cm; filling/backfill of house (V426=V438). Authors E. Ditmar, J. Kopřivová, S. Babušková.

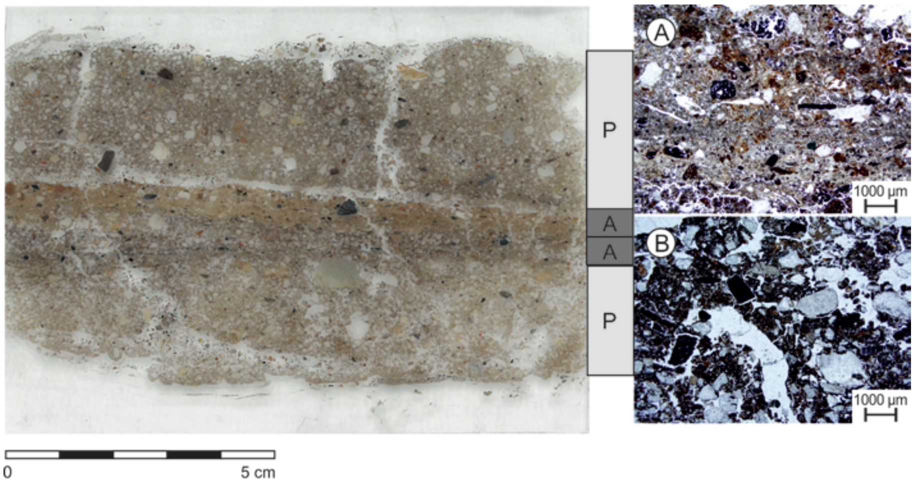


Fig. 16. Micromorphological documentation of the microstratigraphy of the sample as well as chosen features. A – the organic matter is preserved in a large amount, mainly as decomposed dark and black organic matter, charcoal and microcharcoal (PPL); B – large presence of charcoal (PPL). Author L. Lisá.

sandy loam with porphyric-related distribution with $C/F_{(50\ \mu m)} = 30 : 70$. The coarse sandy fraction is composed of subangular quartz, mica and plagioclase, occasional daub and slag and weathered fragments of metamorphic rocks and siltstones. The fine sand fraction is composed of subangular quartz, plagioclase, mica and opaque minerals. The colour of the matrix is dark brown and the birefringence is crystalline. The organic matter is preserved in a large amount, mainly as decomposed dark and black organic matter, charcoal and microcharcoal (Fig. 16a). Organomineral particles are represented by non-articulated phytoliths, burnt bones and fragments of eggshells. The preserved pedofeatures are the passage features after the bioturbation. No leaching or impregnations were observed.

The upper active layer is typical of the large presence of carbonates (Fig. 16b). Its microstructure is complex, and the main types of pores are plates, cracks and compound packing voids. The prevailing part of the material is represented by micritic calcium carbonates. The grain size is difficult to establish, but when excluding the carbonates, it corresponds to silty loam most probably with $C/F_{(50\ \mu m)} = 20 : 80$. The coarse sandy fraction is composed of a few fragments of subangular weathered quartz and plagioclase and daub while the fine-grained sandy fraction is composed of subangular quartz, plagioclase, mica and opaque minerals. The colour is grey and the birefringence is crystalline. The organic matter is preserved as charcoal and microcharcoal. The pedofeatures preserved are depletion as well as impregnation by calcium carbonates.

Interpretation: the sample covers the floor composed of two passive and two different active, or rather, two phases of active floors. The lower active layer represents the trampled kitchen dump mixed with the mineral matrix. The upper active layer is represented by the ashy layer, which cannot be from the time the house was abandoned because it contains horizontal pores that are the result of a long-term trampling.

2.2.3 Sample 3 (33/3) Národní–Mikulandská

Sample 3 represents the filling/backfill of the interior of a semi-recessed building, possibly a house. The maximum preserved depth was 0.6 m and was documented in the southern part of the examined area. Stratigraphically, it was later than the previous structure (V426=V438; see Sample 2). The building dates back to the first half of the 12th century (Fig. 17).

The sample can be divided into four subfacies marked as A, B, C and D (Fig. 18). The transitions between the layers are more or less sharp but wavy.

Subfacie A has a granular microstructure and the main types of pores are compound packing voids. The grain size composition is sand to sandy loam with $C/F_{(50\ \mu m)} = 80 : 20$. The coarse fraction is composed of rounded and subrounded quartz and plagioclase (Fig. 18a). Additionally, the very fine fraction also includes mica and opaque minerals. The matrix is dark brown and crystalline. The organic matter is presented occasionally as decomposed brown organic matter. The pedofeatures observed are mainly depletion and capping on the grains.

Subfacie B has a complex microstructure. The main types of pores are compound packing voids, cracks and vughs. The material is moderately sorted with porphyric-related distribution. The grain size distribution is sandy loam with $C/F_{(50\ \mu m)} = 70 : 30$. The coarse sandy fraction is composed of rounded to subrounded quartz, plagioclase and fragments

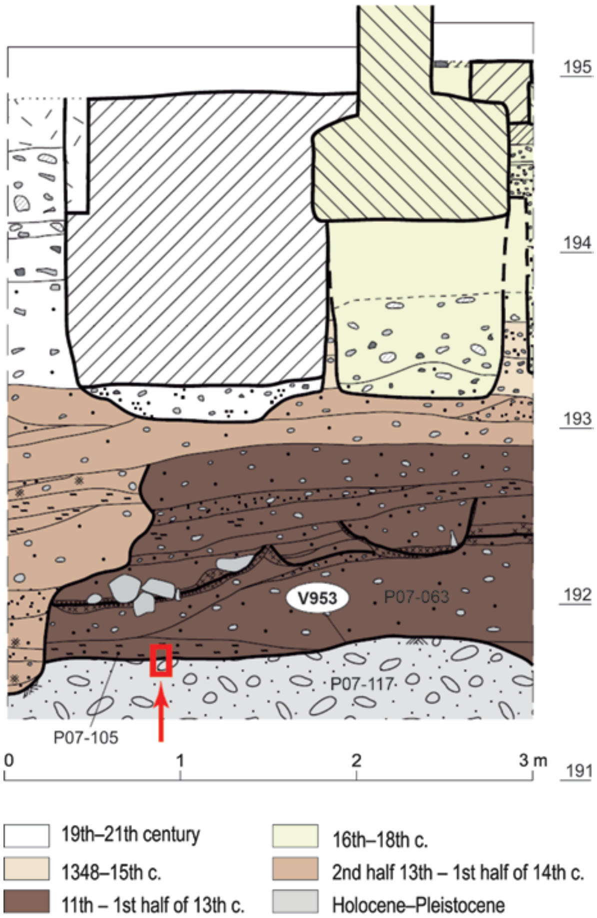


Fig. 17. Location of Sample 3 from the Národní–Mikulandská site; south part of the excavated housing block. P07-105 – medium grey-brown solid clay, slightly with charcoal (up to 1 cm); filling of the recessed house (V953) with structural elements of post holes, the entrance neck was probably from the south, a coin was found in Context P07-063 – Vladislaus I, denarius (1120–1125), dimensions of the building – min. 5.64 × min. 7.58 / 1.3 m, walls – regular, straight/sloping; bottom – mostly flat, orientation of the building – NS; P07-117 – light brown-ochre to rusty loose sand, numerous boulders (up to 3 cm), Pleistocene Vltava terrace. Authors E. Ditmar, J. Kopřivová, S. Babušková.

of metamorphic rocks. The fine-grained part of the coarse fraction is composed of subrounded to subangular quartz, plagioclase, mica and opaque minerals. The matrix is dark brown with crystalline birefringence. The organic matter is preserved as fine-grained fragments of brown and dark brown organic matter as well as microcharcoal and charcoal (Fig. 18b). The pedofeatures preserved are fragments of clay coating and bioturbation.

Subfacie C has a complex microstructure. The main types of pores are cracks, compound packing pores, vughs and vesicles. The material of this subfacie is highly variable. Single angular aggregates with an almost massive microstructure (Fig. 18c) are mixed with the smaller aggregates with more unsorted material. In general, the grain size of this subfacie corresponds to silty to sandy loam with $C/F_{(50\ \mu m)}$ = 20 : 80 – 60 : 40. The coarse fraction is principally composed of subangular quartz, plagioclase, mica and opaque minerals. Metamorphic rock fragments were recorded. The colour of the matrix varies from grey-brown to light brown to brown. The birefringence is crystalline. The organic matter is preserved primarily as buried black dots of organic matter but also as decomposed brown organic matter, microcharcoal and charcoal. The pedofeatures observed are mainly depletion and bioturbation.

Subfacie D is preserved only as a tiny fragment and the composition most likely reflects the trampled active layer. The material of the layer has a complex microstructure with the main types of pores represented by compound packing voids. The material is unsorted sandy loam with porphyric-related distribution with $C/F_{(50\ \mu m)}$ = 30 : 70. The coarse sandy

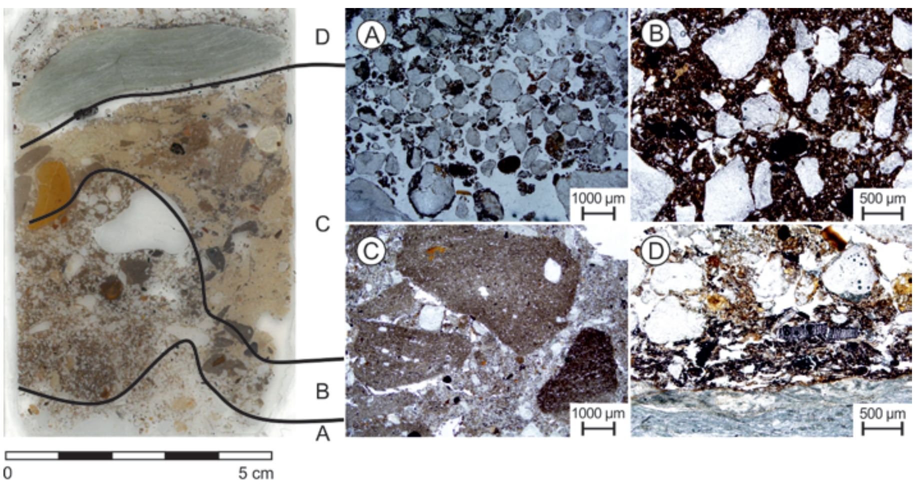


Fig. 18. Micromorphological documentation of the microstratigraphy of the sample as well as chosen features. A – capping (PPL); B – microcharcoal and charcoal in humus rich matrix (PPL); C – destruction recorded by soil aggregates (PPL); D – active layer rich in charred material (PPL). Author L. Lisá.

fraction is composed of subangular quartz, mica and plagioclase. The fine sand fraction is composed of subangular quartz, plagioclase, mica and opaque minerals. The colour of the matrix is dark brown and the birefringence is crystalline. The organic matter is preserved in a large amount, mainly as decomposed dark and black organic matter, and charcoal and microcharcoal are attached to the surface of a stone fragment (Fig. 18d). Organomineral particles are represented by non-articulated phytoliths, burnt bones and fragments of eggshells. The pedofeatures preserved are the passage features after bioturbation. No leaching or impregnations were observed.

Interpretation: it appears from the sample that none of the divided subfractions can be related to the active floor, although the interpretation of the sample as a set of floor layers cannot be excluded either. The bottom part can be interpreted as a coarse-grained fluvial deposit. The layer of dark brown sandy silt probably reflects the material trampled there during construction work. Subfacie C most probably represents the destruction of a plastered wall. Subfacie D, which sits on this destroyed surface is probably trampled on the surface and it is a question of whether it can be called an active layer of the floor or if it originated solely from trampling on the destroyed surface.

2.2.4 Sample 4 (33/4) Národní–Mikulandská

Sample 4 comes from the filling/backfill of the interior of a semi-recessed building/house, where the maximum preserved depth was 0.8 m. Stratigraphically, it is the latest of all the recessed structures described here and examined in the southern part of the area. The building was dated to the 12th century (Fig. 19).

The sample can be divided into three main subfacies (Fig. 20). The lower and upper layers are passive and the central one is active. The lower one has signs of a reactive layer. They are marked as subfacies A, B and C from the bottom to the top.

Subfacie A has a complex microstructure and the main types of pores are represented by the compound packing voids. The upper part of this layer has a number of horizontal pores (Fig. 20a). The material is moderately sorted with porphyric distribution. The grain size is sandy loam with $C/F_{(50\,\mu m)}$ = 50 : 50. The coarse fraction is composed of subangular to subrounded quartz, plagioclase, mica and opaque minerals. The colour is light brown and the birefringence is crystalline. The organic matter is preserved as black dotting. The only pedofeatures are partial depletion and occasional bioturbation.

Subfacie B has a complex microstructure. The prevailing types of pores are complex packing voids, although vughs and cracks are also commonly preserved.

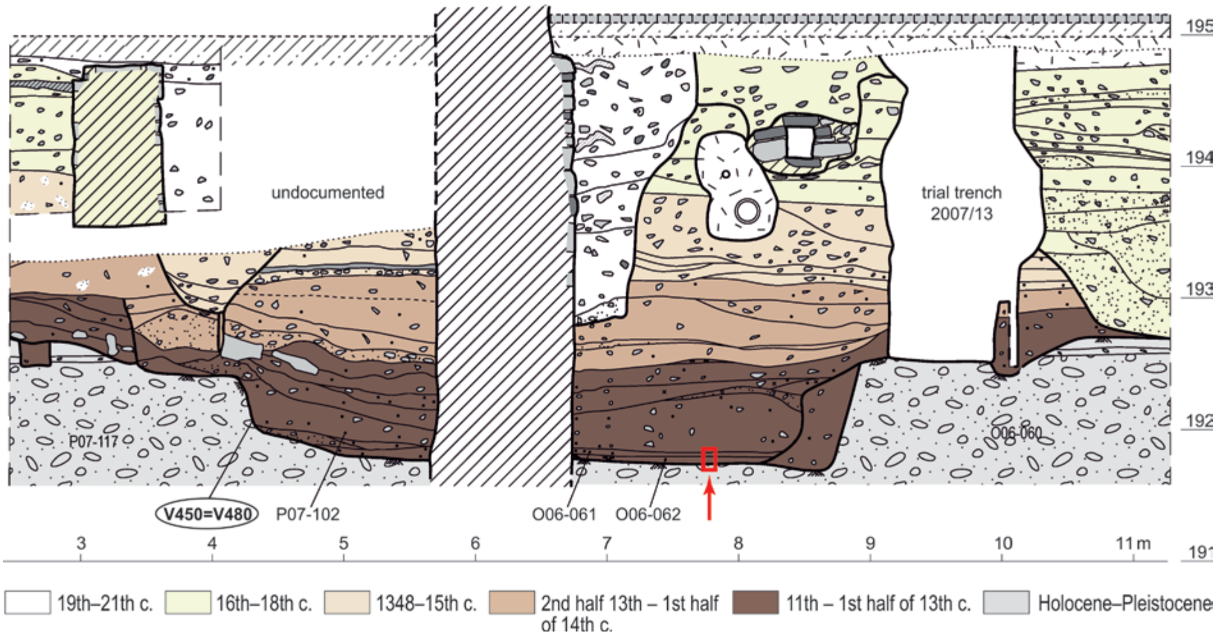


Fig. 19. Location of Sample 4 from the Národní–Mikulandská site. O06-060 – yellow to light ochre clayey sandy gravel; Vltava gravel-sand terrace; O06-061 – dark brown-grey crumbly clayey-sandy clay, slightly wilted wood residues, charcoal (up to 2 cm), boulders (up to 3 cm), random daub (up to 3 cm); filling of a slightly recessed house (V450=V480) with the post-built structure, the floor was made of planks and the entrance neck was probably from the south side, excavated house had the dimensions of 5.8 × min. 3.68 / 1.18 m, a denarius coin (Coloman the Learned, 1095–1116) was found in Context P07-102, walls of the lower part of the house – regular, straight/oblique, stepped in places; bottom – flat, orientation of the building – NS; O06-062 – grey-brown cohesive sandy-clayey clay, slightly withered remnants of wood, small boulders (up to 3 cm), occasionally charcoal (up to 1 cm). Authors E. Ditmar, J. Kopřivová, S. Babušková.

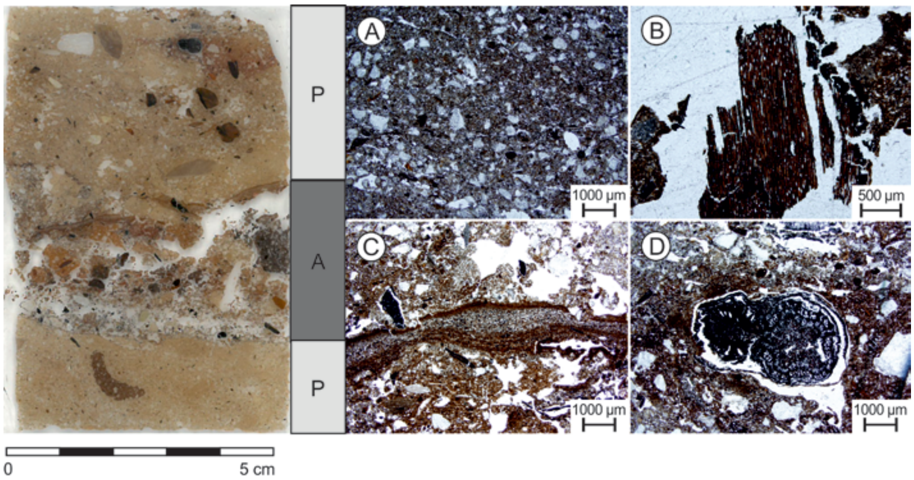


Fig. 20. Micromorphological documentation of the microstratigraphy of the sample as well as chosen features. A – partly developed horizontal pores (PPL); B – wood fragments (PPL); C – soil crusts (PPL); D – burnt cereal grain (PPL). Author L. Lisá.

The material of this subfacie is unsorted with the grain size composition of sandy loam. The sandy coarse fraction is composed of subangular to angular partly weathered grains of quartz, plagioclase, daub, and rock fragments (siltstones, sandstones, metamorphic rocks). The colour of the matrix is dark brown with crystalline birefringence. The organic matter is presented as partially decomposed (fragment of wood – Fig. 20b), and fully decomposed brown organic matter. Microcharcoal and charcoal are preserved in large amounts. Bones and articulated phytoliths were observed. The main pedofeatures observed are bioturbation and depletion. The upper part of this subfacie has a specific pedofeature of a soil crust (Fig. 20c). The positive gradation of this feature reflects the water stagnation on the site.

Subfacie C is similar to subfacie A. The difference is that the subfacie C is more unsorted and contains pores after the organic matter. Organic matter is also preserved in a larger amount, for example, as charred grains (Fig. 20d).

Interpretation: the sample covers one active and two passive layers of the floor. The passive layers are composed of overbank deposits. The lower layer has not been affected by humans to a large extent and may be *in situ*, while the upper passive layer contains much more human impact, which is reflected in the presence of organic matter. The active layer is composed of wood fragments (probably wooden floors) and a kitchen dump. The site was exposed to water at the end of the use of the active layer, which is reflected in the sample by well-developed soil crusts.

2.3 Kaprova, Praha 1 – Staré Město

Archaeological excavation took place in 2016 in the courtyard between House No. 1061 in Valentinská Street and House No. 49 in Kaprova Street in Prague Old Town (Žďárská 2017). As part of the fieldwork, it was possible to document more than a 5 m thick historical overburden, the origins of which date back to the 11th century. The remains of an early medieval burial ground from the second half of the 9th and the early 10th century were also discovered.

2.3.1 Sample 1

Sample 1 was taken from the western profile of Trench pit E2 – from Layers E2-106 and E2-107 (Fig. 21), which correspond to the lower part of Sample 3. Grey solid clay (E2-106) was interpreted as a walking level based on the archaeological context, or the remnant of an attempt to level the terrain. Layer E2-107, formed by green-grey loose clayey-sandy clay with a slight admixture of marl fragments, boulders, diabase and random charcoals, had the character of a batch overlapping earlier contexts (waste facility, sunken house).

Sample 1 (Fig. 22) was taken from the sedimentary infill of an older structure, secondarily used as the dumping pit. The lamination or the sedimentary set was nicely visible all over the studied profile. The reason for micromorphological sampling was to find out as much information as possible about the material provenance, the reason for lamination and the possible influence of post-sedimentary processes. Despite the sample showing a macroscopic type of lamination, there were no divided subfacies within the study sample. The reason is described below.

The microstructure of the sample is complex. The prevailing pores are compound packing voids, planes, vughs, vesicles and cracks. The planes are quite common but not well developed (Fig. 22a). The sample is moderately sorted with visible horizontal

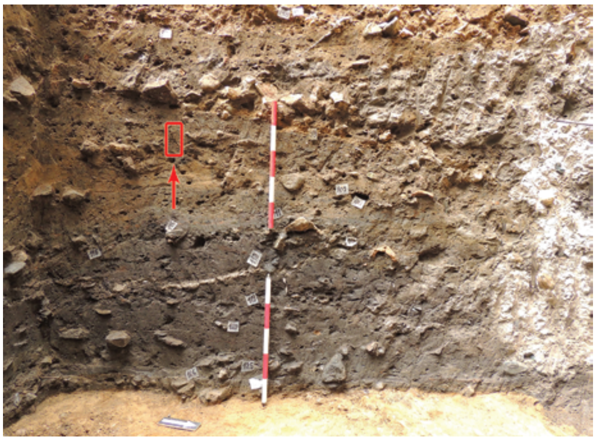


Fig. 21. Location of micromorphological Sample 1 at the Kaprova site. Photo by L. Hájek.

orientation and with porphyric-related distribution. The grain size of the sample is sandy silt with $C/F_{(50\ \mu m)} = 50 : 50$. The coarse fraction is principally composed of weathered quartz, plagioclase, mica and opaque minerals. The coarse sand grains are represented by quartz, plagioclase and rock fragments (siltstones and metamorphic rocks). The colour of the sample is dark brown and the birefringence is crystalline. The organic matter is preserved as black dotting and brown decomposed organic matter. Locally partially decomposed organic matter is preserved as, for example, in the bark (Fig. 22b) and wood fragments. Charcoal and microcharcoal are also commonly present. Most of the coarse organic particles are horizontally oriented. Organomineral particles are represented by non-articulated phytoliths. Digested bones were observed in the samples.

The pedofeatures are the most important feature for interpreting the sample. These are typical of phosphatic impregnations and coatings (blue arrows) and are sometimes connected with the silty clay coating (red arrows) (Fig. 22c) and phosphatic neoformations (Fig. 22d). Other pedofeatures detected are depletion and bioturbation.

Interpretation: the material has quite a significant horizontal orientation connected with horizontal planes that are still visible although they are masked by phosphate illuviation. On the other hand, there are no visible distinctions between the sublayers and laminae. The presence of a dusty clay coating more likely reflects the open-air context, probably an area between the houses where organic material was dumped and trampled. The presence of phosphate features may be connected with the primary use of the space, i.e. with post-depositional processes or it might be connected to the percolating phosphate-rich solutions seeping from the dumping pit located above the sedimentary record.

2.3.2 Sample 2

Sample 2 was taken from the southern profile of Trench pit E2 – from Layers E2-053, E2-054, E2-058, E2-059, E2-060, E2-068, E2-64 (Fig. 23). Based on the archaeological context, it was a partially recessed structure with a possible above-ground structure (V109), which corresponds to the micromorphology results. The building is generally dated to the 13th century. The floor level was formed by ochre-lined sandy clay (E2-64). The later modifications of the walking surface are represented by a thin layer of dark grey to black clayey-sandy clay with numerous

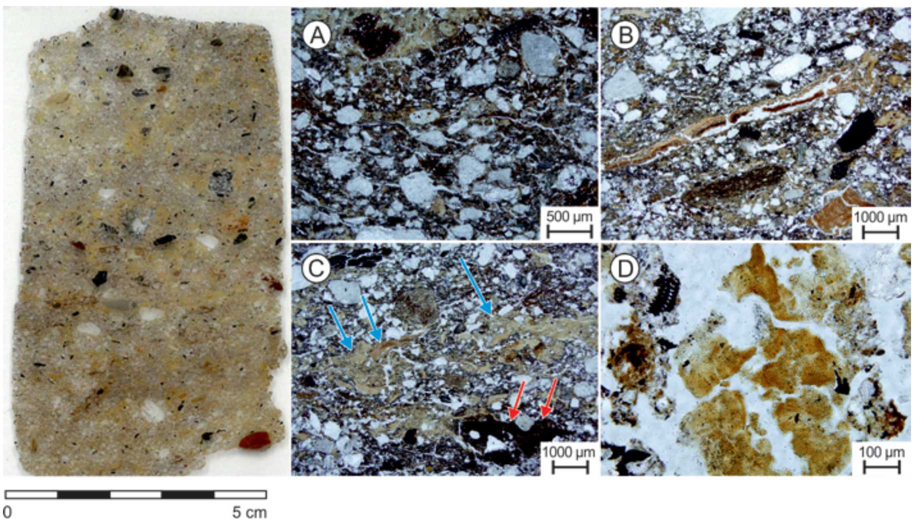


Fig. 22. Micromorphological documentation of the microstratigraphy of the sample as well as chosen features. A – horizontal pores (PPL); B – bark fragment (PPL); C – phosphatic (blue arrows) and dusty clay coating and charred material (red arrows) (PPL); D – phosphatic neoformations (PPL). Author L. Lisá.

layers of ochre clay (E2-068) and the adjacent parts of grey-brown cohesive sandy clay with charcoals and boulders (E2-060). The building probably disappeared as a result of a fire (including E2-053 to E2-058).

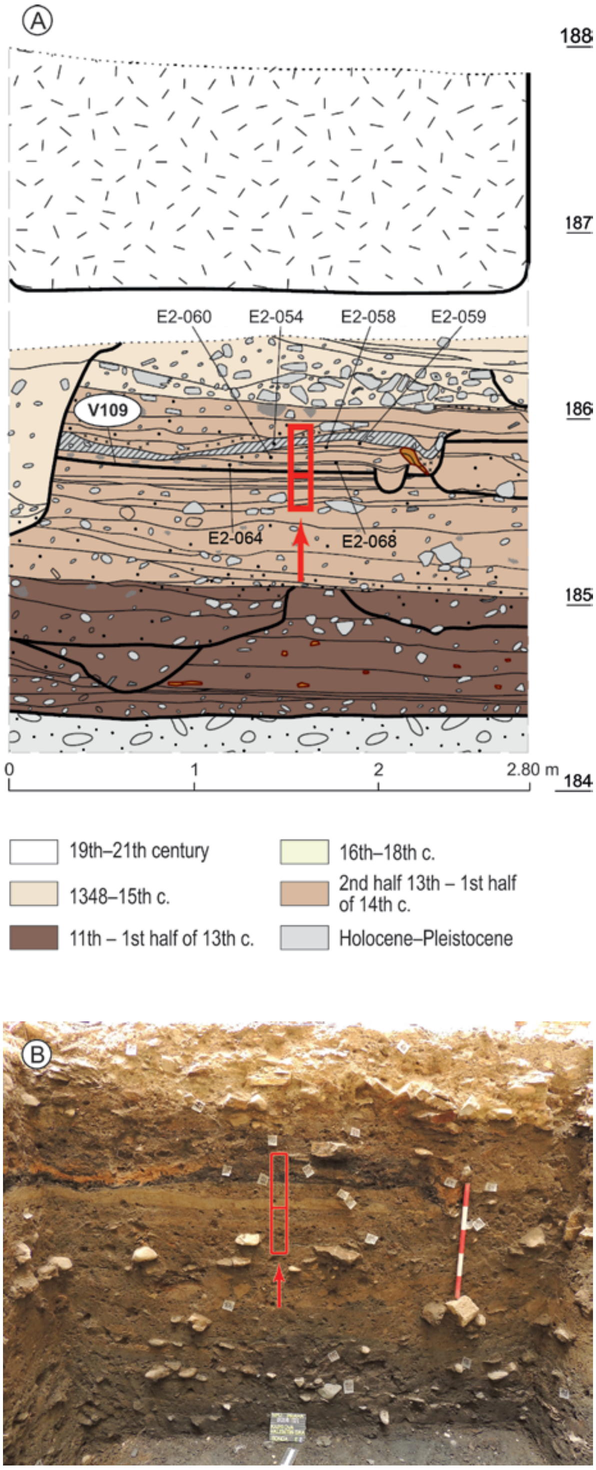


Fig. 23. Location of micromorphological Samples 2 and 3 at the Kaprova site. Author L. Hájek.

Sample 2 was taken from the infill of the recessed house. It is difficult from the archaeological context to say if it is recessed or with above-ground features. Within the archaeological context, the lamination was described as trampling with a thin layer affected by the fire on the very top. Although a set of subfacies could be divided in the sample, the distinctions between them were not easily readable, so we describe them as facies A (passive layer of the floor) and B (active layer of the floor) (Fig. 24).

Subfacie A is a passive layer of the floor with a complex microstructure. The main types of pores are vesicles and compound packing voids. The sample is moderately sorted with porphyric-related distribution. The grain size distribution is sandy loam with $C/F_{(50\ \mu m)}$ = 40 : 60. The coarse fraction is composed of weathered subangular quartz, plagioclase, mica and opaque minerals. The coarse sandy fraction is missing. The colour of the matrix is brown with crystalline and locally stipple-speckled birefringence. The organic matter is preserved as black dotting and decomposed brown organic matter. Only occasionally is partially decomposed organic matter or charcoal presented. The pedofeatures presented are the occasional passage features. These are relatively rare phosphate and Fe/Mn impregnations.

Subfacie B represents an active layer with sets of laminae without distinct transitions (Fig. 24a, b). The microstructure of the subfacie is complex with a large number of different pores. The main ones are complex packing voids, plates and vughs although cracks and vesicles are also presented. The material is unsorted with porphyric-related distribution and with a number of anthropogenic inclusions. The grain size distribution can be described as coarse sandy silty loam with $C/F_{(50\ \mu m)}$ = 30 : 70 – 70 : 30. The coarse sandy fraction is composed of weathered subangular to subrounded quartz, plagioclase, rock fragments (sandstones, siltstones, metamorphic rocks), daub and ceramic sherds. The fine sand coarse fraction is composed of subangular quartz, plagioclase, mica and opaque minerals. The colour of the matrix varies from orange to brown to dark brown or grey-brown, and the birefringence is locally stipple-speckled crystalline. The distinction in composition related to the colour changes is connected with the presence of laminae, which is richer, for example, in humus, microcharcoal, decomposing organic matter or clay related to the charred material (Fig. 24d). The organic matter is presented in a different condition, with black dotting and decomposed and partially decomposed brown organic matter (Fig. 24c), such

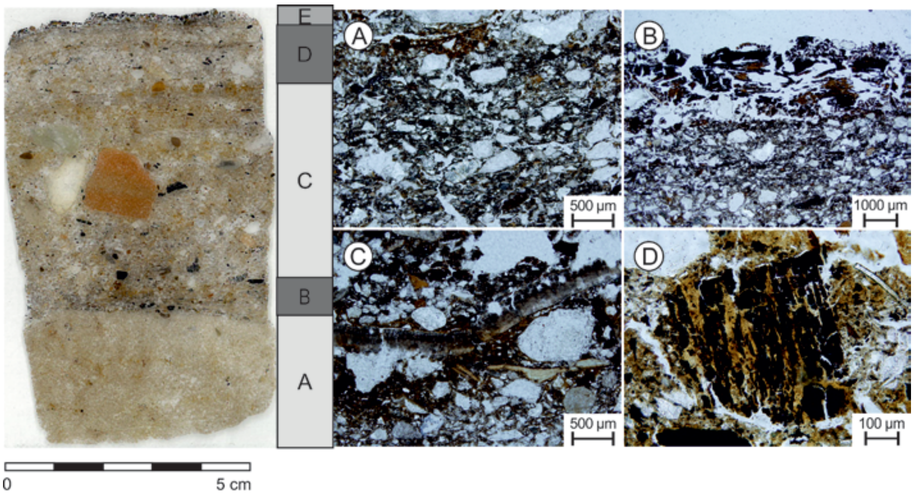


Fig. 24. Micromorphological documentation of the microstratigraphy of the sample as well as chosen features. A – orientation of fine and coarse particles (PPL); B – visible laminae composed of decomposed organic matter (PPL); C – bones and eggshells (PPL); D – clay trapped inside the charcoal (PPL). Author L. Lisá.

as microcharcoal and charcoal. As noted above, the charcoal sometimes works as a place where pure clay is concentrated (Fig. 24b, d). The organomineral particles are presented as bone fragments (Fig. 24c), digested or burnt bone fragments, eggshells (Fig. 24c) and articulated but mainly non-articulated phytoliths. The pedofeatures presented are phosphate, clay impregnations and coatings while bioturbation is preserved as passage features and excremental features of microfauna and depletion.

Interpretation: the sample represents a floor probably composed of a non-constructed passive layer with the active layer located above it with a distinct transition. The active layer is composed of a set of laminae. Each lamina has a slightly different composition in the sense of the presence or absence of microcharcoal, charcoal, bone fragments, decomposing organic matter, bones and phosphate impregnations. Depletion and leaching are visible, which calls into question wet sweeping or the use of water during floor maintenance. Similar sets of microlayers were recorded in subrecent floors at Dolní Němčí where water and animal dung were used for floor maintenance (Lisá et al. 2020b; Lisá, Lisý 2019).

2.3.3 Sample 3

Sample 3 was taken from the southern profile of Trench pit E2 and directly followed Sample 2 (Fig. 23). The upper part of the formation (E2-096, E2-100, E2-101, E2-141, E2-106) formed by dark solid sandy-clay soils with isolated boulders or the charcoal pieces had the character of a walking or floor level. Deposit E2-107, on the other hand, probably represented a balancing load.

Sample 3 again showed a set of macroscopically visible laminae. The question is how those laminae originated, what is their formation process and context with the situation (dumping or trampling) and if this sample is analogous to Sample 1. As visible from Fig. 25, despite that there are some signs of lamination, the sample is more or less one sedimentary facie. Within this facie, it was only possible in the central and upper part of the sample to divide four (1–3 millimetres thick) laminae with a more distinct orientation, which can be interpreted as more intensive trampling (Fig. 25).

The microstructure of the main facie of the sample is complex. The prevailing pores are compound packing voids, planes, vughs, vesicles and cracks. The sample is moderately sorted to unsorted with visible horizontal orientation in some parts and with porphyric-related distribution. The grain size of the sample is sandy silt with $C/F_{(50\,\mu m)}$ = 50 : 50 – 70 : 30. The coarse fraction is principally composed of weathered quartz, plagioclase, mica, glauconite and opaque minerals. The coarse sand grains are represented by quartz, plagioclase and rock fragments (siltstones, sandstones, quartzite and metamorphic rocks), daub and ceramic sherds. The colour of the sample is dark brown and the birefringence is crystalline. The organic matter is very common, and although preserved as black dotting is mainly brown decomposed organic matter. Partially decomposed organic matter is only locally preserved in a form of wood fragments (Fig. 25a), while the decomposed organic matter (charcoal and microcharcoal) is commonly preserved there, especially as brown particles and black dotting. Most of the coarse organic particles are horizontally oriented. Organomineral

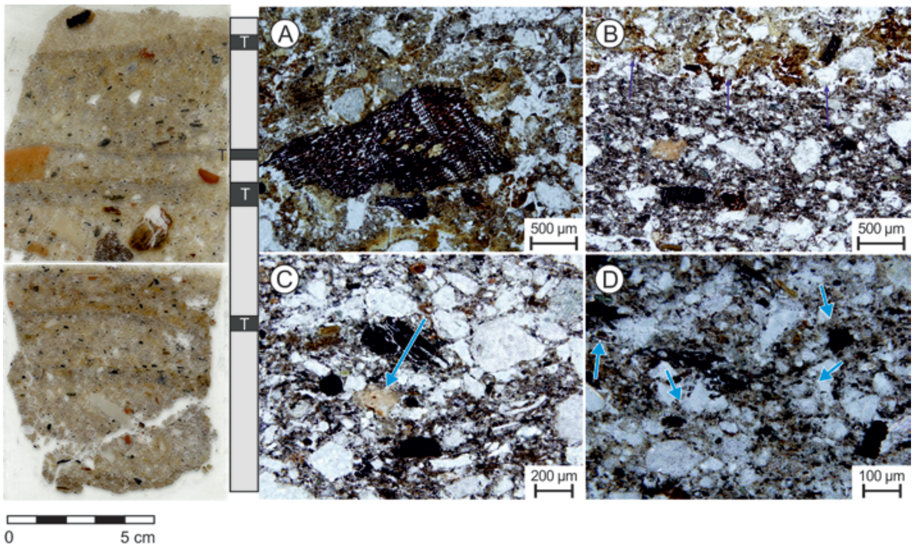


Fig. 25. Micromorphological documentation of the microstratigraphy of the sample as well as chosen features. A – wood fragment (PPL); B – microlayer of phosphate rich material (blue arrows) (PPL); C – bone fragment, probably digested (blue arrow) (PPL); D – phytoliths (blue arrow) (PPL). Author L. Lisá.

particles are represented by non-articulated phytoliths. Digested bones were observed in the samples. The pedofeatures are typical of phosphate impregnations and coatings as well as dusty clay coatings. Other pedofeatures detected are depletion and bioturbation.

Four distinct laminae in the upper part of the sample differ from the rest of the sedimentary set by their composition and the orientation of the organic and mineral particles (Fig. 25b). Signs of similar laminae are visible in many places within the sample but only in those four cases are they so distinct that they can be described separately. They are often connected with the impregnation of the phosphate clay above them (see Fig. 25b, blue arrows). Their microstructure is quite compact and complex. The occasional pores presented are cracks, planes or vughs. These layers are moderately sorted with porphyric-related distribution. The grain size distribution corresponds to sandy loam with $C/F_{(50\ \mu m)}$ = 30 : 70. The coarse fraction is composed of subangular to subrounded weathered quartz, plagioclase, mica, glauconite and opaque minerals. The colour of the matrix is grey, the birefringence is crystalline. The organic matter is preserved as black dotting, brown decomposed organic matter, microcharcoal and single phytoliths (Fig. 25c). Digested bones were sometimes recorded (Fig. 25d). The pedofeatures observed were depletion and bioturbation. Phosphate clay coating was occasionally recorded.

Interpretation: the material has a quite significant horizontal orientation connected with the visible horizontal planes even though these are masked by phosphatic illuviation. Contrary to Sample 1, four cases of distinctive laminae were detected. The presence of a dusty clay coating more likely reflects the open-air context, probably an area between the houses where organic material was dumped and trampled. The laminae detected within the set are composed of depleted ashy material. The change in pH probably influenced the distribution of the phosphatic clay coating, which moves only under certain pH conditions. The alkaline environment is not suitable for its movement. In general, it can be said that the formation processes are probably comparable with the situation in Sample 1, i.e. it is an open-air corridor. The presence of more distinct trampled laminae is probably the result of better preservation or depends on the intensity of the use of some parts of this area but does not mean the environment differs too much from Sample 1.

3. Discussion

3.1 Sampling strategy – past and future

Selected sites in the territory of medieval Prague represent interesting, mostly laminated contexts, in which there is a high probability that micromorphology can answer the origin of these laminae. This is exactly how the micromorphological collaboration with archaeologists from Archaia Brno began in 2006 (Lisá et al. 2009; 2017; Lisá, Kolařík 2020). However, as it later turned out and is still apparent (Dejmal et al. 2014), micromorphology has a much greater potential; it is only necessary to specify the questions that need to be answered. In the case of the laminated contexts, there was a strong probability that the general archaeological interpretations of the context would be correct. In the case of selected contexts from the territory of medieval Prague, i.e. from the Národní–Mikulandská and Kaprova sites, it could be shown that in most cases, the preliminary archaeological interpretation agrees with the general micromorphological conclusions. In the case of the first site, this is a floor set of recessed structures (outside the feature where Sample 33/3 was taken), while in the second case it is most likely an open area with a number of corridors. Sample 2 is a floor set with passive and active layers. In the case of the Nekázanka site, the sample was primarily taken with the proviso that with a certain probability it is a walking horizon. This was not confirmed and, irrespective of micromorphological observations, the archaeological context was interpreted differently than in the field (Semerád et al. 2020). The sampling strategy is often dependent on financial demands so it is mostly tied to research projects or financially well-supported research. However, the financial demands may not be high if the issues arising from the context of the site are well established in advance, which could significantly refine or, conversely, refute the field interpretations. The current set of sampled sites in the territory of Prague is insufficient for understanding the formation processes, although it has already brought the first interesting results concerning the provenance of the material used and the related issue of micromorphological interpretations.

3.2 Comparison of floor maintenance between medieval Prague and Brno

There is already extensive information available about the ways of creating and modifying floor horizons from Brno's medieval contexts. In the case of the research of Brno, it was often possible to determine whether it was a basement or an above-ground structure, and interpretations of micromorphological samples could be confronted with this (Lisá et al. 2021; 2020b; Lisá, Kolařík 2020). In the case of the Prague contexts, there is usually only information available as to if it is a feature or not while information on whether it is above-ground or recessed structure is no longer available. Nevertheless, it is possible to find certain parallels that would perhaps help to interpret in more detail the type of depression of a given structure. It results that basement contexts often have directed floors, with essentially almost no accumulation of organic materials such as mats, hay or straw. This usually only applies to above-ground structures, although it does not mean that they must necessarily have this type of walkable treatment. However, typical of recessed structures, more precisely their floor sets, is the presence of well-developed horizontal pores together with the alignment of the mineral matrix of the active layer. In essence, the context appears as if the basements have been carefully swept dry and affected by repeated pressure due to walking. This is much more than is the case with above-ground constructions. If taking this parameter into account, then the samples from the Národní–Mikulandská 33/1, 33/2, 33/4 buildings and Sample 2 from the Kaprova building would correspond to above-ground rather than recessed structures.

Unfortunately, only a few samples are available to assess the comparison of specific types of floor treatment methods. However, it can be said that, for example, floor plasters that were detected in Sample 33/1 from the Národní–Mikulandská site are probably related to a higher social status and such walking horizons were not recorded in the city of Brno. Probably a wooden floor was detected in Sample 33/4. This type of floor was also detected in fragments in the territory of Brno in an above-ground structure (Lisá et al. 2020a). Kaprova Sample 2 has an interesting set of active layers, which probably corresponds to the repeated use of wet sweeping or the application of excrement to the walking surface. Such types of floor structures were not recorded in the city of Brno, but they are known as an ethnographic analogy from the rural area of the late 19th and early 20th centuries in Dolní Němčí in the Uherské Hradiště region.

3.3 Material provenance

An interesting finding resulting from the presented study is a comparison of the provenance of the material used for walking horizons between medieval Prague and Brno. While the passive floor horizons, whether of a structural or non-structural nature, are created in the territory of medieval Brno exclusively from loess or displaced loess or structural elements created from loess, there is a different situation at the Prague sites. Passive layers and the material used for the construction of active layers or treads in an open space consist exclusively of fine-grained river sediments. This is because the right-bank area of the local medieval agglomeration (the Old Town and the territory of the later New Town) is, unlike the Brno medieval city, located in the alluvial zone of the River Vltava. In contrast, medieval Brno is located on an area elevated above the original riverbeds and terraces of the Svratka, Svitava and

Ponávka rivers. When interpreting the provenance of passive zones, it is then necessary to consider that while the loess will be sorted *in situ*, the river sediment will, by its nature, be moderately sorted or unsorted. In the case of the Prague contexts, it is therefore much more difficult to determine the degree of human intervention in the building part of the structural elements.

4. Conclusions

Contexts from the territory of medieval Prague were selected for micromorphological analysis, in which it is assumed that they functioned as walking corridors either outside or inside buildings. For the sample from the Nekázanka site, the initial terrain interpretation of a possible corridor was not confirmed, and the sample undoubtedly represents the internal building structure within the original burgher house. For features from the Národní–Mikulandská site, the hypothesis of the presence of floor horizons was confirmed for Samples 33/1, 33/2 and 33/4, while for Sample 33/1, preparatory structural microlayers were detected. For samples from the Kaprova site, a floor set was identified in Sample 2 and the environment of an open 'yard' for Samples 1 and 3. In the case of medieval Prague, a small set of samples was used to evaluate the types of floor horizon modifications. However, it is possible to highlight the Národní–Mikulandská 33/1 site with documented floor plaster, the Národní–Mikulandská 33/2 site with the presence of an ash layer on the actively formed tread layer, and the presence of a wooden floor in the case of a sample from the Národní–Mikulandská 33/4 site. Another finding, from the samples described above, is a piece of information regarding the provenance of the material used and the related issue of a more precise *in situ* interpretation of displaced sediments. While the passive floor layers in the city of Brno are exclusively formed of loess, displaced loess or building elements where loess was used in the construction, in the case of the city of Prague they are almost exclusively fluvial fine-grained medium to poorly sorted sediments.

Chapter 4

Transformation of timber building construction in medieval Wrocław

Jerzy Piekalski

1. Introduction

Wrocław, the main city of Silesia, developed on the border of cultural and political zones. The city's development began in the mid-10th century with a stronghold on an island on the River Oder. By the early 1300s, it had reached the form of a polycentric proto-town. The transformation into a city in the legal sense, with regular buildings and a municipal community organised according to the Magdeburg Law, took place in several stages in the 13th century. In the Middle Ages, it alternately belonged to the Czech and Polish states, and in modern times it was the capital of the Silesian Province in the Habsburg monarchy and then in the Kingdom of Prussia. In Czech, it was referred to as Vratislav and in German, the most important language for its late-medieval and modern inhabitants, as Breslau (Piekalski 2014, 31–40, 54–63). The transformation of building construction in 13th-century Wrocław was part of the complex, multi-directional civilisation changes that embraced Central-Eastern Europe in the High Middle Ages (Klápště 2012). The causal conditions associated with the process make it impossible to conduct studies on building constructions without regard to other areas of past reality. In addition, these studies cannot only be limited to the phenomena that took place in the 13th century. This study aims to present the changes to building construction systems, the spatial form and, where possible, the functions of timber buildings at the time of the medieval transformation. A generally defined goal is accompanied by a number of detailed questions related to the conditions of the process. These mostly refer to the changes in social structures, migrations that altered the ethnic structure of the population, transformation of the agricultural model and the related lifestyle change.

The condition for achieving such a goal is the appropriate quality of the source base. It appears that the current state of research on timber building construction in medieval Wrocław can be regarded as fairly good. This refers to both the early phases of the centre's development, preceding the emergence of the municipality, and the institutional town that has developed since the first half of the 13th century. Analyses of buildings from the 10th to 12th centuries, i.e. the time before the town was legally founded, were mainly associated with the excavations of the stronghold in Ostrów Tumski (Fig. 26). The excellent state of the preservation of the timber enabled to gather a large collection of sources concerning log and post-and-plank constructions, and, less frequently, various types of post-in-ground constructions (Kaźmierczyk 1991; 1993; 1995). These were used for constructing residential and utility buildings, grouped within homesteads and referred to as *area vel curie* (SUB II, No. 247) in written sources. Relics of early timber buildings in the irregularly arranged crafts and trade settlement on the left bank of the River Oder were not preserved in such a good state as those in Ostrów Tumski. However, the knowledge we have about the settlement allows us to trace changes that took place between the 11th and 13th centuries. The first comprehensive work concerning the sources acquired there was presented by Józef Kaźmierczyk after his excavations in the 1950s–1960s. His findings and proposed interpretations are, to a large extent, still valid although worthy

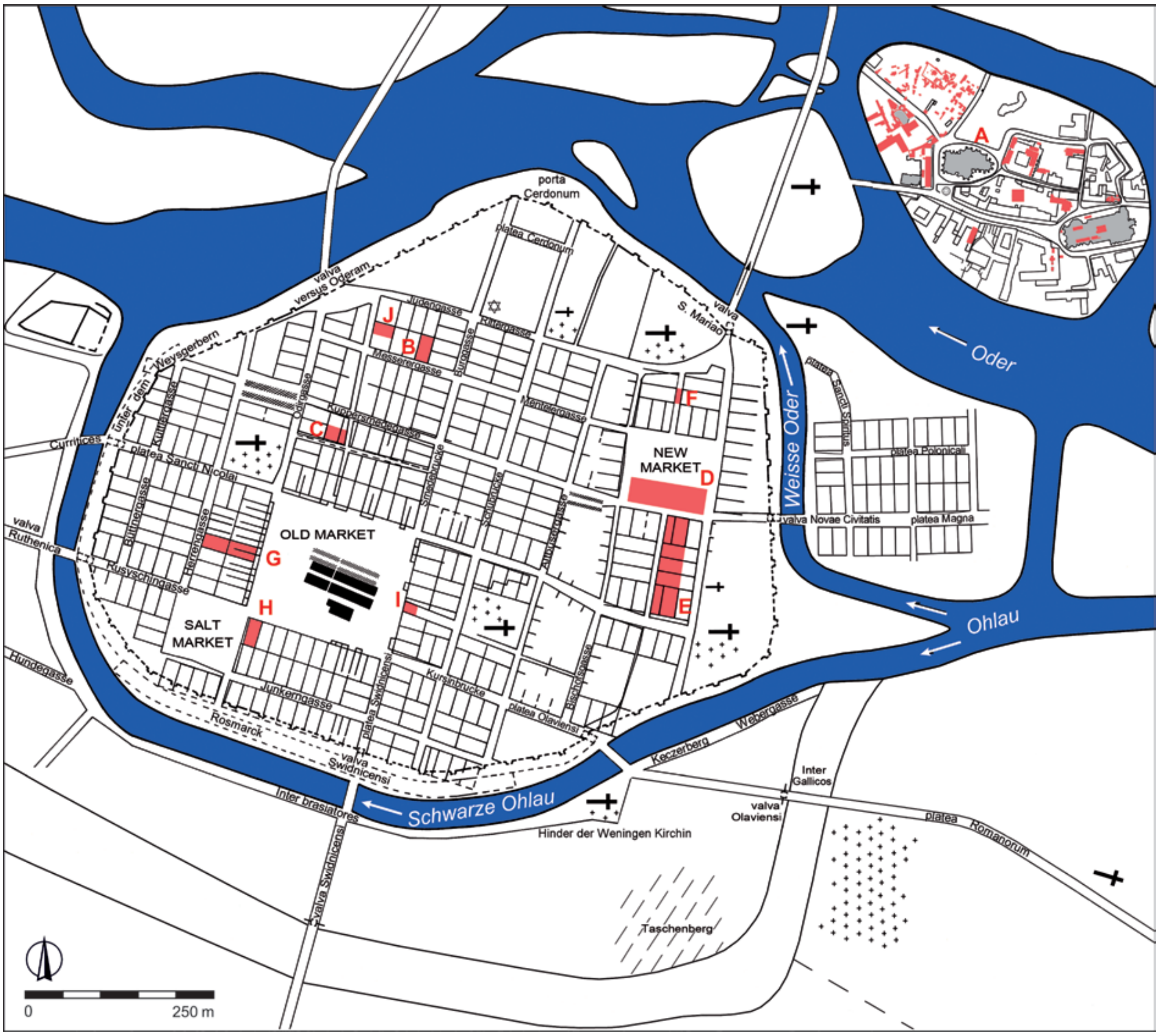


Fig. 26. Wrocław. The town around 1300 with the marked excavations mentioned in the text. A – Ostrów Tumski; B – 13 Nożownicza Street; C – 8 Igielna Street; D – Nowy Targ Square; E – St Katarzyny Street / St Wita Street / Wita Stwosza Street / Nowy Targ Square; F – Drewniana Street; G – 6 Rynek; H – 12 Rynek / 20 Plac Solny; I – Kurzy Targ. Drawing by N. Lenkow.

of further discussion (Kaźmierczyk 1970, 32–60). Complementary to the materials discovered at that time, were the results of the excavations carried out in Nowy Targ Square (Neumarkt) and the immediate neighbourhood from 1999–2000 (Niegoda 2005), and on a large scale in the south of the square from 2010–2012 (Piekalski, Wachowski eds. 2018). There were also excavations in the housing block between the south of the square and the following streets: St Katarzyny (Catharinen Strasse), Wita Stwosza (Adalbert Strasse) and St Wita (Ziegen Gasse) in 2017 (Chorowska et al. 2018). In particular, the last two large trenches excavated in 2010–2017, whose total surface equalled 80,000 m^2, enabled to record the tendencies that were present in the 13th century. Therefore, in the phase that was the most relevant to the transformation.

At the early stages of the development of the town founded based on the Magdeburg Law, timber was the basic building material. Timber houses predominated among all the buildings in medieval Wrocław, although they gradually began to be replaced with brick houses shortly after urbanisation, as early as the mid-13th century (Chorowska 1994; Chorowska, Lasota 1995; 2010). The cellars of the houses, dug deep into the ground, make it difficult to study the preceding timber buildings that served as the oldest burgher houses. Current knowledge of these is based on several preserved examples. The relics of craftsmen and merchants' houses in the eastern part of medieval Wrocław, later included in the incorporated town, help to obtain the correct view of the situation. Buildings from the 13th–14th centuries located deeper within burgage plots are also known. The knowledge of these was gradually extended from the early 1990s (Piekalski 1996a; 1996b; 1996c; 1999; 2018; Jaworski 1999). An attempt at presenting building construction systems in Wrocław against a broader Central European background was also made (Piekalski 2004b). Special attention was then paid to the relation to the phenomena that took place in the neighbouring towns of the widely understood region – Prague and Kraków (Piekalski 2014, 104–138).

Therefore, it can be stated again that the state of the sources for the research on timber building construction in Wrocław makes it possible to realise the chosen subject. However, it will be a challenge to associate the tendencies observed in building construction with the social, legal and economic processes that took place in the town.

2. Construction systems

Small one-room houses without any internal divisions were built in Wrocław up to the time of the intensification of the cultural changes typical of the High Middle Ages. The constructions used were typical of the Slavic zone of Central Europe in the Early Middle Ages.

2.1 Pit houses

The simplest constructions, and at the same time the oldest ones, were small, usually oval pit houses or semi-dugouts, rarely larger than 3 m × 4 m. These were confirmed in several places within the early settlement complex, mostly in the area of the settlement on the left bank of the River Oder (Kaźmierczyk 1970, 32–34). It is not easy to reconstruct their form and function and the main obstacle in their interpretation is the poor state of preservation of the timber. The remains of a sunken house from other buildings cannot always be distinguished. It is also difficult to distinguish a one-room pit house from a cellar of an above-ground house, especially in the situation where the ground floors of residential buildings, including the elite ones, were usually sunken into the ground in the 13th century. A discussion on this subject has not led to any clear conclusions to date (Donat 1993; Klápště et al. 1996; Baumhauer 2001; Vařeka 2002; Piekalski 2004b, 170–174).

Wrocław pit houses, or semi-dugouts, were described by Kaźmierczyk, based on his own research, as rather simple shelters with a small surface, sunken 45–95 cm into the ground, with a thatched roof. He supported his interpretation with a graphic reconstruction (Fig. 27). Kaźmierczyk's findings have been confirmed, at least to some extent, by recent excavations in the southern part of Nowy Targ Square. In the oldest phases of the crafts and trade settlement, 35 sunken buildings were discovered (Piekalski 2018, 219–225). This number should be treated as approximate, as their state of preservation does not guarantee a completely correct interpretation. Their shape was close to oval (Fig. 28, 29) and we cannot always tell whether the pit covered the whole surface of the building or only part of the interior. The more irregular pit houses imply that the latter suggestion is correct (Fig. 30). Several examples of rectangular pit houses or those whose shape was close to a rectangle were also recorded (Fig. 31, 32). The surface of the discovered buildings appears to be different from the results presented by Kaźmierczyk. In the case of the buildings where the interior was entirely recessed, it was strongly differentiated and ranged from 2.60–49 m^2. The recorded depth also covered a wide range from 0.20–1.98 m. Therefore, we can assume that structures of various characters were

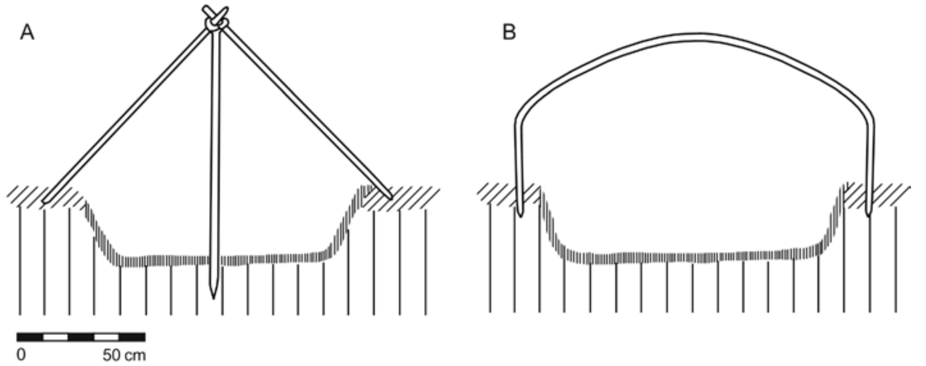


Fig. 27. Wrocław, Nowy Targ Square. Hypothetical reconstruction of the longitudinal section of pit houses. After Kaźmierczyk 1970, 33, Fig. 6.

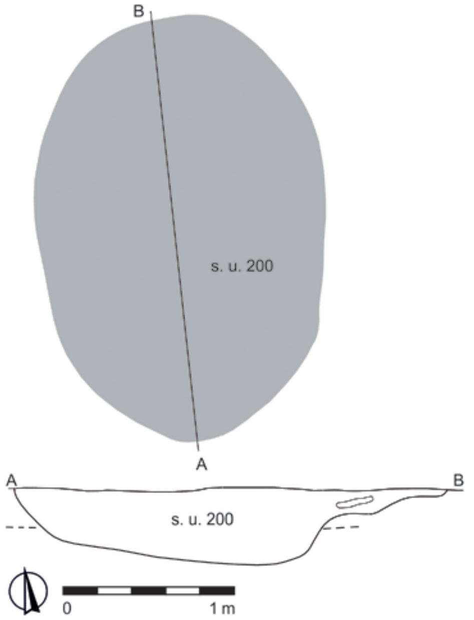


Fig. 28. Wrocław, Nowy Targ Square. Excavations 2010–2012. S. u. 200, plan and cross-section. Drawing by N. Lenkow.

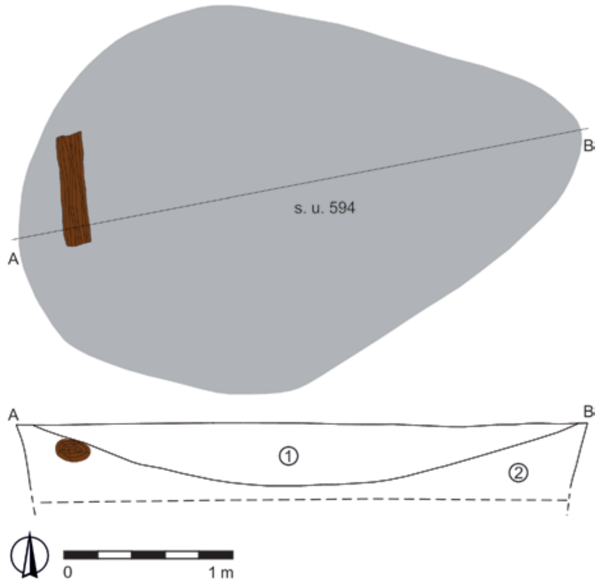


Fig. 30. Wrocław, Nowy Targ Square. Excavations 2010–2012. S. u. 594, plan and cross-section. Drawing by N. Lenkow.

included in the category defined as sunken buildings. The smallest buildings could have had the form described by Kaźmierczyk. The buildings with a larger surface may have required an appropriate supporting structure, most likely log construction, or wattle-and-daub construction in the case of oval plans. The poor state of the preservation of timber in the oldest phase of the settlement does not allow for ample justification of the conclusions regarding their character. Only in a few cases were traces of the wattle walls of pit houses preserved. Some of the sunken buildings had entrances in the form of external corridors (Fig. 33). They were usually placed on the eastern or southern side and, less frequently, on the western side. The preserved construction traces suggest that timber-panelled stairs led to the inside. Sunken interiors were flat or slightly basin-shaped. They were usually covered with a thin coat of clay or compacted livestock manure, on which a layer of litter gathered. Sometimes the litter was layered with sand.

It is not possible in every case to confirm that these buildings had a residential function. The presence of

Fig. 29. Wrocław, Nowy Targ Square. Excavations 2010–2012. S. u. 200. Photo by M. Mackiewicz.

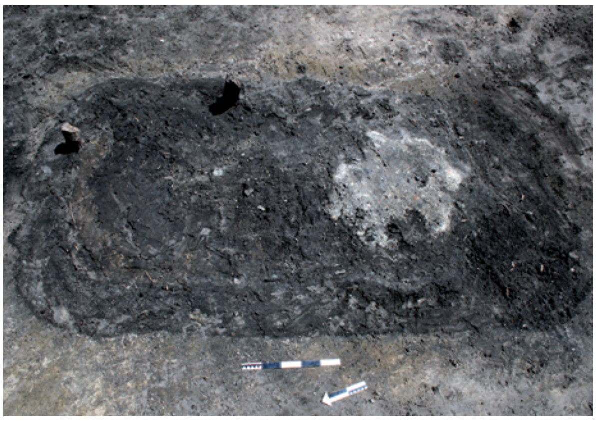


Fig. 31. Wrocław, Nowy Targ Square. Excavations 2010–2012. S. u. 222. Photo by J. Sawicki.

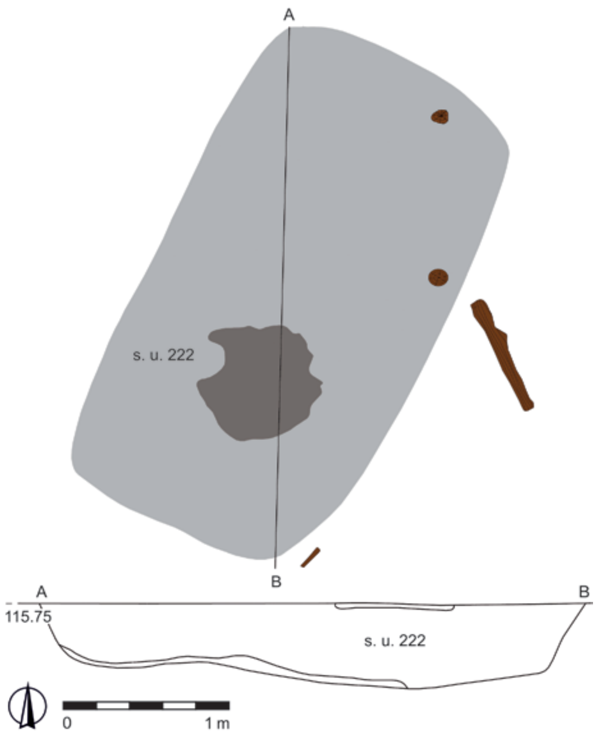


Fig. 32. Wrocław, Nowy Targ Square. Excavations 2010–2012. S. u. 222, plan and cross-section. Drawing by N. Lenkow.

a hearth is regarded as one of the most important but not always certain criteria (Fig. 31, 32), as the remains might be not completely visible. Sometimes, these are traces of fire – ash, clumps of burnt clay, small pieces of charcoal – without any evident construction.

2.2 Wattle-and-daub buildings

The simple wattle-and-daub system, commonly known since prehistory, was in pre-urban Wrocław at least equally important as the later discussed log construction. It was easy to build and did not require professional carpentry skills. However, it must be regarded as relatively labour-intensive. The construction consisted of a frame made of perches a few centimetres in diameter, stuck into the ground every 20–30 cm and a kind of weft braided between them using rods 1–2 cm in diameter. As a building material, wood from species common in the River Oder Valley – willow and less frequently birch, hazel or hornbeam (Kaźmierczyk 1993, 9–13) – was used. The slatted walls were filled and insulated with clay or moss. Wattlework was used alone in lightweight, single-storey buildings and could have been part of other more complex constructions.

In the stronghold in Ostrów Tumski, the construction appeared in the oldest levels and was present until the time when dense housing disappeared in the 13th century. This was confirmed in both aboveground houses and various types of utility buildings, hedges and pit reinforcements (Kaźmierczyk 1993, 51–53). The cost of such construction was low, as was its insulation value and longevity. The perches and rods were not usually stripped of bark and decayed after a few years, forcing the construction of a new house to replace the old one. Despite poor durability, wattle-and-daub buildings constructed in the area of Ostrów Tumski are characterised by relatively rich furnishings, which distinguishes them from the pit houses described earlier. Their surface was on average

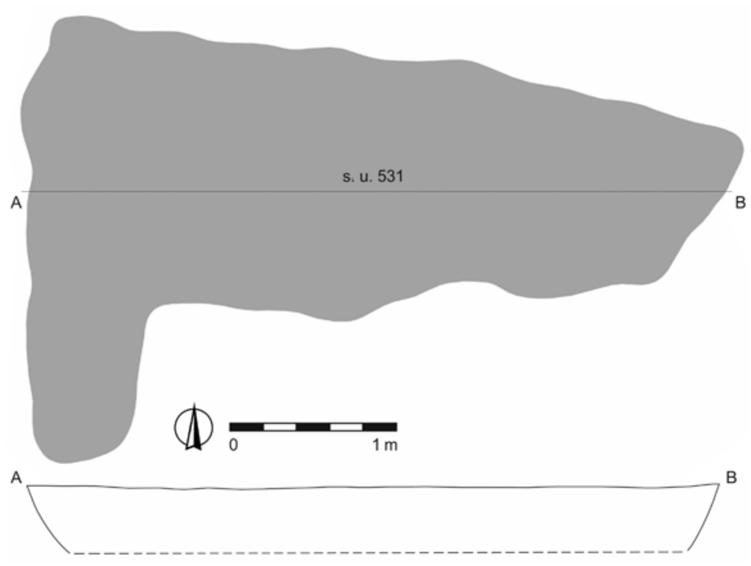


Fig. 33. Wrocław, Nowy Targ Square. Excavations 2010–2012. S. u. 531, plan and cross-section. Drawing by N. Lenkow.

larger than that of the pit houses and ranged between 15–20 m². The interior was coated with threshing or sometimes had a solid floor made of wooden planks. The hearth was lined with clay (Fig. 34).

Wattle-and-daub buildings are also known from the crafts and trade settlement on the left bank of the River Oder. Both the quality and the state of preservation were not as good as in the stronghold in Ostrów Tumski. The quick development changes within the settlement resulted in a large concentration of wattle fragments that are difficult to identify in the cultural layers. Therefore, the identification of genuine buildings, including houses, is not always certain. In Kaźmierczyk's excavations from the

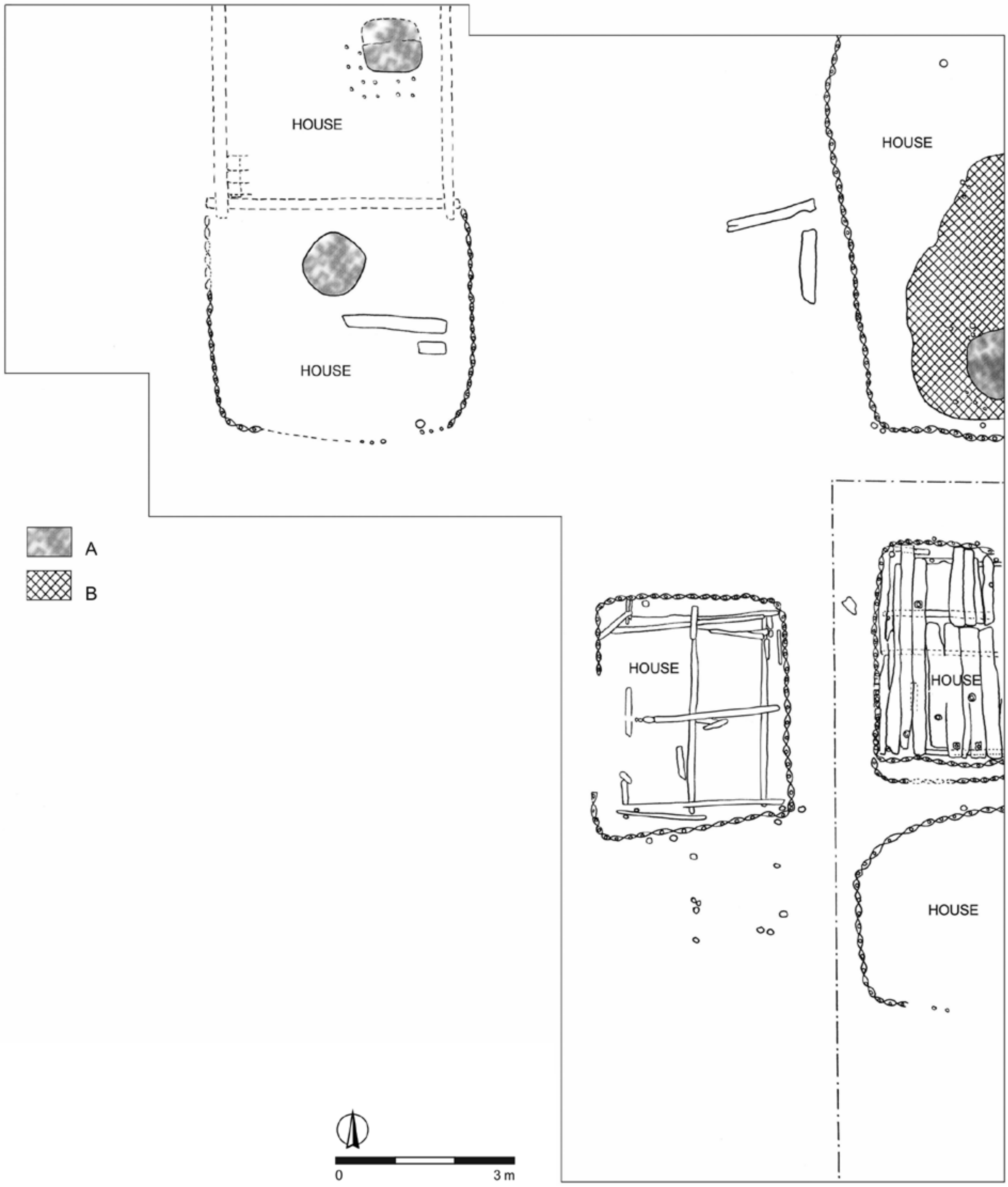


Fig. 34. Wrocław, Ostrów Tumski. Wattle-and-daub houses from the 12th century. A – hearth; B – mud floor. After Kaźmierczyk 1993, 153, Fig. 84.

Fig. 35. Wrocław, Nowy Targ Square. Excavations 2010–2012. S. u. 110. Photo by M. Mackiewicz.

1960s, relics of wattlework occurred in almost all settlement levels with the share reaching 40% within all surface constructions. The buildings identified among these had a surface up to 20 m^2, sometimes slightly more. Unlike in Ostrów Tumski, no wooden floors and solid constructed hearths were discovered (Kaźmierczyk 1970, 36–39). They were confirmed, but to a lesser extent, in the excavations carried out by the team of Cezary Buśko in 1999–2000 (Niegoda 2005, 70), as well as in the area of a housing block adjacent to the south of Nowy Targ Square (Chorowska et al. 2018). The well-preserved layers excavated in the southern part of Nowy Targ Square (Piekalski 2018, 226–231) brought more information on wattle-and-daub buildings in the area of the crafts and trade settlement. Nineteen above-ground buildings erected in this construction system were distinguished. However, it should be kept in mind that their actual number could have been larger. The well-preserved examples of houses meant their surfaces could be determined. These ranged from 7.92 m^2 (s. u. 110; Fig. 35, 36) to 24.80 m^2 (s. u. 444), which confirmed Kaźmierczyk's earlier findings. The building material was carefully prepared – perches of the frame and rods of the weft were usually not stripped of bark. Wood from older constructions was also reclaimed and adapted to current needs by grinding thicker elements with a wedge. Traces of sealing the walls with clay are often not visible. In this situation, it appears difficult to prove the residential function of those buildings. Considering the materials discovered in 2010–2012 in Nowy Targ Square, only in two out of 19 cases were traces of hearths confirmed in the interiors (Fig. 37). In one interior, poorly preserved floor beams were discovered, and a clay floor and sand layering were recorded in one case. The presence of firmly compacted manure in both the 7.92 m^2 and 11.22 m^2 buildings suggests that they could have been used to keep animals. The old concept of Kaźmierczyk (1970, 38) that at least some of the wattle-and-daub buildings were used for crafts should not be ignored. Artefact collections from their interiors seem to indicate leather working.

The declining period of using a wattle-and-daub construction for lightweight utility buildings is marked by the finds from 10–11 Więzienna Street (Stockgasse). From the fragments of wattlework discovered deep in the plot area, four lightweight buildings dated to the second half of the 13th and the 14th centuries can be reconstructed (Piekalski 1999, 36–37). They probably served widely understood utility functions. However, the presence of a threshing floor, a sand layering and, in two cases, the hearths inside them may indicate a residential function.

2.3 Log buildings

Log construction is regarded as characteristic of the Slavic building tradition, to which the indigenous population of Wrocław was naturally bound in the early phases of the Middle Ages. This theory is well justified in the source literature (Moszyński 1929, 494–497; Kaźmierczyk 1970, 40–45; Rębkowski 2001, 143; Brather 2001, 98–109; Šalkovský 2001, 57–59). The fact that the construction occurs beyond the area of the Slavic settlement, mostly in the zone dominated by coniferous forests, does not undermine the theory. Its main characteristic feature is the massive walls constructed using horizontally placed logs and joined in the corners with characteristic notches. Nevertheless, some variations of the detailed solutions are permitted. In Ostrów Tumski in Wrocław, they have become the basis for distinguishing several variants of log construction, reinforced with auxiliary posts (Kaźmierczyk 1993, 25–31). The simplest version of the system without any additional protection is recorded among the materials from the left-bank settlement. This applies to both older and more recent excavations.

Log houses provided better living conditions than wattle-and-daub ones, especially when it comes to the insulation value of the walls. However, they were built less frequently, perhaps because of the difficulties in obtaining good quality timber for construction. The relation refers to the buildings in the stronghold in Ostrów Tumski (Fig. 38) as well as those in the crafts and trade settlement on the left bank of the River Oder. In the latter, Kaźmierczyk recorded only seven log houses and 17 wattle-and-daub ones during his excavations (Kaźmierczyk 1970, 40).

In similar proportions are the 12 log houses and 19 wattle-and-daub buildings from the excavations in the southern part of Nowy Targ Square (Piekalski 2018, 232–238) and eight ones and at least 15 from

Fig. 36. Wrocław, Nowy Targ Square. Excavations 2010–2012. S. u. 110. Drawing by N. Lenkow.

Fig. 37. Wrocław, Nowy Targ Square. Excavations 2010–2012. S. u. 444. Photo by M. Mackiewicz.

the housing block neighbouring the square in the south (Chorowska et al. 2018).

Analyses of timber[1] from the excavations carried out in 2010–2012 indicated that in five cases, oak wood was used as a building material while in three cases, pine wood and one sample defined as fir wood was used, which generally confirms the preferences previously revealed (Kaźmierczyk 1970, 40). Nevertheless, it should be stressed that oak wood retrieved from an older construction for reuse as a building material was confirmed. Preparing trunks for placing them in a wall was usually limited to removing bark and making notches for joining the logs in corners. They were squared less frequently, and in rare cases, oak planks were used in the later phase of the construction.

After the excavations in the 1960s, the surface of the log buildings was estimated to have ranged from 10 m^2 to at least 40 m^2 (Kaźmierczyk 1970, 40–41). However, recent findings concerning Nowy Targ Square do not confirm such a considerable differentiation (Piekalski 2018, 232). For the houses that were wholly discovered, the following sizes were revealed: 15.96 m^2 (s. u. 182), 19.51 m^2 (s. u. 558), 21.16 m^2 (s. u. 532, 533; Fig. 39), 26.01 m^2 (s. u. 464) and 26.80 m^2(s. u. 475). Their layouts were close to a square and the interiors remained one room. The situation of an entrance to the building was determined in two cases – once in the northern wall and once in the southern wall. The interiors were usually protected with a clay floor approximately 10 cm thick, rarely thicker. In some cases, the floor was renovated by placing a new layer of clay on litter that accumulated in the interior. In one of the buildings, a wooden floor was built on a sand base, and in another one, was only sand layering. Heating devices were discovered in most of the buildings – hearths on a clay plate or stoves. Dome-shaped stoves built on a plan of a circle, oval or square with rounded corners predominated (Fig. 40). These were situated in corners or close to walls, usually on the northern side. The main building material was clay, complemented with bricks, brick fragments and small pebbles. The dome was modelled from clay on a wooden frame made of willow branches. The interiors of the stoves were lined with clay. The longevity of a stove could have been shorter than that of a house. The interior was then coated with new clay and a new stove was built, which covered the relics of the older one.

Log buildings discovered within the stronghold in Ostrów Tumski and the crafts and trade settlement on the left bank of the river usually had a residential function. This is confirmed by the previously mentioned facts: high insulation value of the walls, the presence of a floor as well as a stove or a hearth, and usually the abundance of artefacts acquired from the utility layer of the interior. The interpretation of the function stops being obvious in the case of buildings erected using this construction in the institutional town. There are not many of them, just two or three, dated to the second half of the 13th century and the turn of the 14th century, were confirmed on the burgage plots at 10–11 Więzienna Street. However, they did not serve as burgher houses; this role was restricted to the timber frame building that faced the street. Log buildings were located deep in the back of the plot. The length of the walls reached 3.60 m and the interiors were covered with clay floors. In one of these was a hearth, and in the other, a clay-brick stove was found, which suggests a residential function (Piekalski 1999, 37). The position of log houses in the institutional town remained unchanged by the recent discoveries at 2–3 St Katarzyny Street (Chorowska et al. 2018). Two buildings of that type identified there were situated in the back of the plots delineated in the 13th century. Trying to determine the function of the log buildings in the institutional town, we assume that they might have been used by servants or rented to urban commoners, i.e. people without town privileges.

1 Analyses of species of trees and tree ring dating were carried out by Professor Marek Krąpiec.

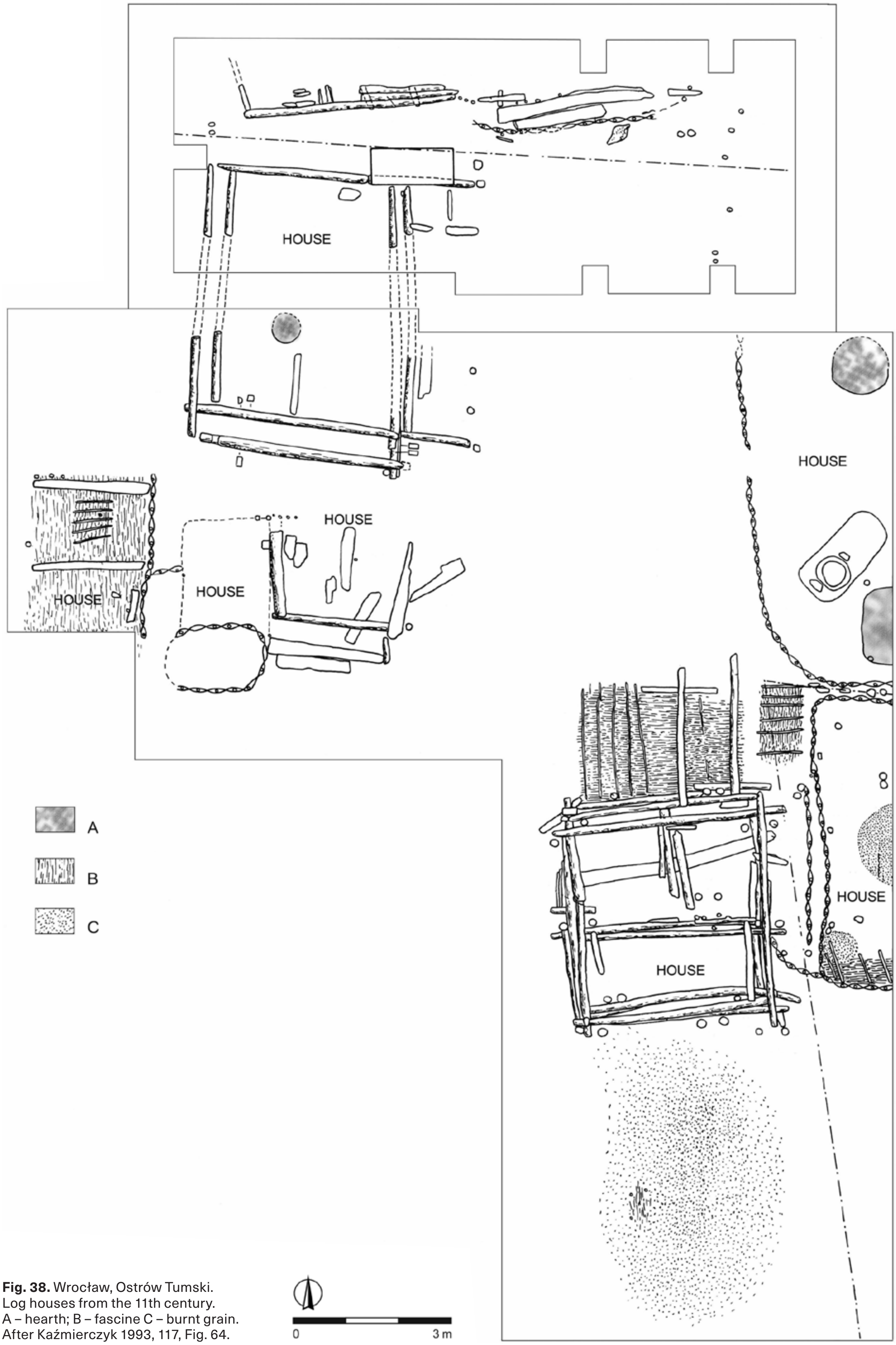


Fig. 38. Wrocław, Ostrów Tumski. Log houses from the 11th century. A – hearth; B – fascine C – burnt grain. After Kaźmierczyk 1993, 117, Fig. 64.

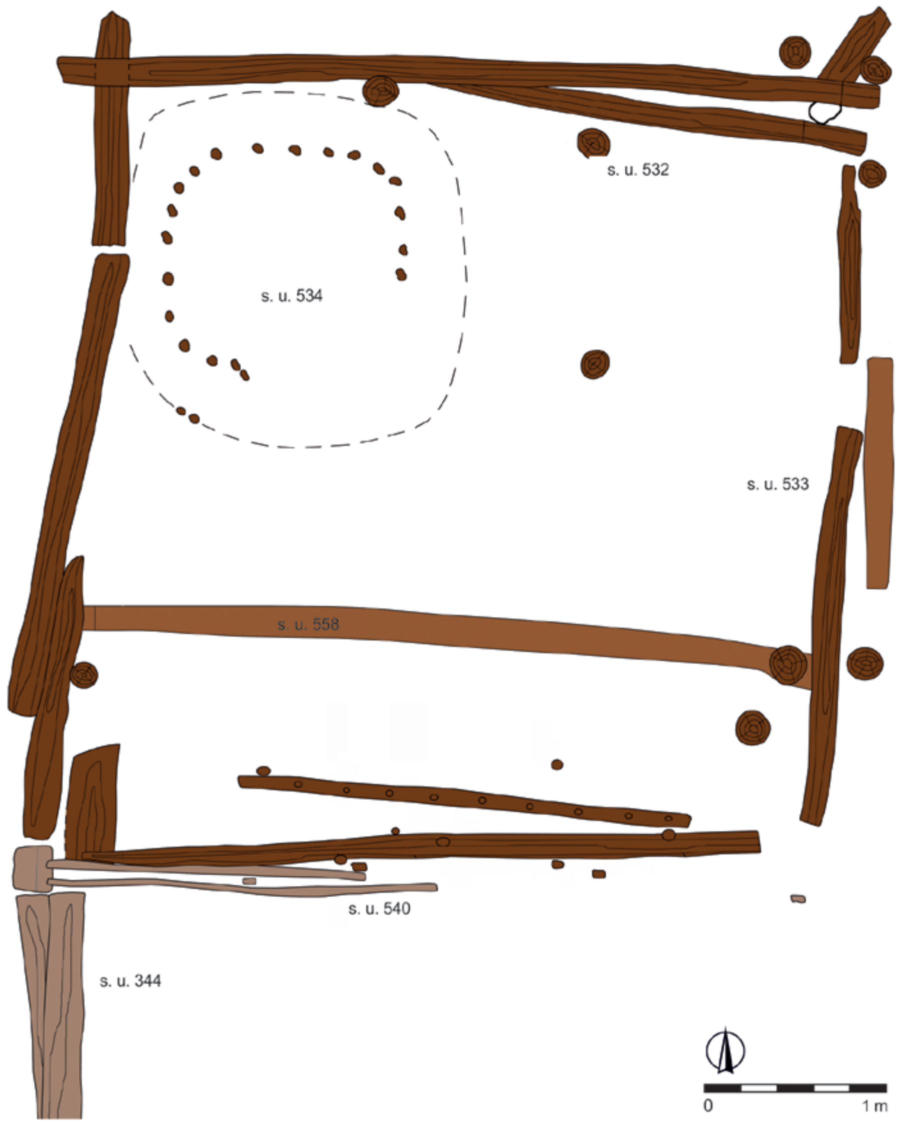


Fig. 39. Wrocław, Nowy Targ Square. Excavations 2010–2012. S. u. 532, 533, plans. Drawing by J. Nastaszyc, N. Lenkow.

2.4 Post-in-ground constructions

Simple post-in-ground constructions were present in Wrocław from the very beginning of the settlement activity in that area. The system can be regarded as universal and timeless due to the uncomplicated character of its basic variant. Its fundamental element was posts that supported the roof vertically plunged or dug into the ground. The post supporting a structure was complemented by various ways of filling walls. Those used in Wrocław in the 11th–13th centuries should be mentioned: post-wattle construction, post-log construction, palisade construction, post-and-plank construction and post-in-ground construction with sill plates (Piekalski 2004b, 174–176). The post-in-ground construction required knowledge of advanced carpentry techniques.

The post-wattle system does not need to be discussed separately. It is only worth mentioning that the above-mentioned wattle-and-daub buildings from Wrocław were often reinforced with posts placed at corners, along the walls or inside to support the roof (Kaźmierczyk 1970, 42–43). This applies to both the early stages of the development of the settlement complex and the institutional town.

Two variants of this construction, apart from the post-wattle system, were identified in the stronghold in Ostrów Tumski: post-log and palisade systems. In the case of the first variant, the walls of a building were made of logs or planks placed horizontally between posts that had been set in the ground. In other words, a log wall was stabilised with posts placed on both sides. In the second construction, a wall was

Fig. 40. Wrocław, Nowy Targ Square. Excavations 2010–2012. A clay stove in a log house. Photo by J. Nastaszyc.

filled with vertical planks or stumps, placed tightly next to one another. The posts then served as roof supports (Fig. 41). Buildings erected using the two construction variants comprised a small part of the stronghold's buildings (Kaźmierczyk 1991, 56–58, 64–65; 1993, 53–57). Their quality was not high, and the building material was to a large extent reclaimed. Despite this, most of them were used for housing purposes. According to the discoverer, such a function could have been brought about by an unusual situation, e.g. a fire in a previous house of better quality.

Several buildings erected using post-log or palisade construction were also confirmed in the pre-urban settlement on the left bank of the River Oder (Kaźmierczyk 1970, 48–52). Their state of preservation is usually poor, and their function is difficult to determine. It is assumed that a post-log building dated to the 1240s–1250s, discovered during the 2010–2012 excavations in Nowy Targ Square, served residential purposes (Fig. 42). In this case, the interpretation is based on the presence of a hearth built from bricks and stones (Piekalski 2018, 239). It is more difficult to confirm the use of post-log construction in houses and utility buildings of the later period, i.e. in the institutional town. However, we know that it was used for building stalls on a market square and sheds on burgage plots (Fig. 43).

The few structures classified as palisade ones did not determine the character of the left-bank settlement. One of the post-in-ground buildings, described by Kaźmierczyk as a palisade construction, actually had only one palisade partition wall (Kaźmierczyk 1970, 48–52). Buildings erected using this type of construction were not recorded in the institutional town.

Kaźmierczyk wrote about the post-and-plank construction in Wrocław after he excavated the left-bank settlement (1970, 55). He stated that these types of buildings were rare and dated them to the 13th–14th centuries. They were sporadically recorded in the line trenches on Piaskowa Street (Niegoda 2005, 21–22). This opinion regarding its late chronology in Wrocław was confirmed by the excavations of a housing block situated south of Nowy Targ Square. Poorly preserved relics of seven post-and-plank buildings were recorded there. Three of these functioned in the 13th century, at the end of the proto-urban phase, and the other two in the back of the plots at 3 and 7 St Katarzyny Street (Fig. 44). Until now, we do not have any information as to whether the system was known earlier in Wrocław before the colonists from the West appeared.

Similar to the post-and-plank construction is a system referred to as post-in-ground with sill plates. Those constructions can be confused when the material is poorly preserved. In both cases,

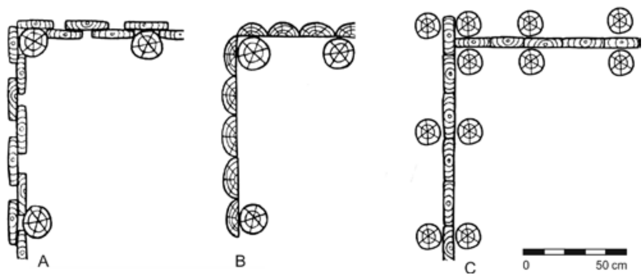


Fig. 41. Wrocław. A, B – palisade construction scheme; C – post-log construction scheme. Drawing by N. Lenkow. After Kaźmierczyk 1970, 35, Fig. 7 with the author's alterations.

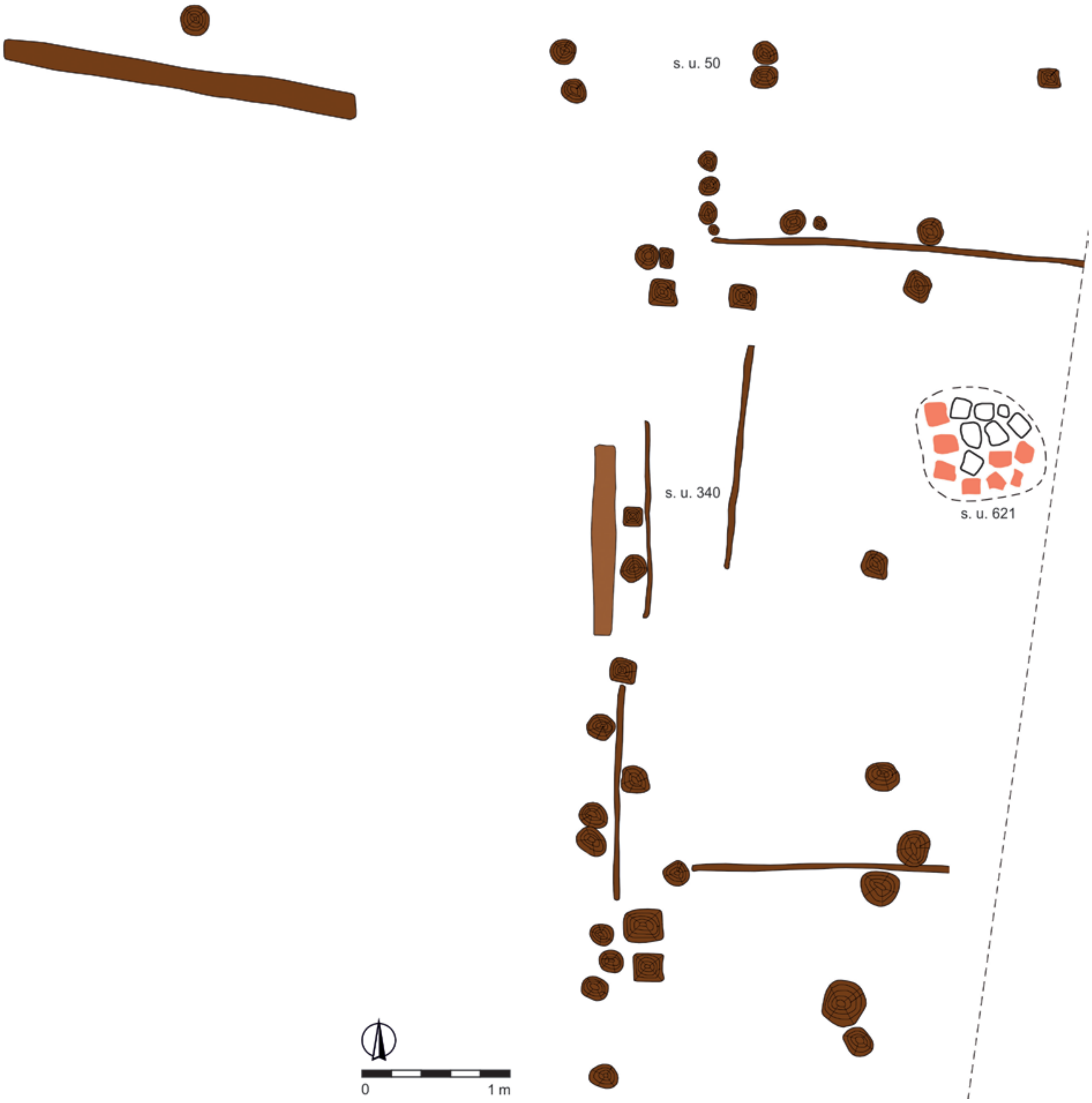


Fig. 42. Wrocław, Nowy Targ Square. Excavations 2010–2012. House built in a palisade construction, s. u. 340, 621, plan. Drawing by N. Lenkow.

vertical cuts were made in the side edges of the load-bearing posts. In the post-and-plank system, horizontal planks that filled the wall were placed in them. In the other system, a deep cut was limited to the lower part of a post. One horizontal element was fixed there – a beam that had a groove along its whole upper surface. The beam, defined as a sill plate, was used to fix vertical elements that filled the wall. These were usually massive planks joined using the tongue and groove technique (Fig. 45). The construction was often characterised by high precision, which indicated the carpenter's professional qualifications. The system was transferred to Wrocław from abroad. The current state of research allows for the statement that it developed in the Early Middle Ages in the area of North-West Europe. It is known, among others, from Hedeby trade emporium (Schietzel 1981; Jankuhn 1986, 96; Elsner 1994, 26), early motte castles (e.g. Herrnbrodt 1958; Binding 1970) and from the 12th-century urban constructions from Schleswig (Vogel 1991, 269–271).

In Wrocław, traces were first discovered during the excavations of the plot at 10–11 Więzienna Street in the west of the Old Town. It was a single sill plate,

Fig. 43. Wrocław, 2 St Katarzyny Street. A wall in post-log construction. S. u. 196. Photo by P. Duma.

Fig. 44. Wrocław, 3 St Katarzyny Street. A fragment of the wall of a building in a post-and-plank construction. S. u. 211. Photo by P. Duma.

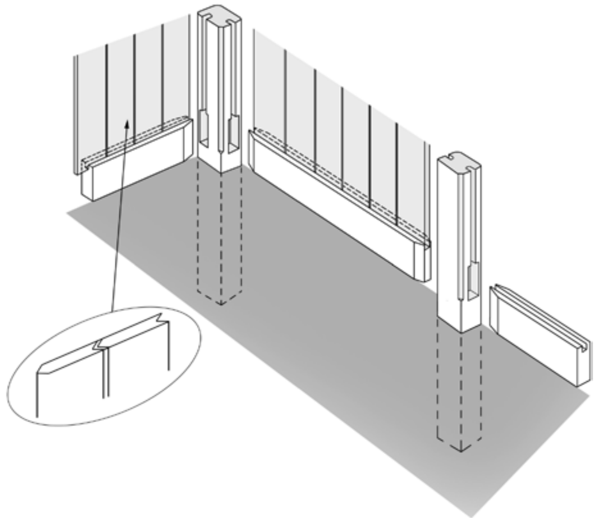


Fig. 45. Scheme of a post-in-ground construction with a wall on sill beams. Drawing by N. Lenkow.

3.40 m long, tree ring dated after the 1250s and discovered as a secondary deposit (Piekalski 1999, 38). Further discoveries suggest that it might have been present in Wrocław earlier, from the turn of the 13th century. That is the chronology of the sill plates discovered as secondary deposits in the cultural layers in the eastern part of the town in Nowy Targ Square and within the housing block neighbouring the square in the south. They occurred there most often. Ten buildings in this construction preserved *in situ*, dated to the 13th century, were excavated there (Fig. 46, 47). Six were erected during the 1240s–1250s and only two were dated to the turn of the 14th century, at the time the institutional town was functioning (Piekalski 2018, 239–243; Chorowska et al. 2018).

The surface of the buildings erected using this type of construction greatly differs. In most cases, the length of walls ranged between 4–6 m, and in one case reached extremely high – 18.5 m. Therefore, the minimum surface equalled ca 16 m^2 and was 30 m^2 on average, while the largest house measured 131.35 m^2. The interiors were stabilised with a threshing floor, less frequently a floor made of wooden planks, and were fitted with clay, slightly sunken hearths in wooden frames. In the case of the largest house, a stove made of bricks and clay functioned along with the hearth. All these structures indicate that most post-in-ground buildings with walls on sill plates were for housing purposes.

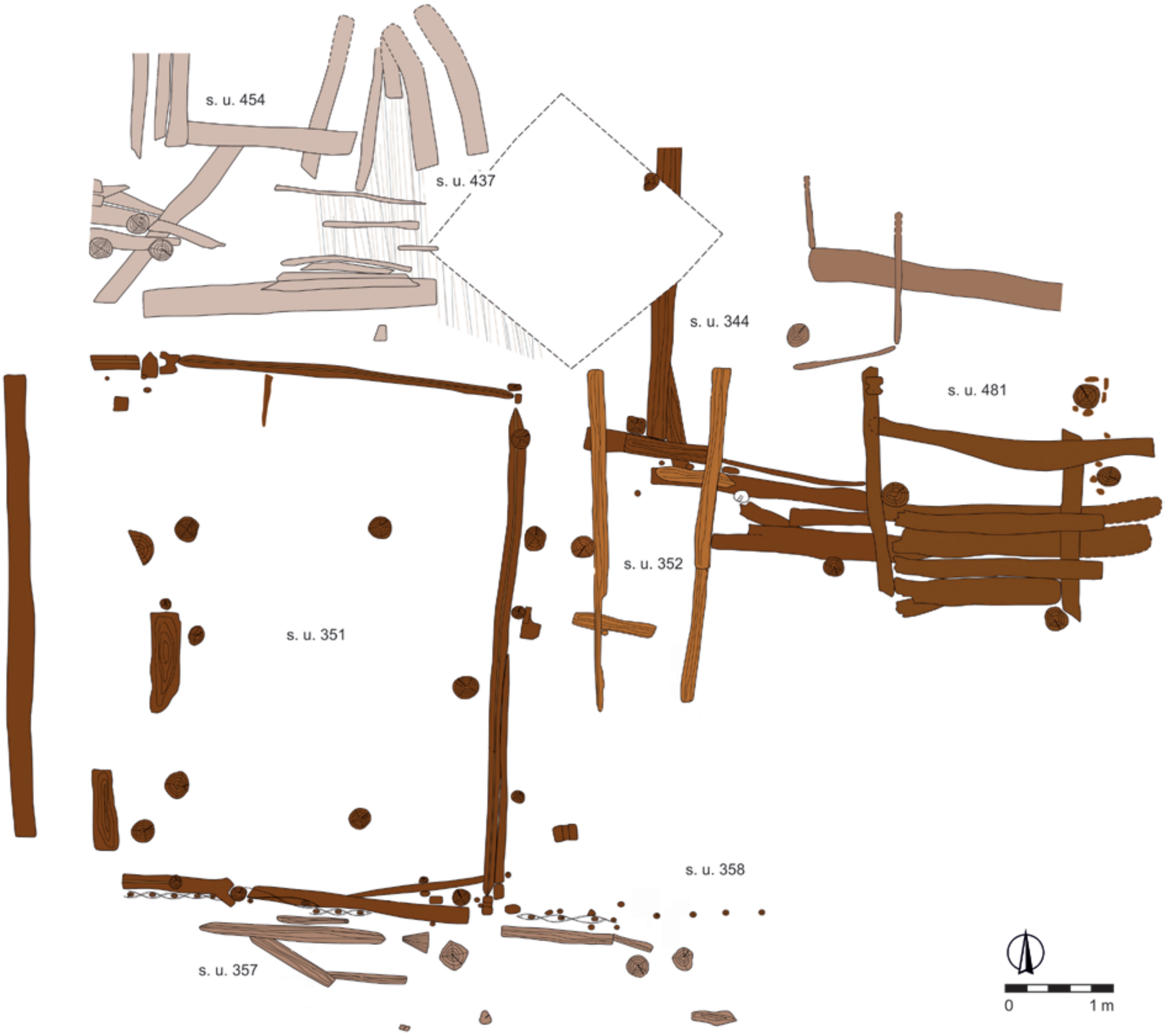


Fig. 46. Wrocław, Nowy Targ Square. Excavations 2010–2012. S. u. 351, plan. Drawing by J. Nastaszyc, N. Lenkow.

2.5 Timber framing

The construction type referred to as a framework, colombage or 'Fachwerk', widespread in Europe north of the Alps, especially in the north-west part of the continent, played a decisive role in the transformation of timber building constructions in Wrocław in the 13th century. Its origins are associated with the improvement of the post-in-ground system. The basic change was to abandon digging the load-bearing posts into the ground. Instead, these were mounted in horizontally placed sill plates, sometimes on a stone base. In the basic variant, the beams formed a frame based on the surface, the posts were fixed in the corners as well as in the length of the walls, and were stabilised at the top with another frame, defined as a cap (Fig. 48). The description included in the work of Vitruvius suggests that its origins may be found in provincial Roman building construction (Vitruvius II, Lib. II, VIII, 20). Relics recorded at Münsterhof in Zürich and Petersberg in Basel, therefore in the continuation zone of at least some achievements of antiquity, can be regarded as examples illustrating the medieval beginnings of this construction (Schneider et al. 1982, 104–144; Gutscher 1984, 212–214; Berger 1963; Matt 1998, 281–282). In the following centuries, it could be found in castles, and its rapid spread may be associated with the urbanisation of Western and Central Europe in the 12th–13th centuries. Its high versatility, visibility, and the possibility to adapt it to different functions meant that it became the main construction system in many cities, with numerous regional versions (Binding et al. 1989; Gerner 2007).

Fig. 47. Wrocław, Nowy Targ Square. Excavations 2010–2012. S. u. 176. Photo by J. Nastaszyc.

Fig. 49. Wrocław, 6 St Wita Street. Construction details of the northeast corner of a timber frame building. S. u. 247. Photo by P. Duma.

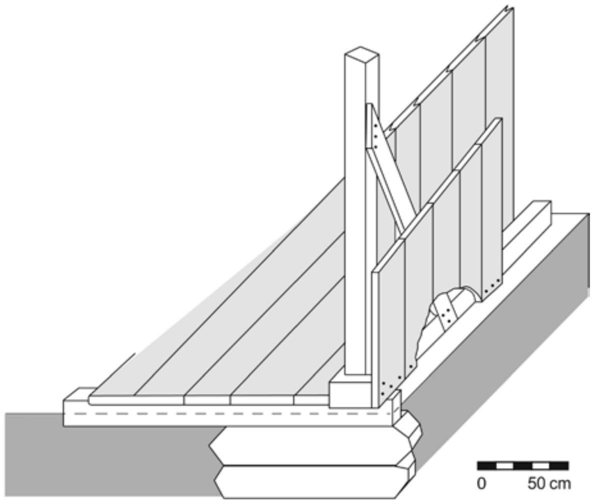


Fig. 50. Wrocław, 41 Kuźnicza Street. Reconstruction of a corner of a timber frame building. After Piekalski 1995, 78, Fig. 3.

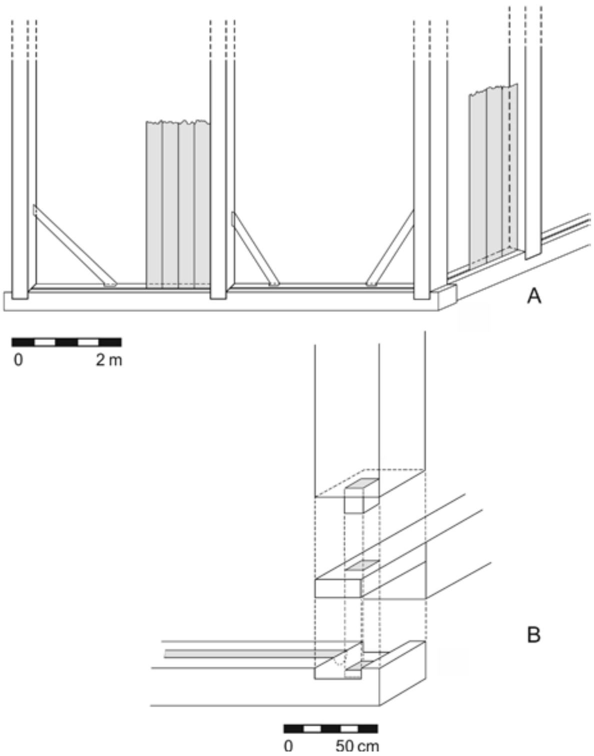


Fig. 48. Wrocław, Rynek. Timber-framing scheme. Drawing by N. Lenkow. After Limisiewicz et al. 2002, 106, Fig. 98.

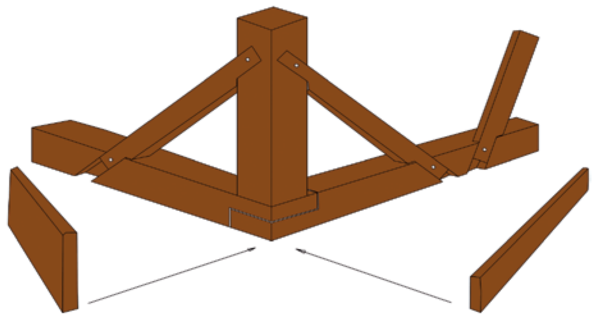


Fig. 51. Wrocław, Nowy Targ Square. Excavations 2010–2012. S. u. 97, reconstruction of the northeast corner. Drawing by P. Duma, M. Mackiewicz.

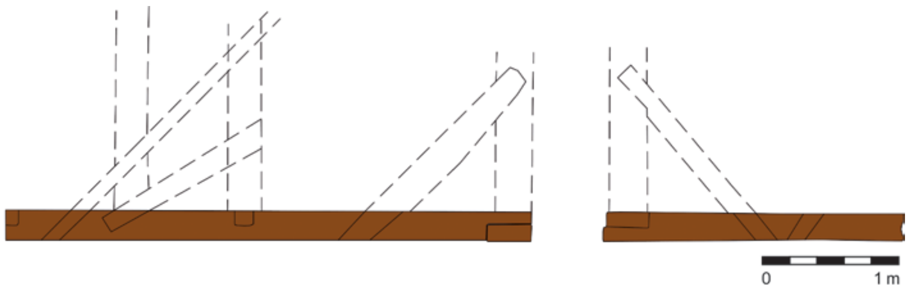


Fig. 52. Wrocław, Nowy Targ Square. Excavations 2010–2012. S. u. 97, reconstruction of the northern wall. Drawing by P. Duma, M. Mackiewicz.

In Wrocław, the oldest timber frame buildings were discovered in the pre-urban crafts and trade settlement on the left bank of the River Oder – in the area of the later Nowy Targ Square and the land bordering it in the south. These were included in the distinguished settlement phase II, dated generally to the end of the 12th century and the beginning of the 13th century, so evidently before the institualisation of the town. The basis for the dating was the stratigraphy, the analysis of a series of tree ring dating results and the features of the artefacts (Piekalski 2016, 111–112; 2018, 243–257). Houses of this construction occurred together with those erected using other construction systems, i.e. traditional wattle-and-daub and log constructions, as well as post-in-ground systems new in Wrocław – post-and-plank and with sill plates. In a short period of several tens of years, timber framing gained much popularity, and replaced other timber building construction techniques. In Wrocław, at least a couple of dozen such buildings were discovered, although only some of them were published. Those known from the literature and my recent excavations mean I can present their construction and functional differentiation.

Observations made during the excavations enable us to state that the construction of a timber frame building began with digging a foundation trench. In Wrocław, the trench depth varied and ranged from 0.4 m up to 2 m, measuring ca 0.8 m on average (Kaźmierczyk 1970, 164–168; Piekalski 1995, 76; 2014, 120). It often disturbed the cultural layer that was usually already formed, reaching the bedrock. The construction of the sill was placed at the bottom of the trench, leaving some free space on the edges (Fig. 49). Buildings placed directly on the surface are also known but are much rarer. In such cases, a wooden foundation basis was usually used. It was set under the corners or along the sill (Fig. 50). Oak wood was used as a building material in this kind of construction. However, it was not always freshly cut timber. The analysis of the tree ring dating results led to the conclusion that reclaimed wood was also commonly used (Piekalski 2016, 118–119). Sill plates had a rectangular cross-section. Well-preserved examples indicate that the size of the edges rarely exceeded 30 cm and the ends were hewn and joined at corners by overlapping. An element that stabilised the corner was a post fixed using a joint in a precisely cut groove running through both ends of the beams, placed on each other perpendicularly (Fig. 51). The posts were placed in corners and the walls. In the case of smaller buildings, two posts in half of the length of the wall were set, and in larger ones, there were several posts every 1.4 m to 3 m. Construction solutions for the upper parts of buildings remain unknown, and we are not aware if and how horizontal beams were installed. In several cases, traces of anchoring diagonal struts stabilising the construction (Fig. 52) were noted. These were fixed in shaft grooves cut in the upper or outer edge of the sill.

The walls of timber frame buildings in Wrocław could have been filled in several ways. A wooden framework was always used in the sunken parts, which was formed by massive planks, 35 cm wide on average and up to 10 cm thick. These were usually

Fig. 53. Wrocław, Nowy Targ Square. Excavations 2010–2012. S. u. 371. Photo by P. Duma.

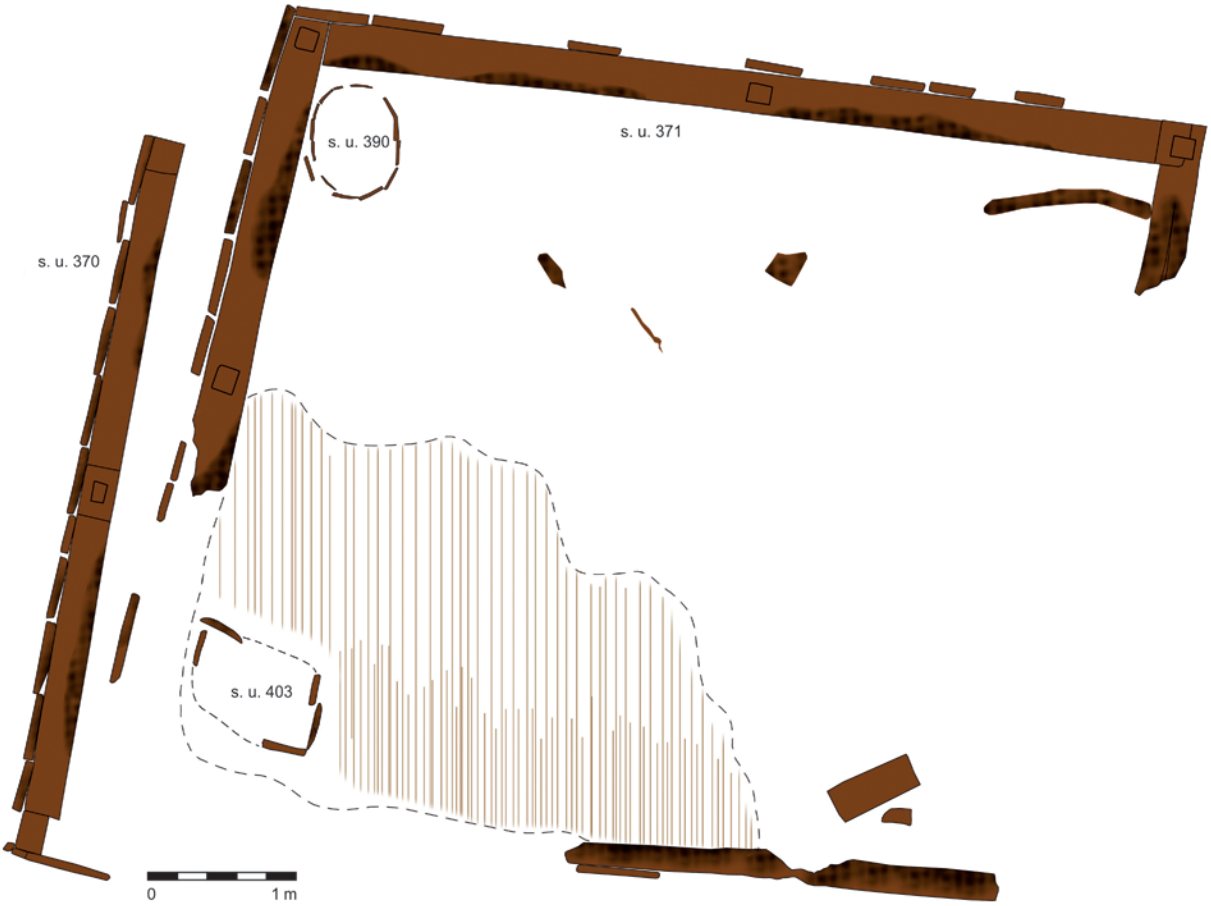


Fig. 54. Wrocław, Nowy Targ Square. Excavations 2010–2012. S. u. 370, 371, 390, 403. Drawing by P. Duma, N. Lenkow.

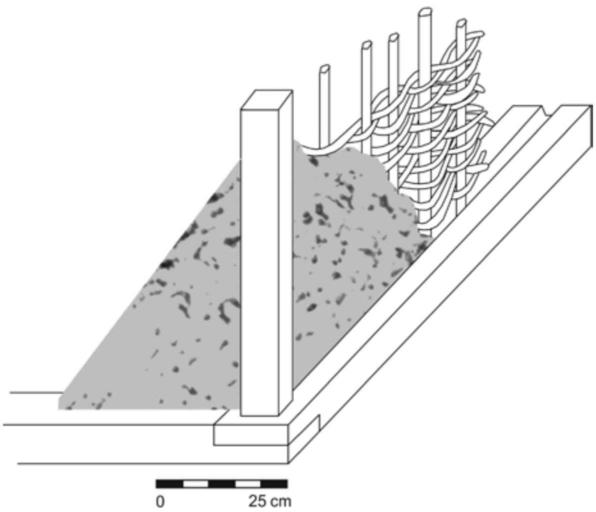


Fig. 55. Wrocław, 11 Więzienna Street. Wattlework wall filling of a timber frame house. Reconstruction attempt. Drawing by J. Niegoda. After Piekalski 1995, 79, Fig. 4.

placed vertically, less frequently horizontally, behind the outer edge of the sill plate and were stabilised by filling the empty part of the foundation trench (Fig. 53, 54). Most often they were set tightly next to one another, edge to edge. Less frequently, planks shaped as wedges placed on one another or the tongue-and-groove technique with a triangular groove were recorded. Sometimes, as in the case of s. u. 332 in the excavations in Nowy Targ Square and at 8 Igielna Street (Nadlergasse), walls were filled with planks vertically placed in a groove made in the top edge of the sill plate and joined using the sublime carpentry technique defined as 'tongue-and-groove' (Piekalski 1995, 76–77). Another technique was filling the wall with wattlework, which was placed in a 3–5 cm wide groove cut along the top edge of the sill plate and covered with clay on both sides (Fig. 55; Piekalski 1999, 39). In addition, coating walls with clay was also confirmed as another way of insulating buildings. A visible trace of this technique is burnt

Fig. 56. Wrocław, Nowy Targ Square. Excavations 2010–2012. S. u. 541, view from the east. Photo by M. Mackiewicz.

clay that remained after the fire. It was one of the most frequent elements of the cultural layers in late medieval and early modern Wrocław. This proves that clay was commonly used for insulating walls, especially the upper parts that are not available for archaeological research.

Timber framing gave better options than log or post-in-ground systems when shaping the form of a house. It is considerably easier to erect a two-storey building using this construction system. Unfortunately, because of their specific nature, the archaeological records do not provide the opportunity to examine the upper parts of the constructions that were visible above the ground. However, based on the current state of research, it can be stated that in 13th-century Wrocław, two-storey buildings existed along with single-storey ones. However, we are not able to reconstruct their quantitative proportions although we can give some examples from each category.

Well-preserved relics of a single-storey residential building were examined in the south of present-day Nowy Targ Square. During the excavations, it was marked as s. u. 541 (Marcinkiewicz, Piekalski 2018, 122). It was built on the plan of a 4.99 m × 12.80 m rectangle, with the walls set approximately along the east–west axis with some northeast–southwest deviation in relation to the arrangement of the neighbouring buildings (Fig. 56, 57). The building was recessed 1.20 m under the surface. From its load-bearing construction, the only preserved elements were sill beams, several wall posts and three interior posts that supported the roof and were placed along the longer axis of the building. Sill plates for the longer walls were made of planks adhering to one another. In the northern wall, those were three planks with the following lengths: 4.75 m; 4.87 m and 2.76 m. They were hewn into a 15 cm × 25 cm rectangle and placed on the ground by the wider edge. In the northern wall, 11 load-bearing posts were installed, including those in the corners. The distances between the posts equalled 132 cm, 102 cm, 124 cm, 126 cm, 124 cm, 117 cm, 116 cm, 115 cm, 113 cm and 107 cm (starting from the east). Each post was placed in a shaft slot cut in the sill plate. The slots were rectangular with sides of 9 cm × 10 cm and a width of 6 cm. At the ends of the posts, proper shafts were formed and then slipped into the slots. The sill plate of the southern wall was formed by one plank that measured 20 cm × 26 cm in a cross-section, with its wider edge placed on the surface. Analogous to the northern wall, 11 posts were recorded in it. The distances between them ranged between 115–135 cm. The form and size of the shaft slots were similar to those in the northern wall. The sill plate of the western wall measured 13 cm × 21 cm in the cross-section. In half of its length, a post measuring 13–22 cm in the cross-section was anchored with a shaft. In the eastern wall, in the plank sized 15 cm × 24 cm in the cross-section, one post was placed whose only remains is a shaft fitted in the cut slot. The posts that supported the roof were set approximately along the longer axis of the building, in its central part, 5.07 m, 6.70 and 9.55 m from the eastern wall. The posts, square in cross-section and sized 13 cm × 22 cm, 13 cm × 22 cm, 19 cm × 19 cm, were placed on wooden plates.

The state of preservation of the building enables us to conclude that the walls, at least in the recessed part, were constructed as a framework made of planks. In the gable walls, the planks were placed

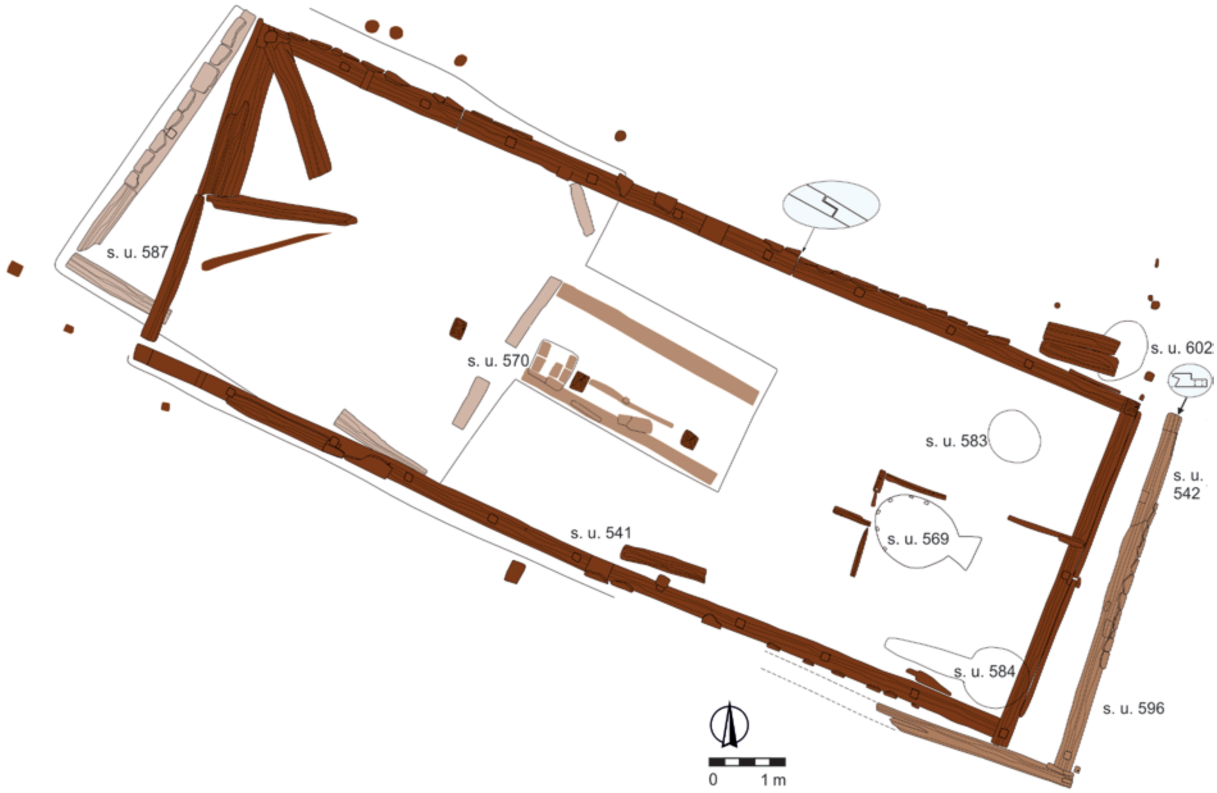


Fig. 57. Wrocław, Nowy Targ Square. Timber frame building. S. u. 541. Drawing by N. Lenkow.

horizontally and stabilised by filling the foundation trench with soil. In the eastern wall, two planks 2.30 m and 2.35 m long, and 6 cm thick were preserved. Two planks of a similar size were recorded in the western wall. The front walls were built of vertically placed planks. The width of the planks behind the sill plate in the northern wall varied from 22 cm to 30 cm, with a thickness of 5 cm. A similar situation was noted in the southern wall, in the area of the southwest corner.

The entrance to the building was set in the northern wall, at the north-eastern corner. Its width was the same as the distance between the corner post and the first post of the wall and equalled 1.34 m. In the corner post was a hook that was used to hang the door. Two planks, 1.05 and 1.00 m long and 25 and 24 cm wide, were placed before the entrance to make it easier to get inside.

In the southeast corner of the interior was a separated rectangular heated chamber – a 2.80 m × 2.47 m 'stube'. The construction of the distinguished part was formed by planks: in the corner, one sized 27 cm × 11 cm in a cross-section placed vertically, joined with the neighbouring one using the tongue-and-groove technique and horizontally placed planks that filled the walls. The interior was lined with a partly preserved mud floor. In the southwest corner, the relics of an oval-planned dome-shaped 88 cm × 112 cm stove were discovered. The dome was formed by a wooden frame covered with clay, and the inlet was placed on the eastern side. The interior was recessed 32 cm into the ground and lined with sandy clay, which was burnt during use.

The interior of the rest of the building was also lined with a mud floor. In the central part, an open hearth built of flat laid bricks, forming a 52 cm × 57 cm rectangle, was discovered. The spaces between the bricks were filled with sandy clay. The layer associated with the construction and use of the building's interior was 3–8 cm thick. A destruction layer that was formed during a fire, consisting mostly of burnt clay and other materials, was deposited above. Pieces of burnt clay indicate that the upper parts of the walls, above the first beam, were insulated with clay. The thickness of the destruction layer was up to 90 cm. Higher up, a backfill of greasy black humus mixed with raw clay and sand was recorded. The tree ring dates that were acquired from the construction elements were 1233, 1234.

A rich collection of artefacts was acquired from the interior, including iron tools and construction fittings, numerous leather fragments, staves from wooden vessels, clay vessel pieces and animal bone fragments.

The building was for housing purposes although it could also have been a workplace at the same time. Heating devices and a separated chamber were placed in the sunken ground floor. There are no premises in this case that would indicate the presence of a second storey. Smaller timber frame buildings discovered in the back of the burgage plots, e.g. at 13 Nożownicza Street (Fig. 58; Piekalski et al. 1991, 215–217), were also single-storey.

Two-storey timber frame buildings were noted in Wrocław in the early stages of the research. In 1962, on Drewniana Street (Einhorngasse), existing from the 13th to the mid-20th centuries and beginning on the northern side of Nowy Targ Square, the relics of two buildings recessed 1.80 m into the ground were discovered (Kaźmierczyk 1966, 164–168, Fig. 49–52). The discoverer defined them as cellars, assuming that residential floors were located above. This interpretation was later confirmed by further discoveries, which provided the information that timber frame buildings identified as two-storey had a smaller surface than the one described earlier as s. u. 541, and their ground plans were close to a square.

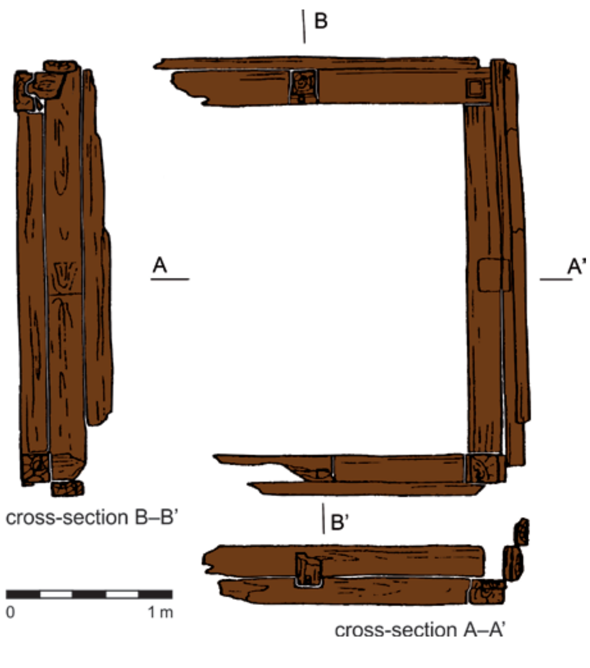


Fig. 58. Wrocław, 13 Nożownicza Street. Timber frame utility building in the back of the plot. Drawing by M. Karst. After Piekalski et al. 1991, 216, Fig. 2.

A good example of such a house is s. u. 322 from Nowy Targ Square (Marcinkiewicz, Piekalski 2018, 113–114). This was built based on a rectangular plan where the walls had the following lengths: southern wall 4.98 m, northern wall 5.11 m, western wall 5.21 m and eastern wall 5.12 m. In the western wall, 78 cm from the south-western corner, an entrance with an external corridor was placed (Fig. 59). It was set in a 1.10 m deep trench, reaching 8–20 cm beyond the construction. Sill plates were hewn to reach the shape of a 20 cm × 25 cm rectangle and merged in the corners with timber joints. The size of the corner posts was as follows: 16 cm × 19 cm in the north-eastern corner, 18 cm × 17 cm in the south-eastern corner, 15 cm × 17 cm in the south-western corner and 25 cm × 25 cm in the north-western corner. In the centre of the building, a post that supported the roof was set in the ground with a size of 32 cm × 34 cm. Within each wall, posts sized 15–16 cm × 26–27 cm were fitted on the sill plate. These were anchored in shaft notches of 11 cm × 12 cm and a depth of 11 cm. The walls were constructed as a framework made of planks vertically set behind the outer edges of the sill plate. The empty part of the foundation trench was filled with sand. The width of the planks stabilised in this way ranged from 36–42 cm. The external entrance corridor was 3.30 m long and 1.57 m wide, and the width of the entrance to the building's interior was 1.20 m. In the corridor, five steps stabilised with planks and reinforced with clay were formed. The depth of the steps was 16 cm. The utility level of the sunken interior was formed by an 8–12 cm thick layer of brown humus mixed with clay. The remains of a ceiling together with the floor of the second storey that collapsed on the inside during the fire were deposited on it. The planks from the floor of the second storey were 36–47 cm wide. Those traces corroborate the main argument that would indicate that the house was constructed with two floors. After the fire, a layer of burnt wood and clay up to 39 cm thick was left. From the relics, two tree ring dates were acquired: after 1252 for oak and 1252 for fir.

In the interior of the house, a fairly rich collection of artefacts that proved the reasonably high quality of the life of its inhabitants was discovered. These included a representative Romanesque bronze candleholder, fragments of glass vessels and glazed ceramic tiles. Numerous mail rings were found in the building and its closest surroundings, which may indicate the profile of crafts that were present there – production or reparation of armour (Marek 2018, 646–648).

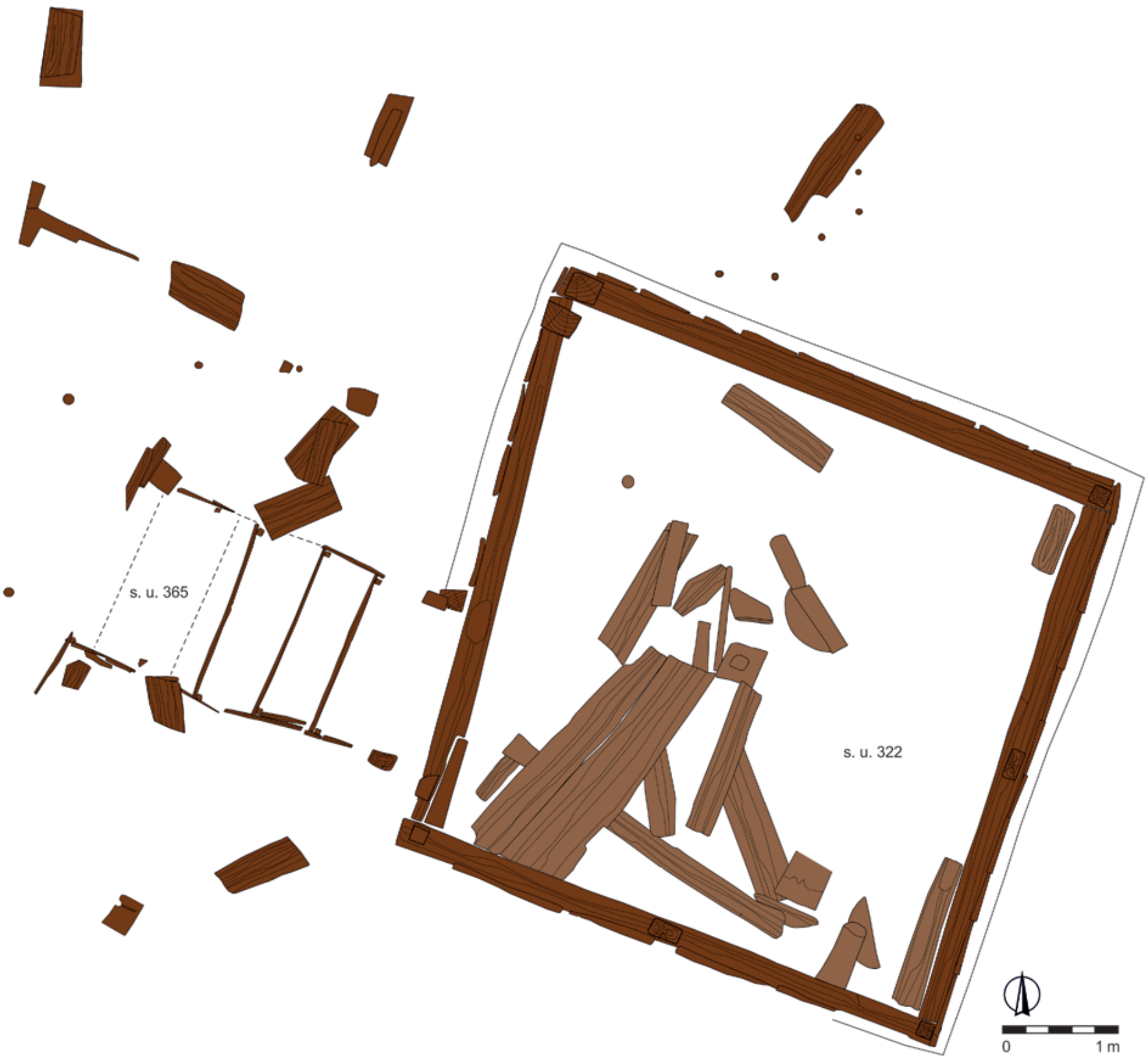


Fig. 59. Wrocław, Nowy Targ Square. Excavations 2010–2012. S. u. 322. Drawing by J. Sawicki, N. Lenkow.

Further information on the functional division of the interior of the house is provided by a nearby building marked during the excavations as s. u. 332 (Marcinkiewicz, Piekalski 2018, 115–117). It was built on a plot close to a square whose northern wall was 3.80 m long and western wall was 3.90 m with a corridor entrance from the west (Fig. 60). It was set according to the cardinal directions. The trench prepared for the building reached up to 40 cm beyond the walls and was 81 cm deep. Preserved from the construction of the building were 19 cm × 19 cm rectangular sill plates. In the corners, 6 cm × 6 cm notches for the post shafts were cut. The southern sill plate was from 50% destroyed by the fire, so it is difficult to reconstruct its original size. The post in the northwest corner was 15 cm × 12 cm in the cross-section, 16 cm × 20 cm in the northeast corner and 17 cm × 12 cm in the southwest corner. In half the length of each of the preserved sill plates, further notches for the post shafts were recorded. In the western sill plate, a groove 4.50 cm wide and 3 cm deep was cut. In the groove were only two planks situated at the entrance to the building. The plank adhering to the post in the northwest corner was 26 cm wide and 6 cm thick. It was hewn in the lower part so that it would fit in the groove. The second, 1.34 m from the corner, was 31 cm wide and 6 cm thick. Both planks were construction elements of the entrance doorframe that was ca 1.05 cm wide. At the entrance, on the utility level of the building, were the remains

Fig. 60. Wrocław, Nowy Targ Square. Excavations 2010–2012. S. u. 332. Photo by P. Duma.

of the 1.6 m high collapsed door, with a preserved key lock. The walls of the building were formed by planks set behind the outer edges of the sill beam, covered later with clay and humus. The width of the planks ranged from 12–45 cm and was 5 cm thick. The planks, charred on the inner side, were usually preserved to the height of 50 cm, less frequently 70 cm. Some of the planks bore traces of being joints using the tongue-and-groove technique. The small planks that were used as tongues were 8–10 cm wide. The interior was lined with river sand. In the north-western corner, the relics of a stove that fell from the second floor during the fire were recorded. The ruin consisted of burnt pebbles, whole bricks and fragments and burnt clay pieces. The presence of the second floor of the building is also indicated by fragments of burnt beams that were previously found in the construction of the ceiling and floor.

The entrance to the building, placed in the north of the western wall, was preceded by an external corridor with an earthen ramp, slightly sloping and boarded with planks. The width of the ramp was 1.60 m. The relics of the construction of the corridor, particularly the posts at the outer end, suggest that it could have been closed.

The first storey of the building, partially recessed into the ground, was used for storage. At the time of the discovery, the interior was entirely filled with various containers – baskets, barrels, other wooden stave and turned and ceramic vessels. The way the sunken ground floor was used excluded its residential function. We can, however, assume that the heated floor served for housing purposes. The tree ring dates – 1224, 1236, 1239 (-6 / +9), 1249 – indicate that the house was built in the mid-13th century.

The interiors of the buildings were covered with mud floors, less frequently with floors made of wooden planks. A floor could have been set on beams, or directly on the ground. Only indirect evidence suggests that the second storey of timber frame buildings also had a wooden floor.

As mentioned earlier, entering the house was possible through an external corridor with an earthen ramp or several stairs (Fig. 59). In some cases, it was confirmed that the corridor was reinforced with a wooden, most probably roofed construction. The width of the entrance slightly exceeded 1 m. In one case, it was possible to determine the height of the door. It equalled 1.6 m, which is more than in traditional timber frame houses (Kaźmierczyk 1993, 32). In s. u. 412 on Nowy Targ Square, the door was placed between the posts set in the sill plate. Also, a place for the bottom edge of the door as well as a groove to mount it was cut in the beam. The door opened to the inside. The preserved lower part indicated that it was made of five planks joined together from the outer side with wooden pins. Directly at the door was a partially burnt wooden lock with a metal mechanism and a key. A door in the timber frame building from Nowy Targ Square described earlier and marked as s. u. 332, fitted with a wooden lock and placed in a wooden doorframe, was 1.58 m high (Fig. 61). Hanging a door on hooks set in a post that

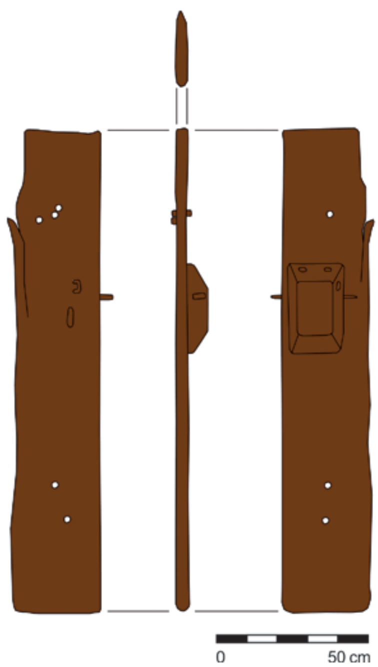


Fig. 61. Wrocław, Nowy Targ Square. Excavations 2010–2012. S. u. 332, door fragment with a lock. Drawing by M. Legut-Pintal, M. Mackiewicz.

served as a doorframe was a new technique, confirmed during the excavations in Nowy Targ Square.

No relics of an entrance to the second floor were discovered. We can only assume that according to 13th-century convention, external lightweight stairs led there (Chorowska 1994, 30, 55; Piekalski 2004b, 178–180).

Residential buildings erected using timber framing were usually situated along communication routes. This was confirmed in several cases in the irregularly arranged crafts and trade settlement from the pre-urban phase of Wrocław. The most notable examples are two houses discovered by Kaźmierczyk on historic Drewniana Street. These were situated on the eastern edge of the wooden construction of the street's surface (Kaźmierczyk 1966, 164–168, Fig. 49–52) and must have been similar to some houses located along the western edge of a traffic route preceding the later Piaskowa Street (Niegoda 2005, 71–73). In the trench from the 2010–2012 excavations in Nowy Targ Square, where the communication routes were partly reconstructed,

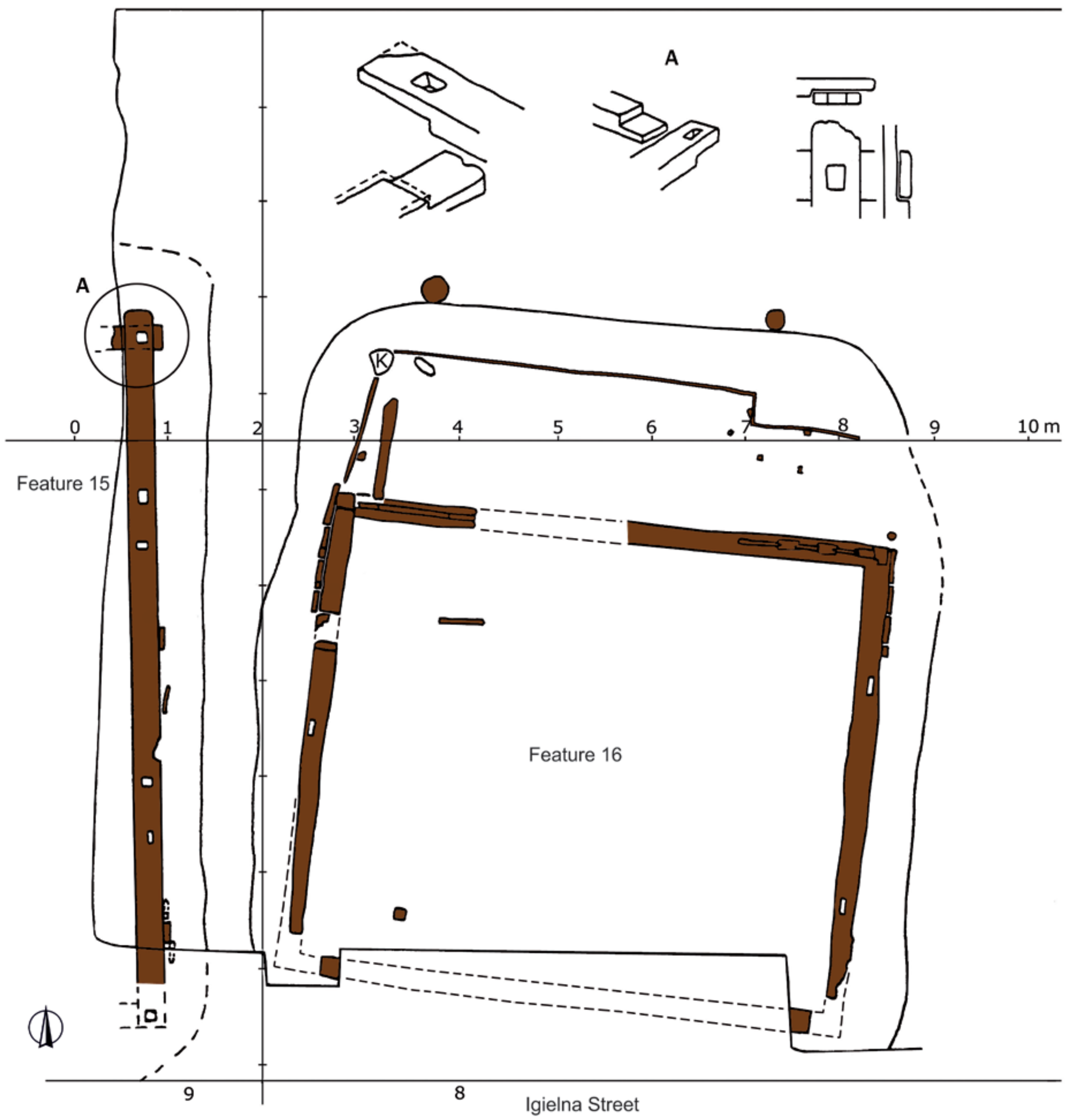


Fig. 62. Wrocław, 8 Igielna Street. Two-storey residential building. Drawing by M. Karst. After Piekalski 2004b, 179, Fig. 76.

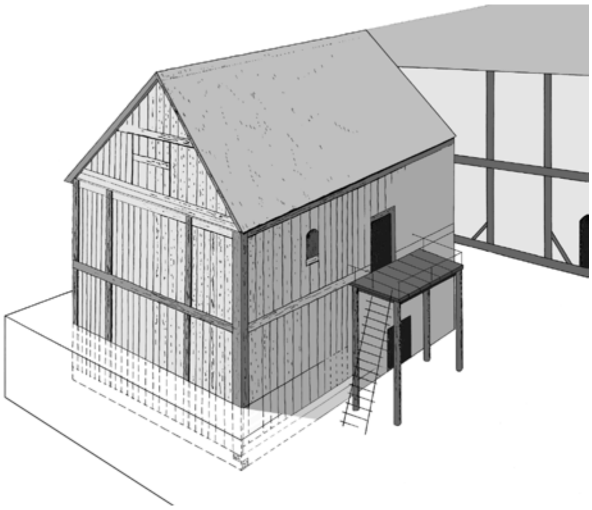


Fig. 63. Wrocław, 8 Igielna Street. Two-storey residential building, attempted graphic reconstruction. Drawing by N. Lenkow.

the previously mentioned buildings – s. u. 541, s. u. 434 (Marcinkiewicz, Piekalski 2018, 95, Fig. 51), and most probably s. u. 254, 255, 257 and 319 – were facing the street. However, their state of preservation did not allow for a definite identification of the construction.

The timber frame buildings served as the oldest burgher houses in Wrocław. The first houses in Rynek, the main market square of the institutional town, were built in this way. On the corner plot of Rynek (12 Ring), Plac Solny (20 Salzmarkt), the relics of a house whose wall was more than 7 m long were discovered. It was recessed into the ground up to 2 m below the initial level of the soil surface. Therefore, it has the deepest wooden cellar discovered in Wrocław up to the present day. The construction that was burnt and charred during the fire indicates that the interior was covered with a wooden floor. Approximately 3 m to the east, also in the corner of the market square, the far less preserved remains of a timber building were recorded (Piekalski 2014, 120). Another construction was confirmed on the plot of 6 Rynek (Chorowska et al. 2012, 52–54), which was erected in the front part of the plot, directly towards the western edge of the square. The length of the front wall exceeded 5.50 m, and the building reached over 4.80 m into the plot. It can then be assumed that it belonged to the category of houses whose plan was close to a square. However, there is no strong argument that would suggest that the building had two storeys. It was recessed 1.25 m below the original humus surface, and the utility level was formed by a clay floor. The interior was divided perpendicular to the edge of the square into two parts that were 1.60 m and over 3.20 m wide. Traces of the construction of a clay stove were preserved in the central part of the interior.

In the eastern front of the square, the presence of timber frame houses was confirmed at the beginning of Kurzy Targ Square (Hünermarkt) (Mruczek 2000). The street was already widened in the 13th century, which destroyed the existing buildings. Each of the timber houses discovered in Rynek was erected before the mid-13th century and almost all were damaged by fire shortly afterwards. Their place was soon taken up by the new brick burgher houses (Chorowska 1994).

Timber burgher houses situated in the front parts of the plots were also discovered outside Rynek. A house built after 1236 on the plot at Igielna Street (Nadlergasse) had two storeys and the interior was reached from the courtyard (Fig. 62, 63; Piekalski 1995, 76). After the destruction caused by fires, other houses using the same construction system were erected. It was a similar case at 11 Więzienna Street, where a timber frame house with a basement was replaced by a brick one as late as the 15th century (Piekalski 1999, 41). In less significant streets, and those located further from Rynek, timber frame buildings could have been a basic type of burgher houses long into the modern period. From the recent excavations in the relatively modest St Wita Street, it is only known that they were removed in the 17th–18th centuries (Chorowska et al. 2018).

3. Conditions and results of the transformation of timber building constructions in Wrocław in the High Middle Ages

Referring to the goal stated in the introduction of the paper and the analysis of timber buildings in medieval Wrocław, we can generally assume that the changes that took place in the High Middle Ages reflect the development of carpentry techniques, an interregional exchange of information, social changes, the migration of the people from the West and the ethnic changes associated with the process.

Defining the role of pit houses, the simplest form of houses in our view, it can be clearly stated that they were not significant in terms of the transformation of building constructions in Wrocław in the 13th century. They were typical of the oldest settlement levels and were dug in soil, not in the cultural layer that was being formed. They were present in the early phases of the development of the crafts and trade settlement on the left bank of the River Oder. Their presence is hardly visible in the elite stronghold in Ostrów Tumski. They had disappeared from the whole proto-urban settlement of Wrocław before significant indicators of the 13th-century cultural transformation first appeared. It should be stressed that later cellars of timber frame houses cannot be included in the category of pit houses.

The simple to build and cheap wattle-and-daub construction was present until the 13th century in all parts of the Wrocław proto-urban settlement (Piekalski 2014, 31–40). In particular, in the stronghold in Ostrów Tumski where along with log construction, it played the most important role in the construction of residential buildings. However, it did not become one of the building techniques that were used in forming the institutional town. It served an auxiliary function at most, as it was used when erecting small utility buildings in the back of burgage plots, and sometimes when filling the walls of timber frame houses.

A similar conclusion might be drawn in the case of log construction. It was helpful in erecting small one-room houses without internal divisions, as it had good insulation value. Nevertheless, it was not used when erecting burgher houses. Analogous to the wattle-and-daub system, it served for auxiliary functions and had completely disappeared before the end of the Middle Ages.

Simple post-in-ground constructions, probably foreign to the local people, played a marginal role in Wrocław prior to the 13th century. The situation changed in this respect at the beginning of the 13th century. We cannot be certain if the introduction of post-and-plank construction, as well as the post-in-ground system with sill plates, was a result of the migration of the settlers from the West, namely from the German lands. However, we can clearly state that those systems had been known in that area earlier than in Silesia. Their reception in Wrocław can, therefore, be perceived as an early stage of colonisation, preceding the intensive flow distinguished by different *hospites* rights during the period of the institualisation of the town. The constructions, unlike those that had been used earlier in Wrocław, provided new options for shaping the form of a house.

The most important change observed from the beginning of the 13th century was the introduction of timber frame houses. Their emergence was one of the elements of the rapid acceleration of the development of Wrocław in the High Middle Ages. Over several tens of years, it almost entirely replaced other constructions, becoming the sole carpentry system used for building residential timber buildings. Its immediate use was the result of at least two things. First, it was the type of construction that was tested and established in the building tradition of the countries from which colonists came to Wrocław. Second, it provided an excellent way of developing a house for a burgher – a craftsman or a tradesman – that combined utility and residential functions under one roof. It was reconstructed in two variants that can be conventionally defined as northern and southern ones, referring to the traditional division of cultural zones for the different traditions of developing a burgher house (Büttner, Meissner 1980; Piekalski 2004b, 40–134). The first referred to a hall house with a large space on one storey. A utility zone – a craftsman's workshop or a trader's storage place – was then situated in the front part of the interior, and the residential area fitted with a hearth was located deep inside the house. In the second variant, utility and residential zones had separate storeys – a workshop or storage occupied a sunken ground floor and the accommodation was located on a heated floor.

The transformation of the building construction systems and the new form of a house should be perceived as a result of an important social phenomenon – the emergence of townsmen with their economic base, legal privileges and a new lifestyle. Edith Ennen, a prominent scholar involved in the studies on the issues connected with towns and townsmen, regarded relatively good living conditions and the tendency for constant improvement as one of the main characteristics of the new social group (Ennen 1988, 637–638). A house built using timber-framing in this respect gave considerably better possibilities than the building systems used in Wrocław before the 13th century. An important factor that drove the social change, as well as the changes in the way people thought and lived, was the migration of the colonists from the West, mostly from the German lands – regulated by local rulers yet leaving much freedom to choose their own solutions (Gawlas 2003; 2005).

In the legally and traditionally regulated town space, a residential building occupied the front part of a burgage plot. In the early phases of development, the entrance to the house might have been placed at the courtyard although the wall that faced the street or a square had a representative character. It was set on the border between private and public space, confirming the position of the owner in the municipality that was strongly differentiated when it came to professions and property. It can be assumed that the desire to accentuate their position in the municipality was one of the factors that in Wrocław led to replacing timber houses with brick ones. Other factors, certainly no less significant, were the reduced risk of fire and the improved durability of a house, which was an important part of a burgher's property.

Despite its unquestionable advantages, a timber frame building did not cater for the increasing needs of the most active and successful members of the municipality. It was no coincidence that replacing timber frame buildings with brick ones began in the wealthiest part of the city (Chorowska, Lasota 1995; 2010). The first brick buildings appeared in the mid-13th century, while they became common in the 14th century, and before the end of the Middle Ages had already formed a system that would predominate the whole town.

Chapter 5

Influence of traditional building techniques on the formation of the Silesian brick townhouse

Małgorzata Chorowska

1. Introduction

It is common knowledge about how special the role of Silesia as a transmission belt was in introducing the civilisational gains of Western Europe to other districts of Poland. This phenomenon increased at the beginning of the 13th century and later when Silesia became the richest district of Poland and the leader as far as the pace of the spread of brick housing was concerned. The numbers are a valid representation of the scale of changes. By the end of the 12th century, we can document the emergence of only 33 churches, while during the first 30 years of the 13th century, the number increased by about 70, and the masonry structures built during the entire 13th century increased by 20 (Kozaczewski 1975, 1–5). This breakthrough meant that not only castles and churches but also burgher houses were built as massive, stone or brick constructions.

It is a paradox that among the medieval and early modern researchers of Silesian architecture, there is a lack of specialists systematically dealing with the subject of construction workshops, such as in the centres of Toruń and Warsaw, not to mention the impressive Czech experience (Škabrada 2003). The only paper written on building ceramics in Wrocław does not bridge this gap either (Małachowicz 2005) and neither is it dedicated to the problem of the transformation of burgher houses from wooden to masonry houses. In Silesia, this transformation took place within a wide chronological timeframe from the 13th century until midway through the following century. The issue of using local building materials had a significant impact on the pace of the dissemination of brick housing in the towns. Anticipating later arguments, I will state that, paradoxically, the abundance of stone deposits did not go hand in hand with the development of brick housing, and in the initial period even slowed it down. However, the rich clay deposits did have a beneficial effect on the development.

The second issue, although less directly connected with the subject of construction workshops, is the question of the roots of local burgher houses in the peasant and feudal-manorial constructions. This is a reoccurring question regarding the birth of burgher houses. German scholars divided the area of Central Europe into two provinces: lower and upper Germany. The lower German zone with multi-compartment houses and timber-framed constructions was to remain under the influence of the rural building tradition, which resulted in the transfer to towns of a spacious high hallway called ‘Diele’ (Piekalski 2004b, 13–15). The researchers observing the constructions in the upper German zone noted that in the vast areas from the Rhineland in the west up to Bohemia in the east, the division into small rooms on the ground floor of townhouses predominated. Besides rural provenience, they also noted the solutions transferred from a feudal construction, namely, donjons or palace.

Jerzy Piekalski, in his work on early burgher houses in Europe, has recently discussed these two ideas. As a result, he concluded that their idea and form should be recognised as totally original and distinguished as a result of the new conditions, needs and possibilities connected with the development of a communal town (Piekalski 2004b, 203–208). According to Piekalski, a burgher house cannot have its roots in a peasant homestead as both were being shaped in Central Europe collaterally and have at the most mutual prehistorical predecessors. He does not see any strong connection between townhouses and feudal-manor constructions as this is not possible due to the vast functional differences between them. However, he allows burghers to repossess local construction, stonemasonry and brickwork techniques as well as the methods of heating the interiors developed in a manorial and church milieu.

To prove the argument about the essential influence of local natural and material conditions on the shape of masonry townhouses in Silesia, it is necessary to compare the beginnings of townhouses in two large municipal centres in two macro-regions constituting the district of Silesia – Wrocław, situated in the Silesian Lowland, and Świdnica, situated in the area of the Sudetes Foothills. The medieval development of those cities underwent intensive architectural (Chorowska, Lasota 2010; 2013), archaeological (Bresch et al. 2001; Niegoda 2005; Piekalski 2004b) and historical (Goliński 2000; 2003) examinations.

2. Geomorphological conditions in Silesia – The Silesian Lowland and the Sudetes Foothills

The area of Lower Silesia consists of two microregions – the Silesian Lowland and the Sudetes Foothills. When it comes to the area formation and natural resources for construction, they are both distinct. The first area is a vast plain, which is a part of the Central Poland Lowlands (Kondracki 2002). These constitute a long strip of lowlands stretching along the coasts of the North Sea and the Baltic Sea beginning from the Flanders Lowland in the west and finishing in the Polish Lowland in the east. The Central European Lowlands are wedge-shaped and about 1,500 km long and 150 km wide in the west to 350 km in the east. Due to the favourable climatic and soil conditions, the Silesia Lowland became an area of arable fields and settlements quite early. The most favourable area for settlement was the Oder River Valley along which many of the early municipal centres such as Wrocław, Opole, Racibórz, Nysa, Brzeg, Oleśnica and Oława were founded. The Silesian Lowland was a poor region when it came to the deposits of building stone. However, it was rich in loam layers suitable for the production of building ceramics (the region of Brzeg Górny, Wrocław, Trzebnica, Milicz, Brzeg Dolny, Wołów, Kąty Wrocławskie, Środa Śląska, Legnica, Prochowice, Gozdnica, Nowa Sól and Żagań). From the 1170s, the production of brick (the basic construction material in this area and also in monumental architecture) began to develop in this area.

The Sudetes Foothills is an area that geographically covers the West Sudetes Foothills and the Sudetes Foreland stretching from Bolesławiec through Złotoryja as far as the Świdnica vicinity. The Sudetes Foothills were the domain of stone construction. The regions in which building stone resources had already been obtained in the Early Middle Ages are collated below (Lisowska 2013, 84–86, Tab. 2).

Strzelin granites were the basic building materials in this area. They occurred in the area of Strzelin in three different variations: tiny and medium biotite granites and medium two mica granite, which was obtained in the area of Biały Kościół. In the area of the Strzelin Hills, in the region of Przeworno, Gromnik, Jegłowa and Strużyna there were quartzites used to forge architectural details and used as a simple building raw material.

Granites (granodiorites) occurred in four variants in the Ślęża area and were obtained in the vicinity of Chwałków, Sobótka-Strzeblów and Sobótka-Górka. Floor plates were made of Przeworno marbles occurring in the Ślęza and the Jańska mountain massifs. Ślęża gabbro and Jordanów serpentinine quarry were sporadically used in construction, mainly for floors and elements of street architecture. The slates with mica particles and Kamieniec slates, in turn, numerously abundant in the vicinity of Kamieniec Ząbkowicki, were used as lumber for building the surrounding churches and for the construction of rural houses in the Late Middle Ages.

Sandstone, occurring in the Sudetes Foothills in three variants, was widely used in construction. In the vicinity of Nowa Ruda, Nowa Ruda-Słupiec and Radków, its pink colouration (red rotliegend) meant it was highly decorative and was used in architecture and sculpture. In the Kaczawa Mountains and Kaczawa Foothills, cretaceous yellow and white as well as yellow and brown sandstone from the Intra-Sudetic Basin obtained from the southwest part of the Kłodzko Basin and the Upper Nysa Gully was used. Upper cretaceous sandstone from white-grey to yellow-grey was the best building material in the area of Stanów. The best-known deposits of gaudy grey-pink sandstone appeared in the vicinity of Lwówek Śląski and Wleń. Basalt (Świerzawa, Lubań, Leśna area), gneiss and slate (Paczków and Złoty Stok areas), porphyry, porphyritic rock (Płonina, Boguszów, Kamienna Góra) and greenschist (Płonina, Wleń) were also sporadically used as building materials.

3. Wood-and-clay houses in large Silesian cities: The case of Wrocław

The archaeological examinations carried out in Ostrów Tumski in Wrocław, in the area of the old stronghold, especially in the central part of the settlement outside the town walls, constitute examples of native timber construction from the 11th–12th centuries (Kaźmierczyk 1991, 1993, 1995). The remnants of one-storey timber houses ranging from 10 to 20 m^2 on the surface were discovered. These were buildings with one dwelling chamber with a heating device such as the hearth or furnace vaulted with a clay dome. Sporadically, a narrow and unheated room used for sleeping was isolated from the interior. These houses were diversified in terms of homeware and the level of living conditions – in the centre of the settlement outside the town walls were solid houses made of full timber notched logs, whereas, in the suburbs, the inhabitants were satisfied with wattle wall buildings. The basic unit was an enclosure consisting of a dwelling house, a house for servants and facility buildings. The borders between the enclosures were rather loose and irregularly shaped. However, these divisions tended to be fixed and lasted from generation to generation.

At first, the development on the left bank of the River Oder looked similar to what was described above. It was an open settlement, which functioned at the river crossing from the end of the 11th until the 13th centuries. In the development of the older settlement levels were small, one-room houses with a log, wattle and post-and-plank structure, which was also used in the fences dividing them. The houses were partially semi-recessed beneath the ground. This type of development was identified in the area of Nowy Targ Square where the consistency of traditional urban and proprietary layouts, identified within the pre-urban horizon, was detected (Niegoda 2005, 69–71). At least from the beginning of the 13th century, yet still prior to the organisation of the Wrocław middle-class municipality modelled on the Magdeburg Law, on the left bank of the River Oder free guests called *hospites* began to arrive from the West along with others such as the Walloons, Germans and Jews. These were the most dynamic groups in the new urban communities and were given legal and organisational distinction by the dukes who had invited them (Piekalski 2004b, 165–167; Zientara 1997, 144–145). Even though it is not always possible in the course of archaeological examinations to distinguish the houses of native inhabitants from the houses of newcomers, it can be assumed (making some necessary simplifications) that log structure houses were rather traditional in this area, while timber and skeletal constructions were adopted from the outside (Piekalski 2004b, 167). However, wattle structures had a transregional outreach.

An example of a timber structure house, which was probably connected with newcomers from the West, is a building discovered in the south of Nowy Targ Square. Its surface was 5.2 m × 7.4 m, and its ridge was in the non-existing Drewniana Street. The posts were in three rows and a wall transverse to them was made of boards, which divided the interior into two parts. One half was a kitchen with a permanent furnace and the other one was a sleeping chamber.

However, we know nothing about the filling of the walls of the higher storeys of the house; to be more precise, about the areas between the posts and the horizontal spandrel beams. Based on source references from the 1270s, which mention 'beautiful houses built from clay', it can be guessed that

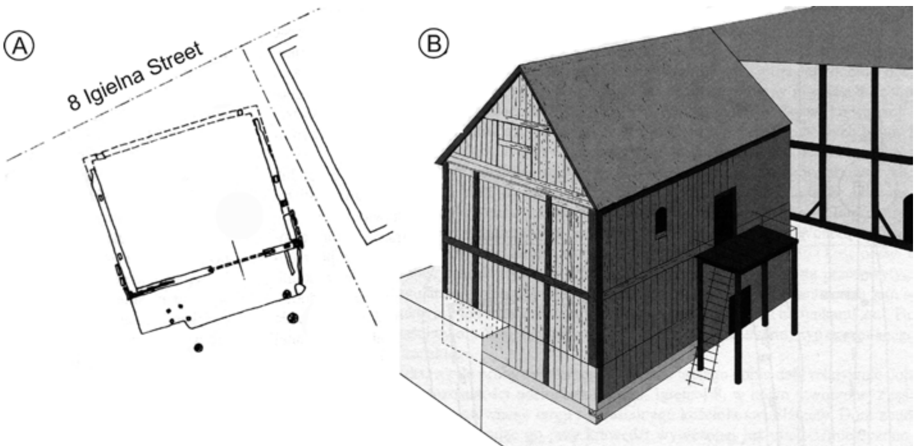


Fig. 64. Wrocław, 8 Igielna Street. Two timber-framed houses with walls filled with clay. A – Building location within the plot; B – reconstruction attempt. After Piekalski 2004b, 179–180, Fig. 76, 77.

they were made with a wood-and-clay technique – a wooden post wrapped in straw and additionally covered in clay mixed with chaff. Finally, the surface of the houses built in this style was plastered both inside and outside. As a result, they did not differ from stone and plastered walls. The wood-and-clay technique of filling the walls was certainly not a traditional approach in Silesia which, at the beginning of the 13th century, had an abundance of wood that formed the basis for traditional log structures. It 'arrived' with the colonists from the West, from the areas which had already been deforested as a result of intensive settling activities. The second advantage of a skeleton structure (spandrel beams and wood and clay) was that it allowed for the construction of floors, which made the dwelling space of houses significantly larger. In the case of log structures, it was not possible to build multi-storey buildings because the walls would expand.

There are many known relics of wood-and-clay houses from the area of the left bank of Wrocław, which prompts us to believe that within a short time they became quite a common occurrence. Similar remains were found in the area of Nowy Targ Square where under the non-existing western frontage of Piaskowa Street, a row of six houses from the 1220s–1230s was discovered (Niegoda 2005, 72–73) and also on all plots in the market square, which were archaeologically examined. These were the houses under Kurzy Targ Street built in the next phases in the years after 1209, 1223 and 1227, two houses at 8 Igielna Street (after 1236; Fig. 64), 6 and 12 Rynek, and 1a Biskupia Street (Mruczek 2000, 261–270; Piekalski 2004b, 178–181).

4. Location of the house in the context of the plot and modular parcelling out

All the houses discovered must be considered in terms of modular building plots. In the case of the western frontage of Piaskowa Street, these were the newly laid out plots on an area that had been previously inhabited. They alternatively constituted a row of six plots, each 7.83 m wide or three plots 15.65 m wide facing the street (Niegoda 2005, 81). In the case of plots in the market square, the plots were laid out on undeveloped, virgin land as modular with dimensions of 18.78 × 37.56 m (Chorowska 1994, 21–23). The buildings were built more or less at the front of the property, usually parallel to their borders, although the example of the relics of one of the uncovered houses on the latter plot at 8 Igielna Street shows that there could have been exceptions. Timber skeleton houses did not border each other and did not reach the plot boundaries as the

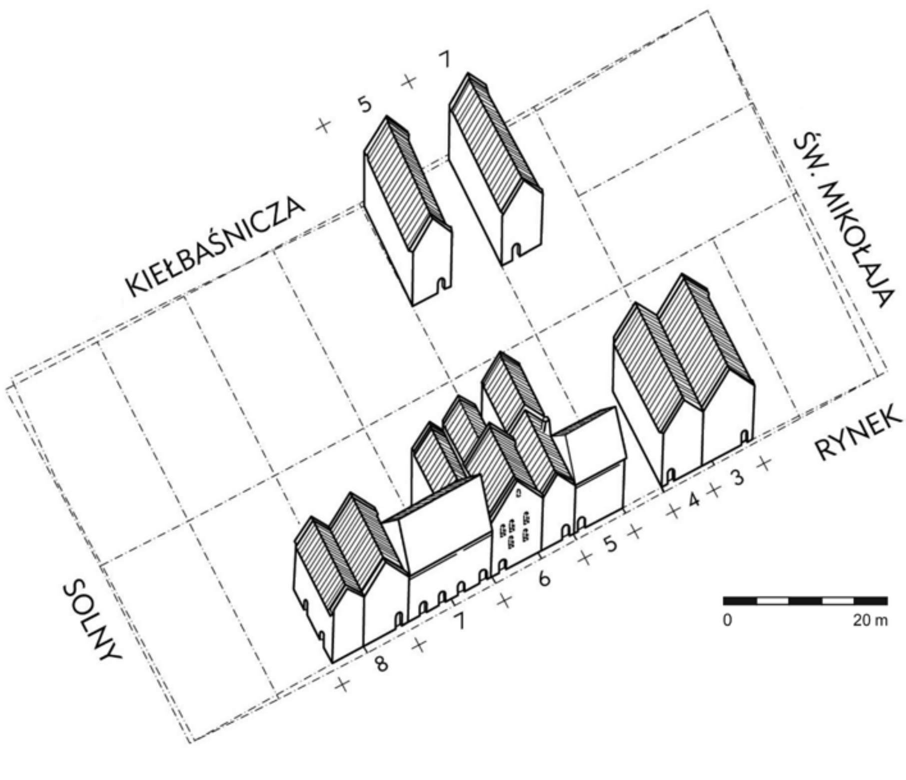


Fig. 65. Wrocław, 3–8 Rynek, 5–7 Kiełbaśnicza Street. Vendic brick building lump reconstruction with the background of parcelling out of a development block. After Chorowska 1994, 44, Fig. 69.

passages between them were needed to enable free access to the walls that required renovation. This is an essential detail that distinguished the location of the timber houses from the stone/brick ones. The latter were quickly built in Wrocław as adjacent, terraced houses (Fig. 65).

The next visible difference that is characteristic of the transformation from traditional development to new forms of settlement was leaving wet and flooded areas to settle on a higher flat, a Pleistocene terrace, which is in the current vicinity of Rynek and has never been flooded (Badura 2010, 40–41). This issue is very important as the phenomenon of leaving flood plains and moving new cities and towns to river banks became characteristic of the location processes in all cities and towns in the Polish Lowlands. Moreover, it was connected with the parcelling out of new areas. In the case of Brzeg Górny on the River Oder, a reference to a settlement called *Wissoke brzegh* (*Wisokebregh*, *Wissokembreghe*) from 1234 underlines the role of a terrace (SUB II, No. 79, 51; Fig. 66). At that time, Brzeg was an early urban centre of the *civitas* type, situated on an important European route/trail, the *Via Regia*. All issues, such as the reception of new materials, new building techniques, and modular parcelling out as well as the change in the settlement show that a break with the traditional model of settlement and dwelling houses occurred in Wrocław in the first decades of the 13th century.

The parcelling out of the left bank areas of Wrocław was done utilizing a 4.7 m long bar (*Virga regalis*) and a foot called the Rhine, 31.3 cm long, based

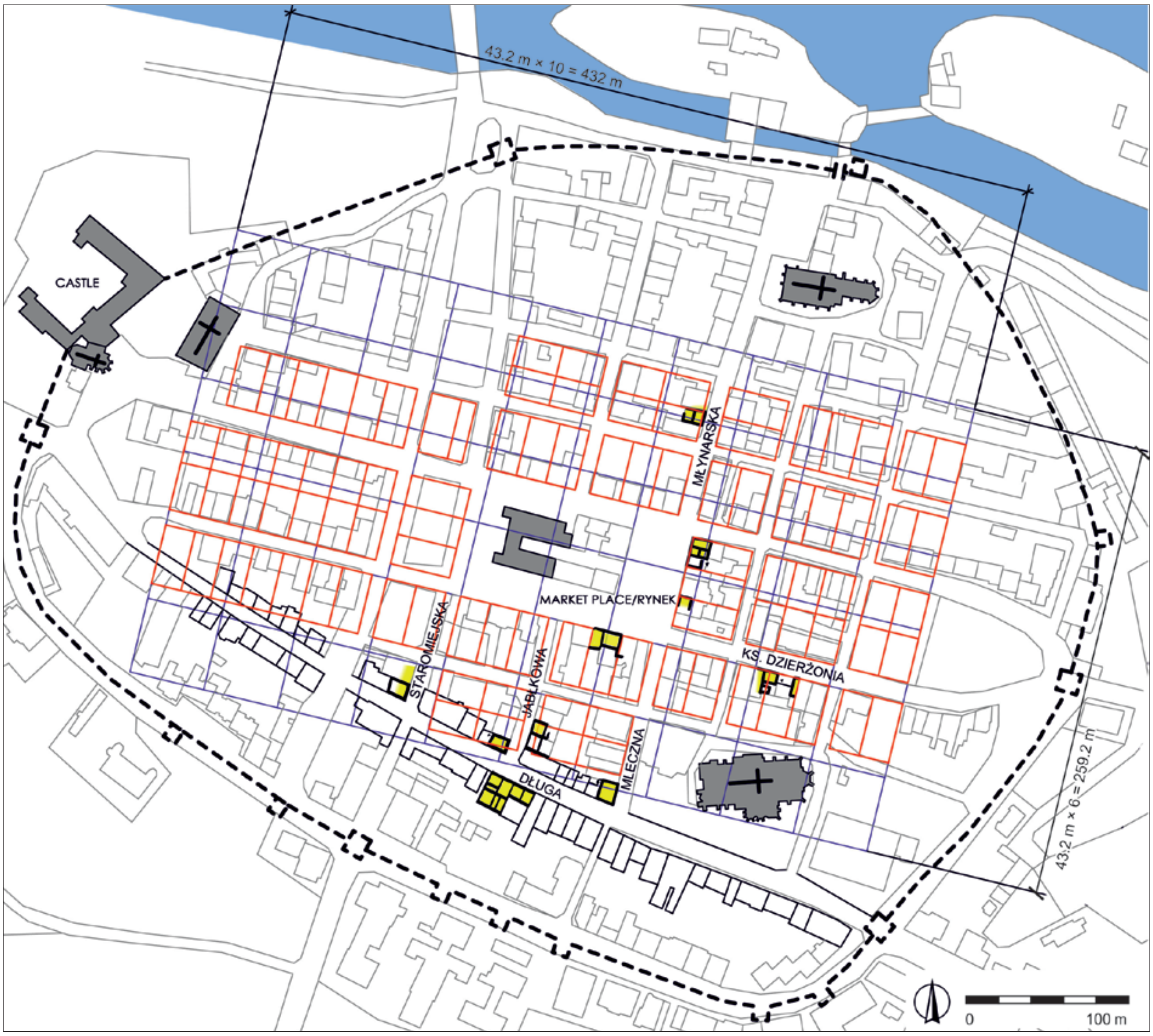


Fig. 66. Brzeg. Original parcelling out reconstruction on 'High Brzeg' with the indication of the location of churches, the castle, the line of town walls and townhouses discovered from the 13th–14th centuries. After Chorowska et al. 2015, 133, Fig. 2; modified.

Fig. 67. Wrocław, the left bank of the town around 1225. An attempt to reconstruct the original layout of block development and plots with the background of the older settlement and network of roads. 1–3 – Roads; 4, 4a – churchyard; 5 – settlement district confirmed in the written sources; 6 – settlements from the 12th century confirmed by archaeology; 7 – settlement from approximately the first three decades of the 13th century confirmed by archaeology; 8 – church; 9 – inn. A – Augustinian Abbey with the Church of Our Lady; B – St Adalbert Church; C – Church of St Mary Magdalene; D – Church of St Mary of Egypt; E – Church of St Maurice; F – Church of the Holy Spirit; G – Church of St Elizabeth. After Chorowska 2010, 79, Fig. 20; modified.

on a recurrent building plot of 18.78 × 37.56 m. The centre of the layout was a rectangular Rynek (the Old Town Market Square). Adjacent to this from the north and south were development blocks of 172.8 × 69.1 m divided into two 10-plot rows, while from the east and west, blocks of 138.24 × 69.1 m were comprised of two rows of 8 plots each. The plot fronts faced the square or an important street – in the first row to Rynek, then to the streets leading to the town gates and wicket gates, and finally to closed and back streets. This is why the corner plots were usually oriented differently than the others in the frontage (Fig. 67).

Świdnica as a location town was founded in the 1240s, on a high river bank on a partially regular plan enclosed within the area of a rectangle of 1.5 ha of a small Flemish cornfield (Fig. 68). Measuring was by a rope net with a square mesh of 43.2 × 43.2 m and a modular burgher plot where the front was 14.4 m wide, which made measuring easier as the front of each plot constituted one-third of the rope length. The depth of plots depended on the location in the town and were 43.2, 50.4 or 57.6 m. The longest plots were laid out on the southern side of the market square and Kotlarska Street. The shortest but the most numerous, normalised 50.4 m plots, were framed by Pulaski (former Wysoka) and Długa streets, the main transport axes of the town and the streets perpendicular to them, which also led to the town gates, as well as the peripheral streets situated north of the market. The irregularity of the east part of the town was interpreted by the previous generation of researchers as proof of its pre-urban genesis. However, not negating that premise, it should be emphasised that the deformation of the Świdnica plan first derived from the elevation of the terrain. The steep slope of the terrace descending to the river valley was divided by a deep funnel-shaped ravine and created two distinct parts – a narrow point on the southern side and a northern-eastern elevation gently descending to the north.

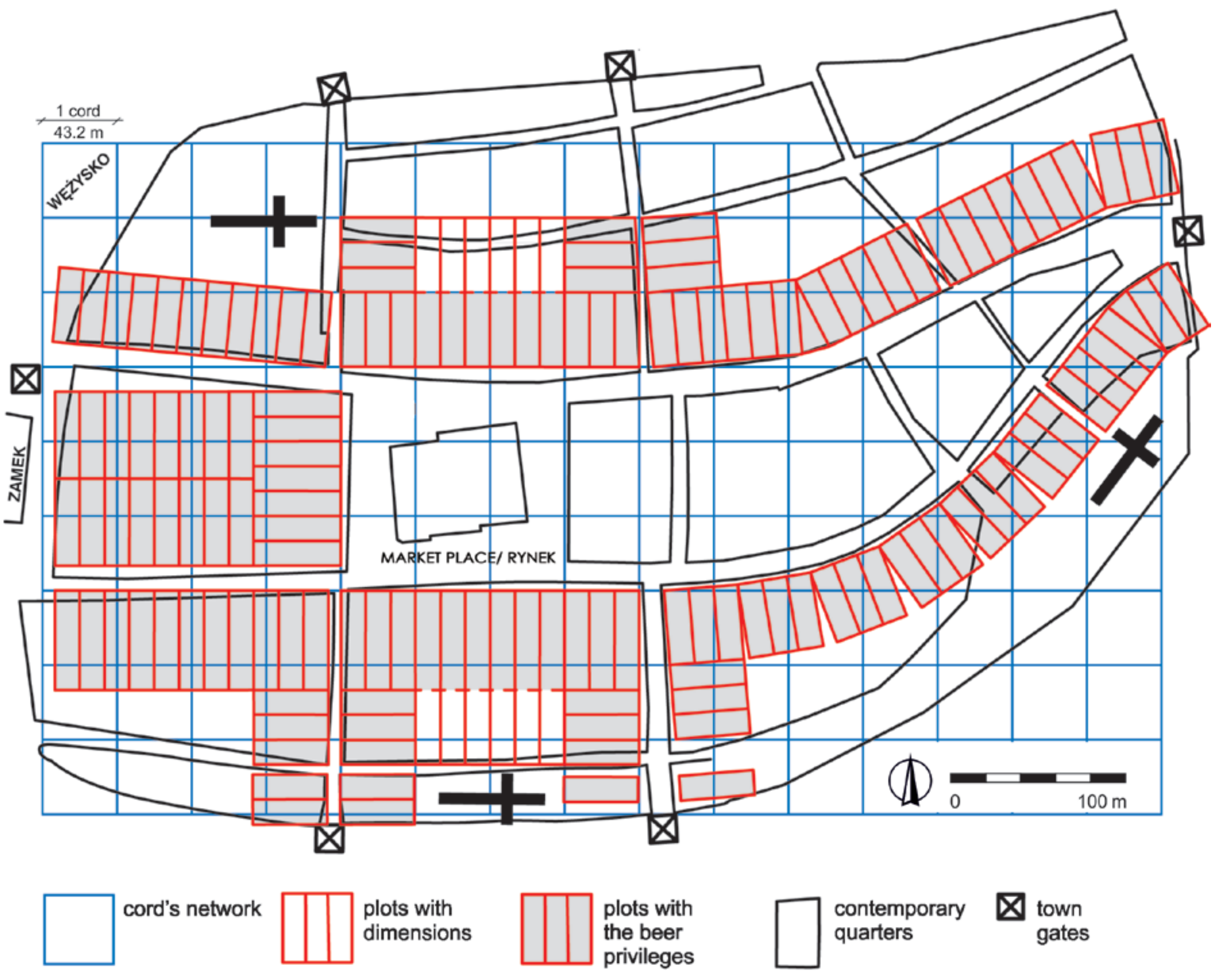


Fig. 68. Świdnica. A scheme of the original location parcelling out based on a 14.4 m wide plot. After Chorowska, Lasota 2013, 25, Fig. 9.

5. Wood-and-clay houses on stone cellars

Numerous traces of timber development can be found in the area of Świdnica Old Town, which confirms earlier speculation that it was truly widespread. These are remains in the form of overheated lumps of clay mixed with chaff and are the remnants of the timber-framed filling of timber-framed buildings. The structure of the buildings consisted of frames made of vertical posts, horizontal beams, diagonal braces and struts. These types of houses had many advantages: they were quickly built, and economical when it came to the amount of timber used, but first and foremost, they were warm. However, they caught fire easily. Houses destroyed by fire were levelled (hence the lumps of burnt clay found in the ground during the excavation) and new ones were built in their place.

The extent to which timber houses are recognised in Świdnica is rather poor. This is due to the intensity of later construction transformations in the front zone of the plots, which even went as deep as 30 m, but primarily from the lack of archaeological research. In a few cases, the architectural research of tenement houses proved the presence of an imprint of a timber structure in a stone wall or a spandrel beam that was a part of the timber frame that was walled-up in the course of the house building. During the archaeological investigation under the ground floors of townhouses, the layers of clay floors of timber-framed houses in turn with the layers of burnt materials were found, confirming their cyclic destruction by the fires. More often, the remains of houses with mixed stone and timber-framed structures were discovered. Such structures were a form of the transition between timber development and tenement houses (Fig. 69).

The specific feature of Świdnica timber-framed development, and also that of the 13th century, was the occurrence of stone cellars deeply situated and

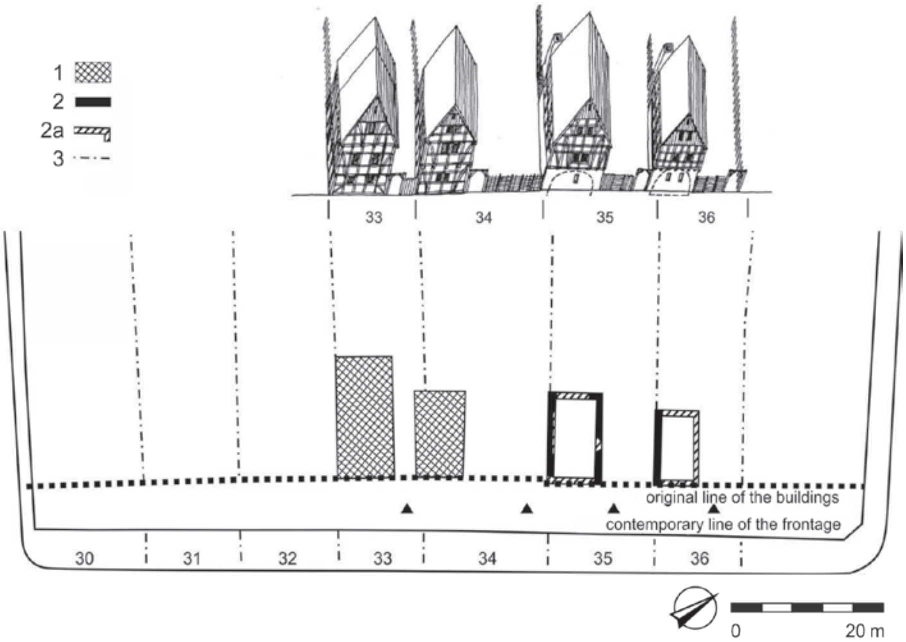


Fig. 69. Świdnica, 33–36 Rynek. Location and visualisation of four timber-framed and stone-framed houses (the second half of the 13th century) discovered in the west frontage of the market. 1 – The reach of a timber house; 2 – relics of masonry walls remaining on the basement level; 2a – walls reconstructed on the basement level; 3 – property boundaries. After Chorowska, Lasota 2013, 66, Fig. 21.

vaulted under the timber-framed houses. The cellars were independent of the timber-framed structure of the houses. They can be compared to stone capsules hidden deep underground (Fig. 70), while the buildings built above stood on their own groundsill and were not adjacent to each other. Cellar walls were stoned to the level of the vault buttresses. The vaults were covered with a thick layer of earth mixed with gravel, clay or loamy sand. The lack of continuation of the side walls of the exterior curve of the arch above the vaulted ceiling was stated a few times in the excavation research and no frontal walls were built above these. Cellars were an essential element in the development of each burgher's property. Świdnica was a famous brewing centre in Europe and over 270 properties had a beer privilege. In the stone cellars, beer in barrels would ferment under the ideal temperature of 7–10°C.

Large vaulted cellars as in Świdnica are not found in any other early burgher houses in any other town in Lower Silesia. However, the inspection of an underground storey of tenement houses was conducted for the needs of the next editions of *The Historical Atlas of Polish Towns* such as Dzierżoniów, Jelenia Gora, Niemcza, Strzegom, Strzelin, Ząbkowice and Ziębice, which confirm their universality in the cities and towns of the Sudetes Foothills as a functional complement of timber-framed buildings (Atlas 2003b, Board 4b; 2014, Board 6; 2016, Board 5; 2017a, Board 5; 2017b, Board 12; Chorowska et al. 2017, 43; Gliński 2017, 33). It was completely different in burgher houses in the Lowlands. In the well-archaeologically examined Środa Śląska, the scattered remnants of timber-framed constructions as well as timber cellars – three in log construction and six in mixed frame-and-beam construction and

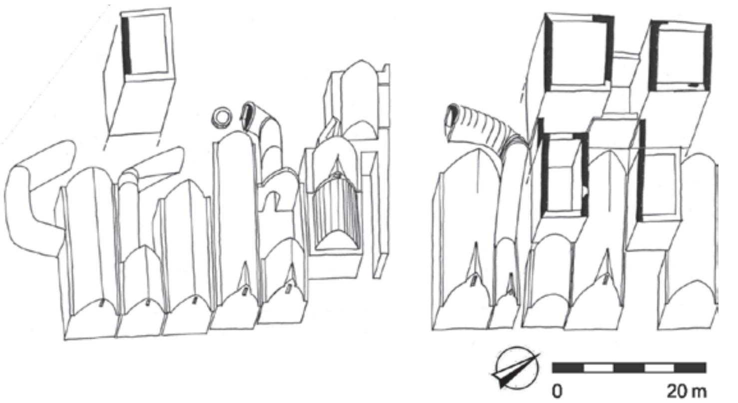


Fig. 70. Świdnica, 33–36 Rynek. Reconstruction of built parts (underground and aboveground) of the oldest houses in the west frontage of the market. At the front were stone cellars situated under timber-framed houses but houses without cellars with built lower storeys were built farther down the plot. After Chorowska, Lasota 2013, 66, Fig. 21.

partially dug-out structures, were common (Atlas 2003a, Board 4). Vaulted brick cellars were already considered to be modern. Only three early brick cellars are known in Wrocław; with only one built on a plot in Rynek (Limisiewicz, Mruczek 2010, 90–91). The other two were discovered on the outskirts of medieval Wrocław, in the vicinity of Wierzbowa Street and Dominikański Square. The first cellar was discovered under the middle part of a tenement house at 60 Rynek, immediately on the border with the house at 59 Rynek (Fig. 71). It was stated beyond any doubt that its walls did not continue above the vault. This meant that only a timber building could have stood above it. The cellar preceded the 13th-century brick townhouse in 60 Rynek erected in a Vendic way (2 stretchers + 1 header). The latter was built in the second phase with its ridge turned to Rynek as a one-room but cellar timber-framed building making a side wing. The oldest cellar was omitted by the foundation walls of the townhouse from the second phase, which created a strange slide. It was pulled down in the third phase when a brick side wing with a cellar was built onto the older front part, which was quite common in the 14th century.

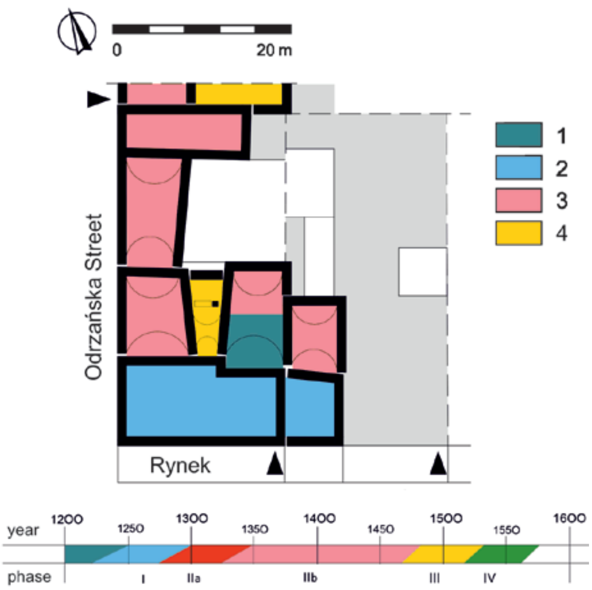


Fig. 71. Wrocław, 59, 60 Rynek. Order of development of the built-up area. 1 – Cellar built under the timber-framed house; 2 – townhouses from the 13th century; 3 – townhouses from the 14th century; 4 – townhouses from the 15th century. Author M. Chorowska.

6. The first brick – Dating, dimensions, origin

The oldest brick find in the area of Wrocław comes from the first half of the 12th century and was called the plate brick, also called the Russian plinth, with the dimensions of 4–5 × 17 × 28 cm. It was made of clay with the addition of sand and organic components – straw or thick-cut grass, which provided large moisture absorption. It was sporadically found in buildings founded by the aristocrat Piotr Włast (Małachowicz 2005, 111–113). This Byzantine type of brick was soon replaced by a full dimension Gothic brick, called Lombardian, of the dimensions 6.5–8 × 12–13 × 26 cm. It appeared in Silesia during the building investment of Duke Bolesław I the Tall, namely in the Cistercian monastery in Lubiąż established in 1175 as well as in the 18-side donjon erected in the stronghold in Ostrów Tumski in Wrocław. The radiocarbon examinations date the mortar from the last building to the years 1166–1186 (with 68% probability) and 1117–1212 (with 95% probability). A brick crypt in the Trzebnica Abbey (1203–1214), the Church of St Giles (1211–1219), the crypt in the Church of St Jacob in Wrocław (1230s), a ducal castle in Legnica (1220s) and a bishop's palace in Ostrów Tumski in Wrocław are all of an earlier date/origin.

In the 13th century, along with the development of the town centre, brick appeared in the area of the left bank of the town where until the end of the century there were about 40 middle-class townhouses erected. The walls were built of handmade bricks laid in the *opus emplectum* technique or more rarely as a full wall. Almost until the end of the 13th century, the facing was bonded in the Vendic way (2 stretchers + 1 header). Bricks were bonded with lime mortar bearing characteristic yellow clumps of wrongly slaked calcium carbonate, the 'micrite aggregation'. In the visible parts of the walls, joints were formed with a putty knife as convex or triangular in section. By the 13th century, they had already started to be cut by forming decorative scratches in vertical layers. In the foundations of the building, the joints were flat and bricks with skewed decorative surface cuts were used (e.g. in the Bishop's manor house in Ostrów Tumski in Wrocław) imitating the face surface of a cut stone.

Bricks used at that time had diverse dimensions with a height from 6.3–9.5 cm, width from 11–13 cm and a length from 25.5–29 cm and had a characteristic 'wrinkled' surface. Since 2010, the Department of the History of Architecture, Technical University of Wrocław has been researching the correlation between the difference in brick dimensions and the time of its manufacturing and the provenance of a construction workshop and a brickmaker[1] (Chorowska, Caban 2015). A detailed analysis of the brick dimensions visible on the face of the *cellarium* walls situated in the west wing of the monastery in Lubiąż, as well as in the oldest 18-sided phase of the castle in Ostrów Tumski in Wrocław, confirmed the contribution of the founder, Duke Bolesław I the Tall and his ducal construction workshop. The convergence of the brick dimensions used for constructing the chapel at the castle of Henry the Bearded in Legnica and the walls of the first longitudinal palace at Wrocław Castle is an important premise, which makes us consider the latter as a construction investment of Henry the Bearded from the third or fourth decade of the 13th century. The similarity of the bricks in the defensive wall of the castle in Ostrów Tumski and the bricks used in the town wall in Grodzka Street and the 'bear keep' points to the same time and Duke Henry III the White as the founder of the structures/buildings.

In the second half of the 13th century in the monumental architecture of Wrocław, a change consisting of substituting the Vendic bond with a Gothic one (1 stretcher + 1 header) took place. The change of brick course produced a better bonding of the wall facing the interior, which was crucial when it came to high Gothic buildings. In the case of the Gothic bond (also called the Polish bond), every second brick was a header while in the case of the Vendic bond, it was every third. The new bond increased the use of well-fired bricks by one-third. It was employed in St Jacob's Church in Wrocław from 1270–1280, the Church of St Cross from 1288–1295, in the first town hall from 1299–1301 (Chorowska 2003, 265) and in St Martin's Chapel at the castle in Ostrów Tumski in Wrocław. A highly irregular bond, which can be called a transition one that was part Vendic and part Gothic, in large areas of wall facings consisted of only headers and had the stoops that were built in the houses in the market square due to an accelerated rise in the level of the market square area. The date of wooden post cutting that was part of the structure in front of the stoop of the house in front of a townhouse at 3 Rynek was dendrochronologically dated after 1250 (Bresch et al. 2001, Fig. 107, passim). The time when the first brick stoops started being used around the mid-13th century is also indicated by the form of a base plate of the stoop column built in the house at 24 Rynek, chiselled out with claws in the shape of small leaves.

The appearance of the Gothic bond in the architecture of Wrocław should be perceived similarly to the perception of Gothic – in a wide chronological span of the second half of the 13th century. More or less at the same time, the unification of brick dimensions used not only in monumental construction but also in the house-building sector took place. This probably resulted from the opening of a brickyard in the town and was intertwined with a construction boom in the last two decades of the 13th century. By the 1300s, the typical brick dimensions were already 9 × 12.5 × 27 cm.

Lime mortar with a large addition of sand was still used in the walls. Triangle joints, although more often flat with vertical or horizontal scratches, were formed. In the outer facing were burrs, usually laid irregularly, more rarely in a monk bond for decorative reasons (in the walls of the dwelling tower in Biestrzyków up to the height of the first floor). The Gothic bond was used until about the mid-16th century.

The change of the bond that took place in Wrocław in the last quarter of the 13th century created a unique opportunity to distinguish the brick development before the times of this caesura in the area of Wrocław and its vicinity. This mainly concerns townhouses which are not recorded in the written sources. The attempts to introduce more precise dating based on perceiving differences in brick dimensions, which at first were low and then high, are under experiment and despite promising beginnings, we have to wait for further analyses.

7. First town houses in Wrocław

In the area of the Old Town of Wrocław, 39 relics of townhouses built from bricks using the Vendic bond have been discovered to date. Most of them (35) were in the market square and the surrounding streets. Four buildings were erected on the northern outskirts of the city, in the vicinity of the monastery foundations and a ducal castle. These townhouses had highly diverse spatial layouts although almost all

1 The research is being carried out by the architect Mariusz Caban, MSc Eng within the framework of his PhD dissertation entitled 'Badania pomiarowe cegieł jako metoda pomocnicza przy datowaniu zabytków architektury' prepared under the supervision of prof. Jacek Kościuk. The dimension analysis of the bricks was also a part of the NCN research project entitled 'Początki zamków na Dolnym Śląsku w świetle badań nad chronologią warsztatu budowlanego (cegła, kamień, zaprawa)' under the supervision of the author of this article within the framework of which a rich comparative and source material in the form of brick measurements from the monumental buildings from the 12th and 13th centuries in Silesia as well as Altenburg, Altzelle and Jerichow was gathered.

of them were built in street frontages. Unlike timber houses, they did not need abutments and they could directly border on one or two plot boundaries. Most often, they bordered on one boundary as at the other one there was a drive-in entry to a yard. However, the plot fronts were quickly completely built over as the result of the division of plots into halves or three parts. This is why the number of building plots in the market square almost doubled in comparison with the period of the foundation of the institutional

Fig. 72. Wrocław, the vicinity of the market. Built-up development in the Middle Ages and the early modern period. After Chorowska, Lasota 2010, 161, Fig. 105.

town (Fig. 72). The process of a secondary partitive plot combination took place and was accomplished 'beyond' the boundaries of the original division. Those phenomena, so characteristic of the towns of the intensive economic life, brought about the diversity of the building layout.

On the plots about 11.5 to 14.4 m wide, one-room houses facing the market square with ridges were built. The houses were then extended with side wings far into the yards. The frontages of the 8.64 m wide plots were built-up with shallow or two-compartment gabled houses to which the next segments making a back part were quickly added. On the plots about 5.76 m wide, gabled houses were built.

The way the houses were extended consisting of building up one room segment with three of its own walls, and the fourth using the older segment standing in the street or the neighbouring house resembles the technology for the spatial development of high German houses called 'dominoes' (Fig. 73). In the 13th century, due to the previously mentioned technology, the compact segments of development came into being in the western and southern frontages of the market square. The area of the smallest, one-room tenement houses (59 Rynek) did not exceed 45 m^2. The largest broad-fronted houses, such as 7, 48/49, 52, 60 Rynek or deep narrow-fronted ones (5, 7 Kiełbaśnicza Street) covered an area of more than 200 m^2. They were one- or multi-room; however, the lack of masonry partitions discovered during the archaeological research did not exclude the existence of wooden partitions. Quite the opposite, the cases of large rooms to which few entrances led (7, 41, and 60 Rynek) confirmed that similar to the then castles and palaces, the partition walls were wooden while the outer ones were made of brick. We also noted a case of a secondary partition utilising a wall of a one-room bricked building into two parts (5 Kiełbaśnicza Street). Tripartite houses presented the most developed plans. These had one large room (a hall?) in the front part and two narrow ones in the back part (3 Rynek, 8 Nankiera Square). This pioneering solution was common in Wrocław in the 14th century. Only in two cases can we mention tower buildings – 33 Rynek and the corner of Wita Stwosza and St Wit streets. This is indicated by iconography as well as the foundation of houses on huge footings that considerably exceed the standard dimensions.

The first tenement houses had two to three storeys. The bottom ones were only illuminated by slit windows and were not heated. They were recessed into the ground at only 50–80 cm. Following medieval tradition, people lived on the upper floors while the ground floors, coupled with the rise of the level of the Rynek area, recessed into the ground more and more and were transformed into domestic storage cellars. Bearing in mind that the oldest tenement houses belonged to the financial elite of the town, such as the merchants and rich salesmen, coupled with the introduction of a ban on home retail sales in Wrocław, it can be said that these *cellaria lapidea* known from the document from 1272 (CDS 1875, No. 1392, 194–195) were used as depots for goods stored in cubicles separated by wooden partitions. Most of the ground floors were covered with storeys. Only at 8, 17 and 43 Rynek were the remains of rib vaults noticed. The vaults on the ground floor of the house at 17 Rynek, which were supported by two stone columns with massive cup capitals and plate bases with a claw[2] constituted an exception.

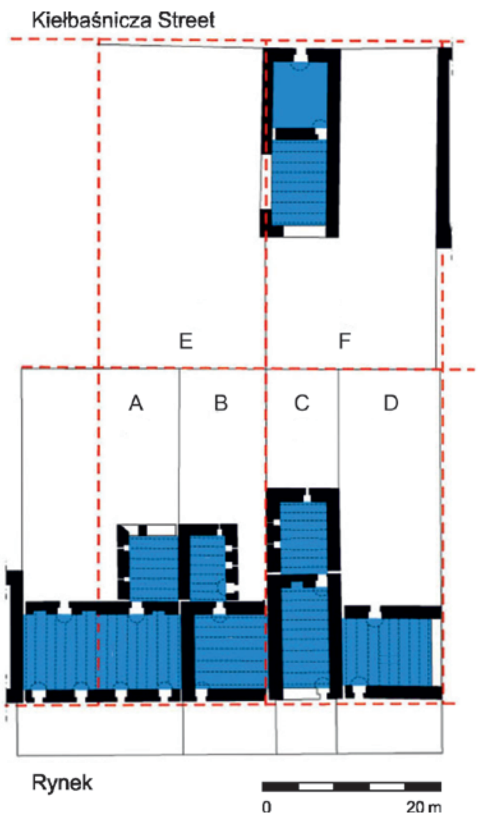


Fig. 73. Wrocław, 5–7 Rynek. Construction order of the 13th-century townhouses and their parts. Letters A–F indicate properties separated as a result of plot divisions. After Atlas 2001, Tab. 5b.

2 Based on their form, they can be dated to about the mid-12th century.

The higher storeys of townhouses were, without exception, covered with beam-framed floors. Daylight entered through slightly larger windows than those on the ground floors. Ogive clearances 1.2–1.5 m high in double-sided splayed jamb niches were closed over with wooden shutters. The houses were heated with fireplaces and heating stoves. The height of the third storey equalled 4.5 m, as observed in one of the parts of the present townhouse at 6 Rynek. This entitles us to recognise it as a middle-class *piano nobile*. The entrances to the floors were in the outer walls and accessible from the outside through wooden stairs, porches and landings. Their remains are mainly preserved in the rear walls of the buildings. The only known element of a housetop was a crenel merlon discovered in the wall of a townhouse in 48/49 Rynek. Therefore, there could have been more buildings topped not only with a roof (two or four gables) but also a parapet walk, which would be in line with the recommendation of the town council from 1290, according to which in the event of a Tatar raid '...*any house guest (host) had at their home a bow, cross-bow and stones on the top of their houses*' (Korn 1870, 49, Appendix 1).

The assumed time of the construction of the oldest townhouses in Wrocław is the second quarter of the 13th century. This opinion is based on the analysis of the forms of stone columns discovered in the townhouse at 17 Rynek as well as by a stratigraphic comparison of the layers accumulated in front of the west frontage of Rynek and Kurzy Targ Street. Those accumulations consisted of two to three sand beds from excavations of the cellars of townhouses in the market square, divided by layers of mulch or humus accumulated over time. The number of sand beds can be connected with the reality identified at the frontage parts of the plots at 6 and 12 Rynek where the first two phases of the development consisted of wooden homesteads and a third of brick tenement houses. The fourth phase was the construction of stoops in front of the house facades, which in the case discussed above (3 Rynek), the dating can be estimated to go beyond 1250 (Chorowska, Lasota 2010, 166–167).

The pace of the accumulation increase in front of the tenement house at 8 Rynek was proven by an earth profile with a relic of a wooden trough from 1240–1244, which was in the ninth (!) layer above the natural humus, above three beds of sand, silts, mould and accumulating waste. Until the end of the 13th century, the level of Rynek increased by over 1 m and until the mid-14th century to about 3 m. Stoops allowed to 'push aside' waste getting into the houses' interiors and made access to townhouses from the market square easier as the lower storeys were in the ground up to two-thirds of the height. There were annexes in the form of roofed landings stretching along the whole width of the facades of the townhouses and protruding into Rynek by about 4 m. The interiors of the second storey were entered from the landings situated on the level of the floors between the first and second storeys. In the room below were the entrances to the cellars. Every landing was a floor spread between the facade and a transparent front wall of stoops, consisting of vast arcades resting on stone columns or brick pillars. One column base (with a claw) was discovered in front of the townhouse at 24 Rynek. In front of the arcades were the ditches from which wooden or stone stairs led to an elevated market square. Undoubtedly, there were also some footbridges directly connecting the levels of the square and the landings. Stoop sides were limited by brick walls, the adjoining facades of townhouses. Only in the case of the two latest houses built in a two-stretcher bond (59, 60 Rynek) did stoops interconnect the townhouses. They were also registered in front of the buildings already erected in the first half of the 14th century in a one-stretcher bond. They were dismantled after one of the violent fires occurring around the mid-14th century that devastated the existing dwelling development and stalls. The stoop interiors were buried, and the ruins were covered with a thick 30 cm layer of sand. The frontages at Rynek were built at the same place but houses under the order of the council from 1363 were rebuilt unconditionally as stone or brick ones (Korn 1870, No. 238, 207; Chorowska, Lasota 2010, 166, 169–170).

8. First townhouses and houses in Brzeg Górny

The city of Brzeg on the River Oder remained an important place of trade in the 13th and 14th centuries, and it was here that long-distance routes from Greater Poland to Moravia (north-south) and the more important east-west part of the transcontinental *Via Regia* crossed. Prior to Brzeg being granted town rights, the local ducal court mentioned as early as in 1235 served as a way station between Wrocław and Kraków; later it was the site of a brick castle. The importance of the court and the castle increased or decreased depending on the frequency of the duke's travels, and these increased twice. The first time

Fig. 74. Brzeg, 6 Jabłkowa Street. Corner townhouse from the 13th century (Vendic way house). A – After conservation works; B – at the time of conservation works. Photo by M. Chorowska.

was in the 1230s, when the powerful Duke of Silesia, Henry the Bearded (1201–1238), also claimed the title of Prince of Kraków. The second time this occurred was in the 1280s, when Silesian Duke Henry IV Probus (1270–1290) was a candidate for the Polish throne.

If the presence of the Vendic bond is taken as a chronological characteristic of the buildings from the 13th century, then the group of the oldest Silesian tenement houses must be enlarged by a few structures discovered in Brzeg (Chorowska et al. 2015). The closest to them was a brick tenement house in the quoin of 6 Jabłkowa and Długa streets, preserved to the full height of its brick walls (without a possible wooden floor and roof). Its plan corresponded to the townhouses belonging to the group of one-room houses that were half the width (8.64 m) of the plot location (Fig. 74, 75a). In the veduta of Brzeg from 1535/1536, it was depicted as a tower significantly rising above the walls of the old-town townhouses. However, architectonic research showed that in the 13th century it had three bricked storeys. This was a standard in Wrocław and was not significantly increased until the end of the Middle Ages. Therefore, the solidity of its tower must have been due to the wooden and clay floors that have not been preserved. The walls of the ground floor were 1.5–2.0 m wide, which made the construction of a few storeys possible. A townhouse, situated opposite at 5 Jabłkowa Street had an analogous one-room plan of a slightly elongated rectangle with dimensions of 8–9 m × 11 m. It was examined only on the level of the present cellar, i.e. the old ground floor (Fig. 75b). The walls of that storey were built from handmade bricks and faced with the Vendic bond or an irregular one with a visible predominance of stretchers. Bricks with dimensions of 8.2–9.0 × 12.5 × 26 cm joined with lime mortar were used. The ground floor was covered with a beam-framed ceiling. The original 1.5 m entrance led directly from the yard. We came across a similar case in Rynek regarding tenement House No. 7, its neighbours (6 and 8 Rynek) and, although it is not certain, the townhouse at 2 Rynek. In the 13th century, it is highly probable that all those buildings were fully-dimensional, two-storey townhouses as they rose from the very thick walls of the ground floors and were erected in the centre inhabited by a patrician.

The buildings erected in a mixed brick and timber structure (4 and 6 Staromiejska and 6 Długa streets) underwent a different development, which also started in the 13th century. The first two buildings were originally wooden but were partitioned by a brick wall up to the height of the first storey. This wall, in the Vendic bond, was built as a boundary between the properties. It was the only bricked wall within the area of the oldest buildings and no toothings were left, which confirms there was no intention to continue the construction. Perhaps it was necessary to meet the requirements of constructing a fireproof wall. The extension of bricked walls to a full outline of buildings probably took place in the first half of the 14th century and was made of brick,

Fig. 75. Brzeg, 5, 6 Jabłkowa Street. Plans of cellars with chronological wall stratification. Preserved walls built in a Vendic way are highlighted in black. After Chorowska et al. 2015, 134, Fig. 3; modified.

already used in a Gothic bond. On the property at 6 Staromiejska and the corner of Długa streets, a one-room house was built on a slightly bigger plan than was typical: 10 × 11.5 m akin to a square (Fig. 76).

Meanwhile, the research of the row of houses at 8–14 Dzierżonia Street showed that the four oldest bricked houses in that street did not rise above the ground floors of the present townhouses and any of the floors could have had a spandrel-beam structure. The walls were partially built from field stones and partially from brick in a one-header bond. In the next phase, one-room gabled houses were extended with rear wings. Narrow yards were left nearby to illuminate the houses and make walking or riding/driving into the yard possible. Those houses had a basement floor and were vaulted on the lowest storey. Added annexes had three walls with the fourth belonging to the former one. They were added in the back or on the side until the entire width of the property was filled. As already mentioned, these are called 'dominoes' in the secondary literature (Piekalski 2004b, 40–76). Storied, fully bricked townhouses with Gothic-decorated facades were the next generation of development in the Old Town in the 14th–15th centuries.

To summarise, it can be said that already in the 13th century and also in Brzeg, bricked storey houses as well as houses erected in a mixed, brick-timber structure, could have been built. These houses shared some common features, such as a simple one-room spatial layout, and were originally without bricked partitions or beam-framed ceilings between the storeys.

9. The beginnings of stone and town houses in Świdnica

Świdnica was one of the largest and richest towns in medieval Silesia. Describing them in 1512, geographer Bartłomiej Stenus drew attention to the impressive fortifications, brewing and the widespread presence of brick houses in the city. At that time, Świdnica was the second largest economic centre in Silesia, exporting beer far beyond the local market. Due to the universality of the brewing privilege, all medieval tenement houses within its walls (totalling ca 250) were also beer taverns.

The broken stone walls in the upland area of Silesia were used throughout the Middle Ages and later,

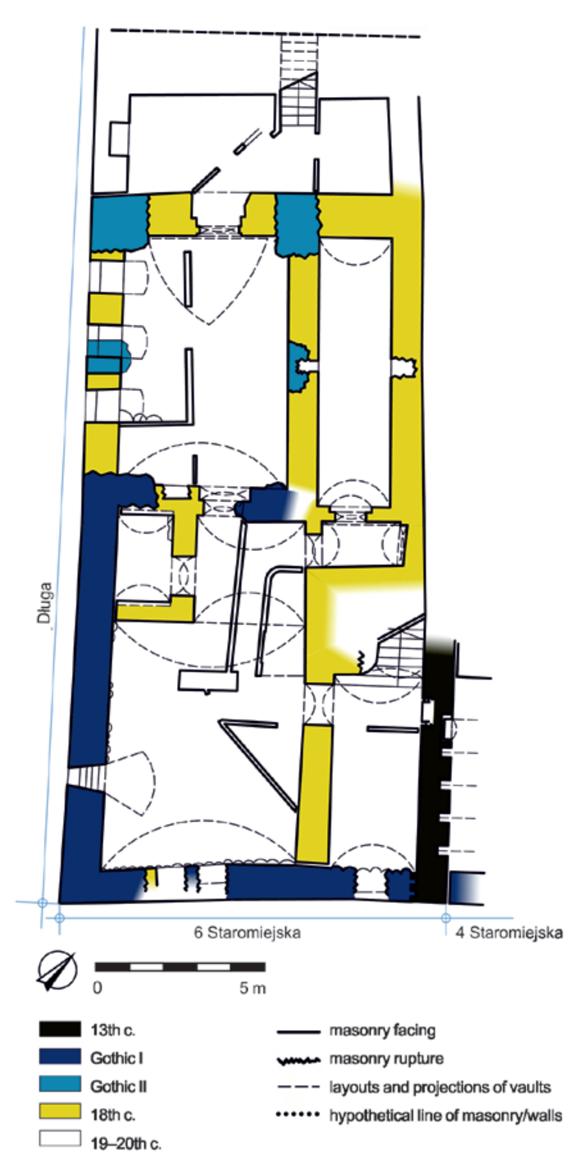


Fig. 76. Brzeg, 4–6 Staromiejska Street. The plan of a cellar with chronological wall stratification. A single Vendic bond wall is highlighted in black (13th century), while outer walls of neighbouring townhouses are highlighted in marine blue (beginning of the 14th century?). After Chorowska et al. 2015, 134, Fig. 4.

which makes it difficult to determine the time that development began. In the townhouses in Świdnica, the macroscopic analysis of the mortar was an essential tool for dating walls made of broken stone. It enabled us to differentiate between the walls from before the mid-14th century from those in the 15th and 16th centuries. One of the ingredients of the older mortar was an additive of clay or loamy sand, which gave it plasticity and brownish colour and, in the case of exposure to fire, changed its tincture into the characteristic pinkish one. Later mortars tended to be lime, light beige and hard. Ultimately, the issue concerning the time that earlier and later mortars were used was resolved by the dendrochronological analysis of timber extracted from both walls. In the first case, dates from the 13th and the beginning of the 14th century were obtained (1276, 1303), while in the second case, dates from the turn of the 14th and 15th centuries (1396, 1397, 1398, 1403 and 1406) were obtained. The date of building the synagogue in the west of the market square determined the *terminus ante quem* of using mortar with the addition of clay. This was confirmed by this source as 1379–1380 (Chorowska, Lasota 2013, 10–13).

Stone houses began to sporadically appear in Świdnica after the mid-13th century and became quite common after the mid-14th century. Initially, they were constructed deep in the plots behind the timber front houses and behind small courtyards where something resembling an autonomic, second line of development was constructed. Subsequently, and much more seldom, those houses were built at the fronts of the plots and usually lacked cellars. In the upper-ground part, they consisted of one or two stone storeys built on as timber-framed structures. Therefore, they did not resemble towers, which was suggested by the ground floors similar to a square. One such line was discovered at 30–36 Rynek that was built at the back of a built-up area with a predominance of wood and clay, standing in a comb layout, which ensured the possibility to enter the yards. The back line consisted of four one-room buildings without cellars (Fig. 77 a, b). A second line consisting of three rear buildings was discovered at 9–11 Westerplatte Street (Fig. 78).

The process of the built-up timber development on plots and the stages of the exchange into stone and brick was analogous to the process of the phenomena taking place in the upper German cities that were part of a stone construction zone. This was marked by the rather slow pace of exchanging a dwelling substance into a massive one, which was caused by the reluctance to live in stone buildings due to the cold and dampness. It was the great fire in the town in 1361 that prompted Duke of Świdnica and Jawor, Bolko II the Small, and the council to pass a regulation that buildings should be built not solely from timber and clay, but should have stone fireproof walls reaching the height of at least the first floor. The process of building stone or brick houses was also accelerated by the town council through the use of incentives and constraints. The most effective of these was introduced in the 'Statute on innkeepers'

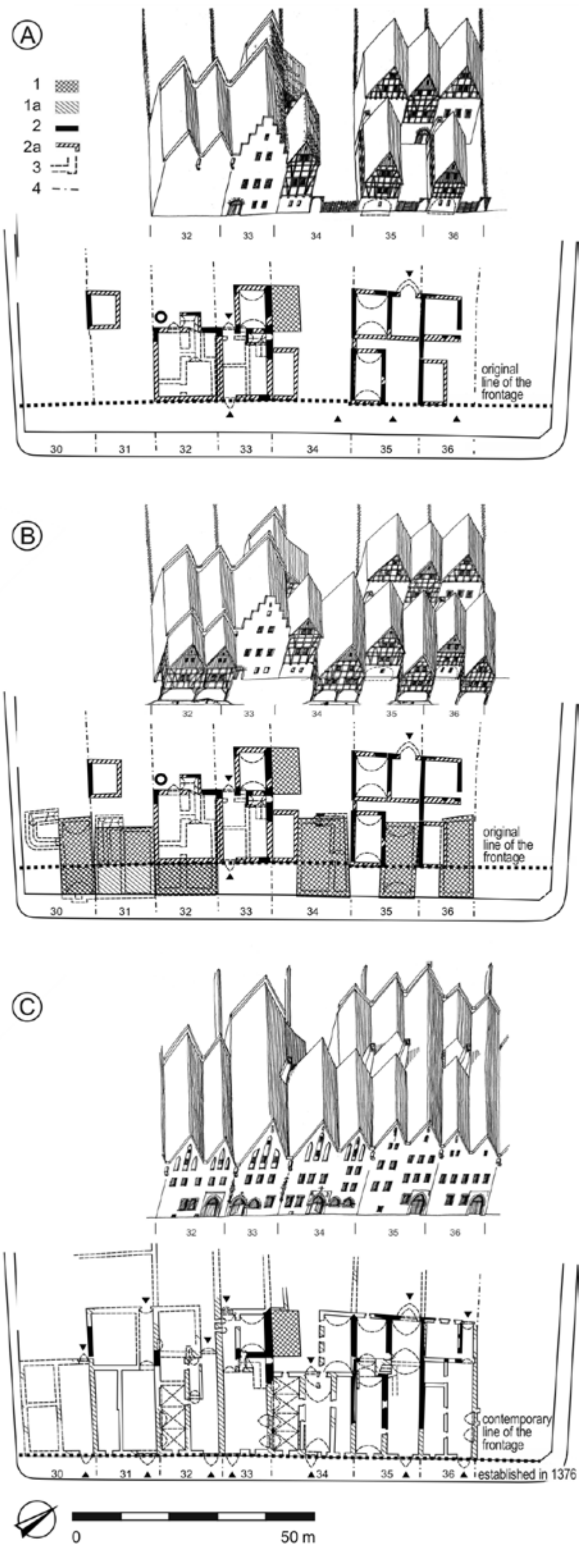


Fig. 77. Świdnica, 30–36 Rynek. 'Double houses' from around the mid-13th century to the mid-14th century. In phases A and B on the fronts, timber-framed houses with stone cellars were in the majority, while in the second line were brick and brick-wooden houses without cellars. The switch to solely brick substances and the development of the interior yards took place in phase C during the 1460s–1480s. 1 – Reach of a timber-framed house; 1a – reach of wooden arcades; 2 – remnants of masonry walls remaining on the basement level; 2a – walls reconstructed on the basement level; 3 – cellar walls footprint; 4 – property boundaries. After Chorowska, Lasota 2013, 75–80, Fig. 28, 29, 31.

houses' according to which the construction of each stone or brick storey of a house was to be awarded the possibility to increase the yearly limit of beer production by one batch.[3] After the statute's declaration in 1379, the process of building townhouses dramatically increased. The dense stone and brick development filled the frontages in the market square as well as six streets leading to the town gates. Stone buildings also appeared in the substandard streets. However, they were much smaller than those situated in the town centre (Chorowska, Lasota 2013, 90).

The confrontation of data from tax sources with the results of the architectural research, especially those most recognised in the western and northern frontages of the market square, sheds light on how the regulations introduced in 1379 are interpreted in the best possible way for those who are interested. Despite different objections concerning *totally stone inn*, many of the rebuilt houses were still in a mixed stone-timber system. However, the following solutions were applied: A – on the front of the plot was a timber-framed house above the stone cellar, then behind it, there was a yard, followed by a rear stone house without a cellar (4, 7, 8, 31 Rynek, 13 Pułaskiego Street, 1 Trybunalska Street); B – on the front of the plot was one stone line with the second timber-framed line with cellars. Behind this was a yard, then one or two stone lines without cellars (35, 36 Rynek); C – on the front of the plot was a shallow timber-framed house (5–6 m) with an arcade above a stone cellar and behind it was a long stone rear house (1 Rynek); D – a stone, two-room or two-winged house on the whole plot (32, 33 Rynek). It resulted that the stone ground floors in some of the buildings had upper storeys made of timber (front and rear houses within the area of 35, 36 Rynek). Comparing the number of additional brews obtained by the owners of particular properties to the relics of stone development discovered during the research, it is apparent that they corresponded to the number of stone storeys on all rows, wings and separate dwelling houses from the property area and quite often projected into the yard by 20–30 m. The width of the internal yards, in the discussed layouts, was 2.5–4 m, which presumably housed kitchens.

3 The statute informed '*how to build houses and serve beer out of them…*' If the house that was an inn was stone, then '*…it should for every new built floor get 1 brew but not more than 3. No brews should be given to any timber inns until they are fully stone, as it is described above…*' This privilege only referred to newly built main houses, but not to stone malt houses, cellars, stables or other buildings (Bunke 1935, 15).

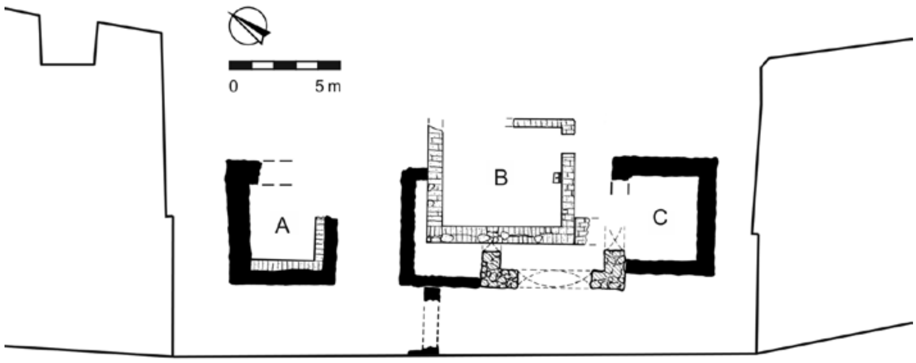


Fig. 78. Świdnica, 9–11 Westerplatte Street. Foundation walls of the oldest stone houses discovered on the property. After Chorowska, Lasota 2013, 81, Fig. 32.

Full stone townhouses erected in the last two decades of the 14th century were the last stage. The largest had two rows, two floors, two gables and were about 30 m long (Fig. 77c). Townhouses built on half plots had one row consisting of a huge hallway, passage and 'small cellars' in the back used as beer taverns. In two row houses, there was one, usually vaulted, room at the front. However, in the rear part, there was a comfortable and wide driveway. On the floors were upper hallways, rooms and chambers for living in as well as one large chamber at the back, which served for dining. The kitchen was placed in the centre, next to the dining room where there used to be the inner courtyard. After raising the kitchen to a mezzanine or the first floor, it was still covered by a chimney flue.

10. Conclusions

A model of a townhouse with both timber and stone construction was brought to Silesia and other East Central European countries from the West but has little in common with the former stronghold or rural development. The discontinuity that occurred can be clearly seen when comparing the remains of traditional homesteads discovered in the stronghold area and the left-bank settlement in Wrocław with the frame construction houses of the foreigners. This discontinuity refers to many issues, starting from choosing a function and ending with a form. Regarding localisation, we can observe backtracking from the tradition of settling isles and alluvial river valleys in favour of elevated terraces. As far as the proper shapes are concerned, the backtracking was from irregular homesteads in favour of standard, modular plots. As for the material, the timber absorptive log construction made of full logs was replaced by a framed one filled with clay. Moreover, the tendency to enlarge the house space by raising two or three-storey layouts is observed.

An interesting transitional phenomenon that took place at the confluence of log and timber-framed construction was the 'Upper Lusatian' construction, developed as a result of the settlement processes taking place in high-altitude mountain areas, e.g. in the Karkonosze (The Giant Mountains). This consisted of combining in one dwelling house a log construction on the ground floor and a timber-framed construction on other floors. The behaviour of log walls in buildings in high-altitude mountain valleys indicates a key advantage of full timber log architecture. This was perfect concerning thermal insulation. In the case of Wrocław and other large cities that were much warmer than the Karkonosze area, that advantage lost its prominence in favour of timber saving and the possibility to double or even triple the house area.

Equally deep discontinuity is observed at the time of the transition from timber-framed construction to stone or brick houses, especially brick townhouses. However, to fully consider this, some essential regional differences between brick houses in the Silesian Lowlands and stone houses at the foothills of the Sudetes should be noted. These differences refer to the acceptance of stone and brick building materials, the beginning of townhouses and the provenance of the accepted solutions. In Wrocław, in the central part inhabited by patricians, brick townhouses appeared in the second quarter of the 13th century and were immediately in a mature form. From the very beginning, they can be observed as three-storey buildings, erected at the property frontages, and able to form a well-knit street frontage. It is sufficient to state that the middle segment of the western frontage of Rynek was built tightly based on 'dominoes' around the mid-13th century. Meanwhile, the ability to build frontages, peculiar to a mature town development, was not so obvious in the case of timber houses or houses of mixed construction,

Fig. 79. Brzeg, elevations of tenement houses. A – 8–12 Dzierżonia Street, back elevation; B – 12 Dzierżonia Street, fragment of the facade on the first floor; C – 2 Rynek, facade on the first floor. Photo by M. Chorowska.

stone-timber, e.g. timber-framed houses on stone cellars. The latter dominated the landscape of Świdnica until the mid-14th century, while street frontages built with townhouses were erected about 100 years later as compared to the market square in Wrocław.

Paradoxically, the abundance of granite deposits did not go hand-in-hand with the development of stone or brick dwelling architecture. Average annual temperatures in Silesia hardly reach 9˚C and the conductance of stone wall warmth is twice as high as that of brick walls and ten times higher than that observed in timber walls. In our climate, outer frost-proof stone walls should be 80–120 cm thick. In the case of brick walls, the sufficient thickness is 40–60 cm but in the case of a wooden partition corresponding to them, is just 8–12 cm. Therefore, it should not be surprising that wood recompensed the basic disadvantage of stone construction material, which makes for poor thermal insulation. The long-lasting popularity of wooden dwelling architecture resulted from the will to provide greater comfort than in stone buildings, which were usually cold and damp. Economic considerations were not that important. The middle class in Świdnica, living on beer exports that were famous throughout Europe, were not inferior to the middle class of Wrocław when it came to wealth.

Therefore, in Świdnica, timber-framed houses in street frontages dominated until the mid-14th century. The first stone houses were built deep down the properties, behind wooden houses built on the front and small courtyards where something resembling an autonomous, second line of development came into being. Those houses were rarely built without cellars. They were built on the frontages of the properties and their function is still not clear. In the 14th-century written sources, they appear as 'rooms', small rooms (*stobe*, *stobechin*) or chambers (*kamnatin*), which suggests their dwelling function and occasionally as a representative one as opposed to the front timber-framed houses simply called *hus* (house) (Goliński 2003, 5–6, 86–92; Chorowska, Lasota 2013, 203–204). The latter were warm and comfortable as their wood-and-clay walls provided good thermal insulation. Living in a stone house was not very comfortable. On the other hand, the massiveness of the walls had advantages such as fire resistance and the enhanced prestige of the owner whose building from stone imitated the material used in ducal premises. A stone room was a rather representative white room, which was used only occasionally. Moreover, the oldest rear 'rooms' are found in exactly the same places as in the following periods, dining rooms were placed in complete stone/brick townhouses.

It is no coincidence that the process of the transition from wooden architecture to stone/brick in Świdnica was analogous to the course of the phenomena occurring in the upper German cities that belonged to the stone architecture zone, such as Freiburg im Breisgau and Goslar and even in Swiss Zurich (Piekalski 2004b, 40–76). This is also illustrated by the development in the western frontage at 2–14 Schneidergasse in Basel. In the 11th century, there were four timber houses there that were separated from each other by a drive-in entry to the property. The first stone/brick houses were built behind them and behind small courtyards at the turn of the 11th and the 12th century and created the second line of development. Just as in Świdnica, four hearths were discovered in the inner courtyards.

If the processes taking place in Świdnica are stretched to the architecture of medium-sized cities in the Sudetes Foothills as proven by many of the facts, it should then be assumed that two models of stone/brick development appeared in the Silesian towns – the piedmont and lowland models. The stone houses of the Sudetes Foothills come within the broadly understood model of the upper German house and differed from the brick houses of the Silesian Lowlands. In the case of Wrocław and Brzeg, it should be noted that the first brick townhouses had the most in common with the local feudal-court architecture, i.e. brick ducal and bishop palaces in Wrocław, Legnica and Jelcz. Comparing the area of many of the townhouses[4] and the bishop's palace in Ostrów Tumski in Wrocław of an area of about 325 m^2 or the palace in Jelcz, we arrive at the difference of only 1.5 times. The patriciate of towns building the first stone/brick houses made use of experiences from workshops constructing monumental buildings. In both cases, we can find brick walls with the wall facing a built-in double stretcher bond. Besides workshops, the unity of the 13th-century palaces and townhouses, there was also the similarity in shaping them in the brick form, a cuboid shell, and divided inside into storeys by a timber beam framed floor and then wooden walls into smaller rooms. Further similarities can be noticed in the vertical disposition of palaces and townhouses, which had *piano nobile* on the highest storey, the solution of vertical axis, and the adoption of the same heating methods. However, excluding the kitchen from the house interior and leaving it until the end of the Middle Ages in the zone of yards and annexes, settles the problem of the court, not the peasant, origin of the Wrocław townhouses. It is interesting to note that developed, fully Gothic townhouses in the Lowlands resembled solutions that were known from the lowland brick Hanseatic towns when it comes to the design and colour of the facades (Fig. 79). This is another argument in favour of the crucial impact that the materials and construction technology had on the shape of a townhouse.

4 For example, the area of townhouses was: 52 Rynek – 201 m^2, 7 Rynek – before extension – 216 m^2 but after the addition of a rear wing – 300 m^2, 24 Rynek – 231 m^2; Wita Stwosza – 234 m^2.

Chapter 6

Wood-and-clay architecture of medieval Brno

Antonín Zůbek – Václav Kolařík – Marek Peška –
Lenka Sedláčková – Pavel Staněk

1. Introduction

Brno's location at the confluence of the Svitava and Svratka rivers on the northern edge of Lower Morava Valley, the south end of which opens into the lowlands of the Marchfeld (Lower Austria) and then onwards to the middle stretches of the River Danube, played a major role in the formation of the city's cultural and economic contacts. From prehistoric times to the early modern period, this was a territory connecting the more developed south with areas north of the Sudetenland and the Carpathian Mountains (Silesia and Poland). The majority of impulses affecting the relatively peaceful history of Brno came from the south. Beginning in

Fig. 80. Reconstruction plan of Brno and immediate surrounding area in the mid-14th century. Dark grey – Brno suburbs and suburban settlements. 1, 2 – Order of Malta commandery with Church of St John; 3 – Dominican nunnery with Church of St Anne; 4 – All Saints Church; 5 – Church of St Procopius; 6 – Cistercian nunnery with Church of the Assumption of the Virgin Mary and Chapel of the Virgin Mary with hospital in Staré Brno; 7 – Church of St Martin (?); 8 – Holy Spirit Hospital; 9 – Premonstratensian abbey with Church of the Assumption of the Virgin Mary in Zábrdovice; 10 – Chapel of St Cunigunde of Luxembourg; 11 – ford across the River Svratka with stone Long Bridge. Drawing by M. Peška.

the 11th century, the town of Brno as the seat of one of the Moravian branches of the princely Přemyslid ruling family held an important position among the three leading early medieval Moravian settlement agglomerations. At the beginning of the 13th century, it strengthened its position in the process of its transformation into a medieval town, when Brno became one of the seats of the Přemyslid margraves and in 1243 was granted town rights by Bohemian King Wenceslas I. The layout of the town within the walls covered an area of 36 ha, making Brno the fourth largest medieval town in the Czech lands. The adjacent suburbs occupied at least the same area (Fig. 80). By the middle of the 13th century, the town was already surrounded by stone walls. Prior to that time, Friars Minor friary, Dominican priory and the Dominican nunnery were founded in the historical centre, which is proof of Brno's high population within the Kingdom of Bohemia. Based on the estimates of certain historians, Brno in the mid-14th century had a population of 7,000–8,000 residents in 535 houses (Mendl ed. 1935, 59). In the past, many Czech historians pointed out the close historical connection of the town with the Austrian lands, with some in particular emphasising the colonisation current starting in the Danube region, which began to establish itself especially in the Viennese area at the end of the 12th century; the branch running towards south Moravia very likely grew from this current. This close connection with southern and western neighbours also had a more permanent character in the 14th century, as is documented by the numerous contacts of Brno burghers with the inhabitants of neighbouring Austrian lands, Bavaria, Swabia and the Lower Rhineland (cf. Jan ed. 2013, 19–118). The apparent preference for these locations was by no means random, as a great deal of evidence of the cultural contacts are addressed especially by art historians, who find them in sacred architecture with the help of style analyses of individual buildings. This study only marginally addresses urbanism and fortification architecture. Over the last two decades, thanks to new archaeological excavations and building surveys, common Danubian cultural elements have also gradually been sought in burgher architecture (Peška, Merta 2009).

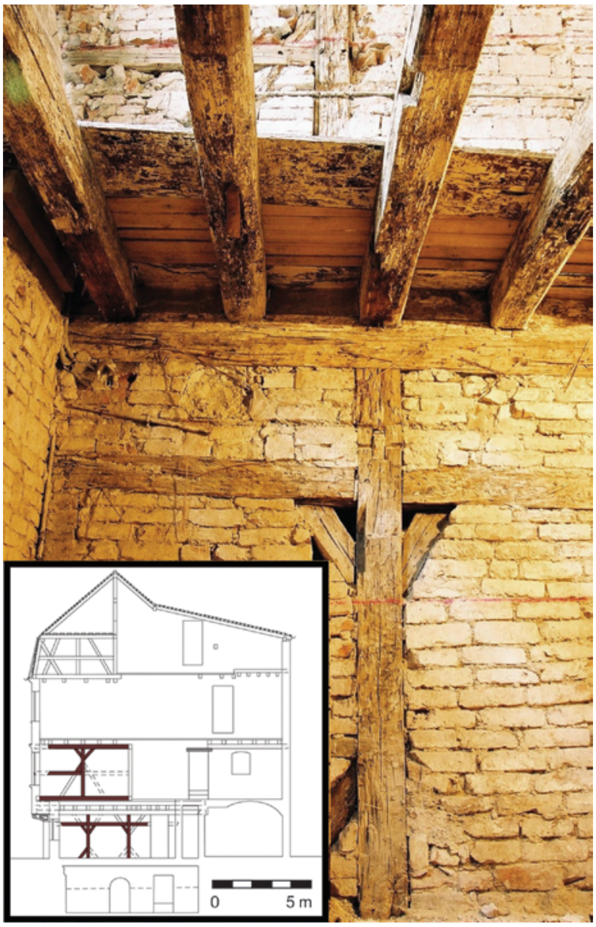


Fig. 81. Brno. A view towards south outer wall of house at 8 Mečová Street with preserved half-timbered structure on the ground floor and upper floor from 1450. Cross-section of a house in lower left corner of photo. Photo by M. Peška, Archaia Brno, Inv. No. 105-01-32.

2. Current state of knowledge and alternative sources for the study of Brno's wood-and-clay architecture

No high medieval timber frame building has survived in the historical core of Brno to this day (for that matter, wooden structures do not have a modern tradition in the town and its immediate surroundings). With only a few exceptions, all buildings standing in south Moravia today are masonry, although often of unfired bricks. The lone tangible evidence of older wood-and-clay techniques in Brno in this respect are the remains of a half-timbered structure from the period after 1450 discovered during the reconstruction of the house at 8 Mečová Street (Merta et al. 2004, 177–179; Fig. 81). As such, the study of wood-and-clay burgher architecture requires the use of alternative sources, in the traditional scheme iconographic and written sources, archaeological records and topographic context.

In the case of Brno, early iconography is of little benefit. Realistic depictions of the town are not available until the middle of the 17th century in the painting *The 1645 Swedish Siege of Brno*, depicting,

Fig. 82. Brno. Insets from veduta of H. B. Beyer and H. J. Zeiser from 1645. Half-timbered houses are schematically illustrated on the small inset. © BCM.

for example, the layout of the houses, their schematic appearance, the roofing on most of the houses from organic materials, but also the half-timbered upper floors in today's Minoritská Street (BCM; Fig. 82). The situation is even worse with written sources. Mention of a wooden house – *domus lignea* – comes only from an mid-14th-century memorial book (cf. Vičar 1971).

And while this leaves archaeology as the most important and essentially lone source for learning about the wood-and-clay burgher architecture of high medieval Brno, even its possibilities are limited. A large part of the archaeological sites fell victim in the past to the repeated rebuilding of houses and especially to the 'tempestuous' redevelopment of the historical centre and subsequent construction in the 19th and 20th centuries. Eighty percent of burgher houses were demolished. The conclusion of this text briefly summarises existing archaeological knowledge of wood-and-clay burgher architecture in the historical centre of high medieval Brno. Future work will involve incorporating the results obtained from archaeological excavations in the historical suburbs, where the opportunity exists to capture wood-and-clay buildings in a greater scope, variety and state of preservation (Zůbek 2016; 2018a; 2019a).

3. Pit houses or cellars? A discussion of the form of the earliest houses in Brno

From the beginning, wood-and-clay architecture in Brno was perceived exclusively from an archaeological perspective, as the first finds of the remains of recessed buildings came only with the first archaeological excavations in the 1980s in the historical centre of Brno. These structures were considered by earlier Czech scholars to be temporary dwellings – pit houses – with a fireplace or oven, which are well known in our milieu from the Early Middle Ages (cf. Goš 1984; Michna 1988; Vařeka 2002). Initially, only brief passages were devoted to these early structures in studies evaluating archaeological activities in the historical centre of Brno (Procházka 1988; 1992; 1993), and it was not until 1995 that the article 'On the History of Urban Construction in the 13th Century' was published, with the authors interpreting the first burgher houses in the existing tradition primarily as 'pit houses' (Loskotová, Procházka 1995). The same conclusions were also reached in additional professional works in the following years (Procházka 1996; 2000). The amount of information about these buildings began to increase especially after the establishment of the Brno branch of Archaia (a non-profit organisation) in 1997 as a reflection of

Fig. 83. Current parcellation plan of Brno with reconstruction of course of town walls. Light green – archaeologically excavated area; dark green – finds of basements of wood-and-clay houses. Drawing by M. Peška.

Fig. 84. Brno. Reconstruction of parcellation plan of inner town from the mid-14th century. Green – captured remnants of basements of wood-and-clay houses. A – Church of St Peter; B – Church of St James; C – Church of St Nicholas; D – Royal chapel consecrated to Virgin Mary; E – Dominican priory with Church of St Michael; F – Friars Minor friary with Church of St John the Baptist and St John the Evangelist; G – Herburga convent of Dominican nuns with Church of the Virgin Mary; H – Jewish synagogue. Dark green – finds of basements of wood-and-clay houses. Drawing by M. Peška.

the consistently applied concept of systematic rescue archaeological research (Holub et al. 2004; Peška ed., in print). The issue of wood-and-clay buildings in medieval Brno was also identified at the beginning of the millennium as one of the basic areas of research interest of the newly founded Archaia Brno institute. A major breakthrough came in 2003 with the publication of a short scholarly article that fundamentally rejected the identification of the majority of these buildings in Brno as pit houses and, mainly on the basis of the absence of heating devices, reinterpreted them, consistent with the Western European milieu, as the basements of above-ground wood-and-clay houses (Holub et al. 2003). In addition to its importance for Brno itself, this change in interpretation also contributed in general to an intensive professional discussion on the medieval wood-and-clay house in the Czech lands, culminating in a professional conference and the thematic proceeding entitled *Forum urbes medii aevi II* (Merta, Peška eds. 2005). This publication included an extensive study summarising the state of research on wood-and-clay buildings in Brno at that time (Holub et al. 2005a; 2007; 2013).

4. Source base

As one of the most archaeologically explored Central European cities, Brno has a remarkable source base, which is the result of four decades of intensive rescue activity in the historical centre (Fig. 83). The number of archaeological contexts connected to wood-and-clay development is close to 140 (Fig. 84).

Identifying wood-and-clay structures in Brno is complicated and even frequently prevented by the vast disruption of the medieval terrain. Archaeology has been able to document mainly relics of cellar spaces and, in significantly smaller numbers, their above-ground parts. Surface layers are missing in many places. A privileged position in this respect is held by the northwestern and southeastern part of the urban centre, where the terrain gradually increased by up to 2 m in the course of the Middle Ages and the topography has been preserved to this day over relatively large areas. In the southeastern parts, this concerns sites in Františkánská and Josefská streets. However, much of the archaeological work here took place in the early period of systematic excavations in Brno and did not yield sufficient information on the above-ground parts of the buildings (Procházka 2000, 52–60; Procházka, Zůbek 2012). New excavations in the area around Besední and Veselá streets could produce interesting information in the future. Other smaller sites in the centre of the city include Biskupská Street, where certain information on the above-ground parts of buildings was obtained on the plot of House No. 7 (Borský et al. 2016, 215–218).

Several basic sets of issues are being addressed in detail in processed excavations, which could help clarify and reconstruct the appearance of the earliest wood-and-clay development in Brno. All of these are based on existing knowledge and finds. First and foremost, these are topics relating to typology, technology, chronology, the composition of wood species used and the sources of the earth. Typological issues are a broad topic that includes single or multi-compartment houses and the classification of wood-and-clay basements based on their dimensions, construction techniques and entrance location. In this context, it should be noted that the 12th-century wood-and-clay dwellings that preceded burgher houses are essentially uncharted territory.

5. Above-ground parts of wood-and-clay structures

Knowledge of the above-ground parts of buildings is still minimal and in most cases all that is preserved is solitary post and stake holes or the trenches in which they were embedded. A small number of relics of floors are available, mainly involving earth layers with observable 'walking' layers and small heating devices of a wide range of constructions. The complete floor plans and precise structural solutions of buildings are mostly unknown. The apparently largest group of these buildings was captured in the as yet unprocessed extensive excavation in Veselá Street (Fig. 85).

Fig. 85. Brno, Veselá Street. Stove (s. u. 2971, 3937) of one of the above-ground wood-and-clay houses from the 13th century. Photo by Archaia Brno, Inv. No. 27123-2015.

6. Subsurface parts of wood-and-clay structures

The recessed parts of buildings that served as cellars can be divided into two basic categories according to the technological process of their construction. The first is composed of features created by means of 'classic' digging, the vast majority of which are interpreted as the basements of wood-and-clay houses. Another specific group of features here is described as dug cellars – small pits (up to 6 m^2) of a regular (square or rectangular) plan and a considerable depth (2.5 m in documented cases). The walls are straight and vertical with a sharp transition to the flat floor. Traces of their wooden constructions have not yet been recorded. They were apparently accessed by ladder or notched log. The cellars were used to store products that required the most stable temperatures. Only three such contexts have been identified thus far in the historical core of Brno. Two were dated to the first half of the 13th century and these cellars represented the oldest remains of buildings on the respective town plot (Holub et al. 2005a, 46–47; Zůbek 2018b, 87–91).

The second category includes bored structures (i.e. dug without removing the ground above). During archaeological excavations, mostly only their former existence was recorded without the possibility of verifying the relevant parameters, or only separate segments were documented. In more favourable conditions, some excavations have shown that the bored spaces were an addition to or part of the dug basements, from whose interiors they were accessible. On the other hand, no clear case of a bored structure functioning as an independent cellar has been recorded in the area of the historical town centre, and it is therefore assumed that they mostly represented an appendage to 'classic' cellars. However, this may be a view distorted by the state of research, which mainly reflects significant disturbance of archaeological contexts. Bored structures in the function of independent cellars are positively documented from the environment of certain historical suburbs of Brno and especially nearby suburban settlements (Zůbek 2016; 2018a). In the case of specific locations with the presence of a steep slope (Kopečná Street below the Petrov hill), it is even possible to consider the possibility of completely separate structures unaccompanied by an above-ground structure.

The term 'basement' of a wood-and-clay house is used for an underground level of the building, though it is only applied to structures that have been significantly recessed into the ground (1.2 to 3 m) and functionally correspond to a cellar. Access to these basements also required the construction of a staircase or entrance ramp. Basements do not include recessed ground floors accessible from at least one side directly from the surface, which applies especially to buildings built on sloping terrain. In some cases, the interior of the basement more or less coincides with its excavated pit, though typically the timbering was used to direct the shape and plan. Basements have a regular, most often rectangular or square plan, but entire preserved structures are rarely found. Their size is relatively variable, ranging from 7 to 120 m^2, and as such they can be categorised by size. The smallest basements with an area of only 7 m^2 include several from Veselá and Panenská streets. In contrast, the largest structure is the basement of s. u. g. 2 from 17 Svobody Square, with side dimensions of 17.1 × 7 m and an area of 120 m^2 (Holub et al. 2005a, 79). Square structures with an area of 15–25 m^2 make up the largest group. Larger structures typically have a rectangular ground plan, often with an area of 35–45 m^2 (see Fig. 86, Tab. 1).

7. Knowledge of wood-and-clay houses and their construction technique

Archaeological contexts have shown that the walls of above-ground buildings were constructed using two basic techniques. In the first, the vertical structural elements (posts) are driven into the ground or set into dug post holes. The second technique utilises horizontal set beam, to which vertical construction elements were anchored. A specific type of foundation or wall construction is represented by trenches into which vertical elements of smaller cross-sections (around 5 cm) are embedded and arranged in a line with relatively close spacing (0.3–0.6 m). This type of construction has been documented in a 13th-century house that stood in the front part of the plot at 7 Biskupská Street (Borský et al. 2016, 215), and after a review of the investigated context, a small trench from Františkánská Street from the period around the middle or second half of the 13th century, originally identified as a palisade trench (Procházka 2000, 54), can also be included in this category. The same construction is perhaps represented by a similar context from the second half of the 13th to the 14th century documented during excavation in Veselá Street (as yet unprocessed), though the smaller trench

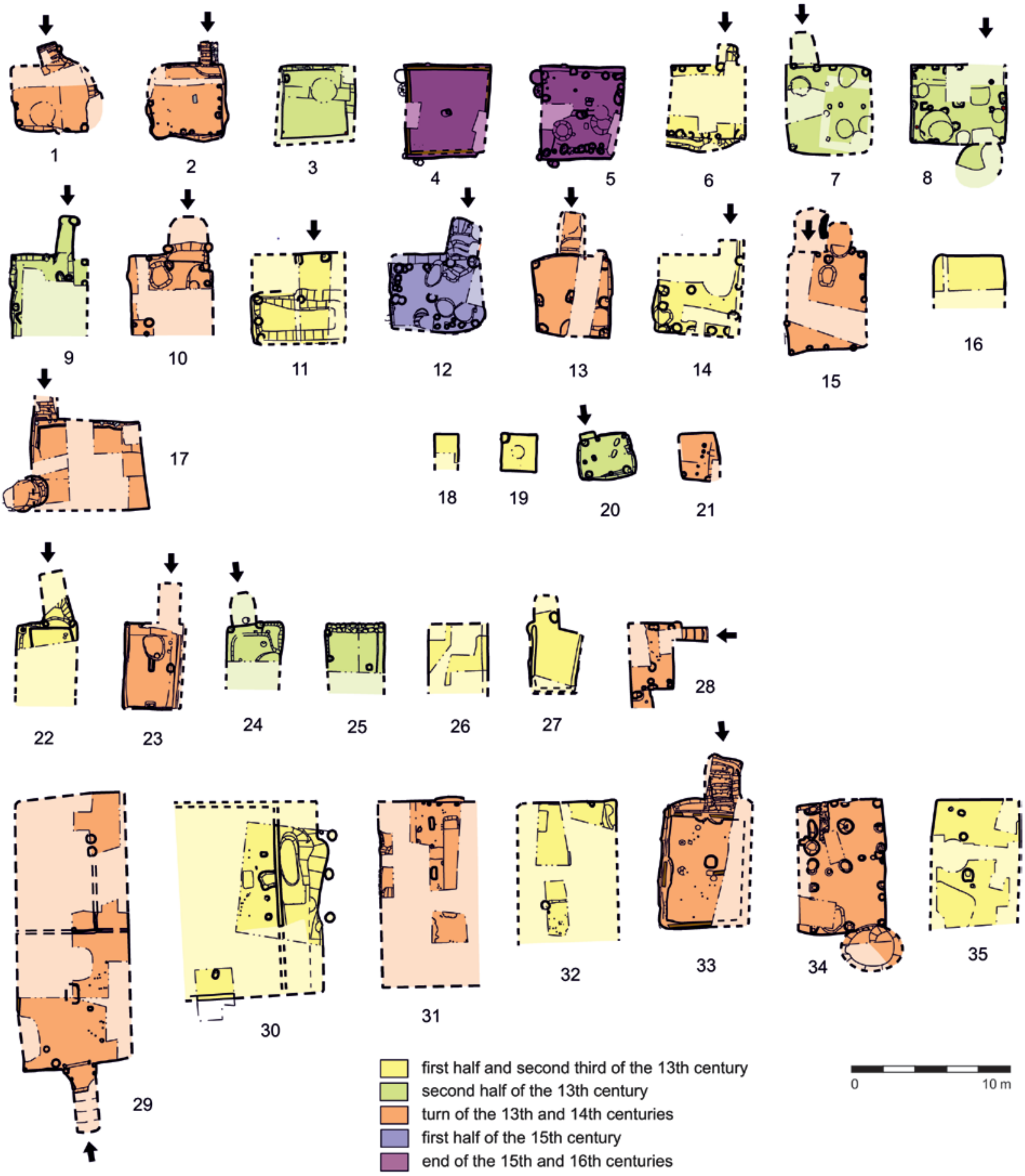


Fig. 86. Brno. Chart of selected floor plans of uncovered basements of wood-and-clay houses. 1 – 1 Panenská Street, Basement 7; 2 – Veselá Street, s. u. g. 2; 3 – Veselá Street, s. u. g. 16; 4 – 1 Panenská Street, Basement 1; 5 – 1 Panenská Street, Basement 1; 6 – 19 Orlí Street, s. u. g. 12, 13; 7 – 7 Dominikánská Street, s. u. g. VS001; 8 – 1 Panenská Street, Basement 2; 9 – Veselá Street, s. u. g. 3; 10 – 6 Starobrněnská Street, Basement s. u. 579/578; 11 – 7 Dominikánská Street, s. u. g. VS010; 12 – 1 Panenská Street, Basement 11; 13 – Veselá Street, s. u. g. 15; 14 – 8–12 Orlí Street, Basement SII (s. u. g. 4); 15 – 6 Rašínova Street, s. u. 549, Basement s. u. 614; 16 – 8 Biskupská Street, s. u. g. 7; 17 – 1 Panenská Street, Basement 8; 18 – 5 Dominikánská Street, s. u. 2504; 19 – 17 Svobody Square, s. u. 550; 20 – Veselá Street, s. u. g. 17; 21 – 1 Panenská Street, Basement 3; 22 – 4 Kobližná Street / 2 Poštovská Street, s. u. g. VS029; 23 – Veselá Street, s. u. g. 13; 24 – 5 Dominikánská Street, s. u. g. VS166; 25 – 5 Dominikánská Street, s. u. g. VS165; 26 – 1 Dominikánské Square, s. u. 531; 27 – 3 Kobližná Street, Basement s. u. g. 5; 28 – 1 Panenská Street, Basement 10; 29 – 17 Svobody Square, Basement s. u. g. 2; 30 – 6 Rašínova Street, Basement s. u. 593; 31 – Mozartova Street, s. u. g. 1; 32 – 4 Kobližná Street / 2 Poštovská Street, s. u. g. VS014; 33 – 1 Panenská Street, Basement 9; 34 – 1 Panenská Street, Basement 6; 35 – 2–4 Starobrněnská Street, Basement s. u. 629. Author M. Peška.

Market/ Square/Street	Context	Interior area	Excavation area	Interior dimensions	Construction pit dimensions	Original depth	Basement destruction horizon
8 Biskupská	s. u. g. 3	max. 46 m²	46 m²	ca 8.2 × 5.6 m	8.2 × 5.6 m	> 0.9 m	2nd half of 13th c.
17 Dominikánská	s. u. g. 63	ca 16 m²	> 17 m²	> 3.8 × 3.8 m	ca 4.5 × 3.8 m	> 1.8 m	2nd half of 13th c. – 13/14 c.
7 Dominikánská	s. u. g. VS001	ca 25 m²	ca 30 m²	5 × 5 m	5.5 × 5.5 m	> 1.50 m	2nd half of 13th c. – 13/14 c.
Dominikánské Square	Basement s. u. 602 = s. u. g. 51	> 65 m²	> 65 m²	> 14 × > 4.6 m	> 14 × > 4.6 m	2.1 m	2nd half of 13th c.
3 Kobližná	s. u. g. 1	max. 24 m²	ca 24 m²	max. 6 × 4 m	ca 6 × 4 m	2.5–2.8 m	2nd half of 13th c. – 1st half of 14th c.
19 Orlí	s. u. g. 47	ca 22.5 m²	> 27 m²	ca 5 × 4.5 m	?	2.4 m	mid-13th c.
8–12 Orlí	Basement SI (s. u. g. 5)	ca 22 m²	ca 26 m²	ca 5.6 × 4 m	ca 6.5 × 4 m	2 m	1st half of 13th c.
8–12 Orlí	Basement SII (s. u. g. 4)	ca 25 m²	?	ca 5 × 5 m	?	min. 1.5 m	1st half of 13th c.
1 Panenská	Basement 1	25 m²	?	5 × 5 m	?	2.5 m	2nd half of 15th c. – beginning of 16 c.
1 Panenská	Basement 10	11 m²	ca 11 m²	4.2 × 2.7 m	ca 4.2 × 2.7 m	2 m	2nd half of 13th c. – 1st half of 14th c.
1 Panenská	Basement 11	22 m²	28 m²	5.4 × 4 m	5.8 × 4.8 m	2.2 m	2nd half of 14th c. – 1st half of 15th c.
1 Panenská	Basement 2	30 m²	?	6 × 5 m	?	2.4 m	2nd half of 13th c. – 1st half of 14th c.
1 Panenská	Basement 3	7.5 m²	?	3 × 2.5 m	?	ca 1.3 m	2nd half of 13th c. – 1st half of 14th c.
1 Panenská	Basement 6	34 m²	45 m²	7.8 × 4.4 m	8.3 × 5.4 m	> 1.3 m	2nd half of 13th c. – 1st half of 14th c.
1 Panenská	Basement 7	18 m²	min. 24.5 m²	4.5 × 4 m	min. 5.6 × 4.4 m	2.2 m	2nd half of 13th c. – 1st half of 14th c.
1 Panenská	Basement 8	38 m²	min. 38 m²	7 × 5.5 m	min. 7 × 5.5 m	2.2 m	2nd half of 13th c. – 1st half of 14th c.
1 Panenská	Basement 9	ca 37.5 m²	min. 49 m²	6.7 × ca 5.6 m	8.2 × > 6 m	2.6 m	2nd half of 13th c. – 1st half of 14th c.
6 Rašínova	Basement s. u. 593	> 75 m²	> 75 m²	> 10.8 × > 6.9 m	?	min. 1.4 m	2nd half of 13th c.
6 Rašínova	Basement s. u. 614	30 m²	30 m²	6 × 5 m	6 × 5 m	min. 2 m	2nd half of 13th c. – 13/14 c.
2–4 Starobrněnská	Basement s. u. 629	> 44 m²	> 44 m²	> 8 × 5.5 m	> 8 × 5.5 m	min. 1.7 m	2nd half of 13th c. – 13/14 c.
Veselá	s. u. g. 1	ca 16 m²	> 16 m²	4 × > 3.2 m	4.5 × > 3.5 m	1.7 m	2nd half of 13th c.
Veselá	s. u. g. 2	20 m²	25 m²	4.5 × 4.5 m	5 × 5 m	2.8 m	2nd half of 13th c. – 1st half of 14th c.
Veselá	s. u. g. 7	ca 19 m²	?	3.7 × > 2.8 m	?	min. 1.3 m	2nd half of 13th c. – 1st half of 14th c.
Veselá	s. u. g. 13	17.5 m²	19.5 m²	5.2 × 3.4 m	5.4 × 3.6 m	3.1 m	2nd half of 13th c. – 1st half of 14th c.
Veselá	s. u. g. 14	16 m²	?	4 × 4 m	?	1.4 m	2nd half of 13th c.
Veselá	s. u. g. 15	22.5 m²	?	5 × 4.5 m	?	2.1 m	2nd half of 13th c.
Veselá	s. u. g. 16	17 m²	ca 24 m²	4.2 × 4 m	4.9 × 4.9 m	1.5 m	2nd half of 13th c.
Veselá	s. u. g. 17	7 m²	ca 10.5 m²	3.2 × 2.4 m	3.6 × 2.9 m	1.8 m	2nd half of 13th c.
Veselá	s. u. g. 18	7 m²	12 m²	2.9 × 2.5 m	4 × 3 m	1.8 m	2nd half of 13th c.
9 Zelný Market	s. u. g. 1	> 49 m²	76 m²	8.5 × > 5.8 m	10.9 × > 7 m	3 m	14th c.

Tab. 1. Dimensions of selected basements of wood-and-clay houses from archaeological excavations in Brno.

Fig. 87. Brno, Veselá Street. Floor (s. u. 18112) of one of the above-ground wood-and-clay buildings from the 13th century. In lower part a small trench with post holes. Photo by Archaia Brno, Inv. No. 3112-2016.

Fig. 88. Brno, 1 Panenská Street, plot No. 501/1. Pit for Basement 11 of wood-and-clay house abandoned in the first half of the 14th century, overall view from above. Photo by Archaia Brno, Inv. No. 16868-2009.

Fig. 89. Brno, Veselá Street, plot No. 593/2. Pit for Basement 17 of wood-and-clay house, view from north. Photo by Archaia Brno, Inv. No. 28666-2015.

was significantly wider and shallower (Fig. 87). An analogous situation for the first two cases in Brno is represented by the Building s. u. g. 61 from Trnitá Street, which was a settlement near the city walls in the Middle Ages (unpublished). However, the construction elements here had a diameter of up to 10 cm. The building is a rural house from the period between the second half of the 15th century and the first half of the 16th century that stood at the front of the plot.

The majority of basements had outer walls with a wooden construction, and the space between these walls and the excavated basement pit was backfilled. Wooden elements are preserved in the conditions of the Brno site only in exceptional cases and in a specific natural environment. Occurring more frequently are 'charred' elements that have been exposed to heat or elements transformed into distinctly weathered relics, mostly just strips of amorphous peat. The presence of wooden structures is thus most often demonstrated by the discovery of post holes or small trenches for the placement of sill beams. Both of the basic construction techniques described above have been observed in the basements of wood-and-clay houses in Brno. The first involves posts recessed along the walls of the excavated space, directly into the floor of the basement (Fig. 88, 89), whereas the second employs sill beams set horizontally along the lower edges of the basement (Fig. 90, 91). Vertical elements were then anchored to the sill beams, as was positively documented in several cases. Neither of these techniques is exclusively linked to a specific type of basement, either in terms of their dimensions, position on the plot or part of the city. At 8–12 Orlí and 6 Rašínova streets (Fig. 92), the basements with columns embedded in the floor are stratigraphically younger. In contrast, in the case of one of the basements in Panenská Street, the replacement of the original post-built structure with a structure stabilised into horizontally placed beams is observed in the second phase of its existence (Fig. 93). Examples of the apparent simultaneous use of both techniques in the same basement were also recorded. The presence of horizontally placed sill beams in some parts of the basements, the wall construction of which was otherwise evidently made mainly of posts embedded in the bottom, was relatively common (these mostly occur at the walls in corners or at the entrance). The question is whether this is only a separate technical solution or a later repair of the structure. In one of the buildings from Veselá Street, the continuous beams were placed only along the longer walls, while

Fig. 90. Brno, 10 Česká Street. Part of wood lining of north outer wall of Basement s. u. g. 15, of wood-and-clay house from the turn of the 13th and 14th centuries with remnants of sill beam and burnt posts. Photo by Archaia Brno, Inv. No. 223-04-33.

Fig. 91. Brno, 1 Panenská Street, plot No. 501/1. Pit for Basement 9 from the turn of the 13th and 14th centuries. Overall view from above. Photo by Archaia Brno, Inv. No. 18878-2009.

Fig. 92. Brno, 8–12 Orlí Street. View from east towards uncovered parts of Basements s. u. g. 4, 5, of wood-and-clay houses from the first half of the 13th century. Photo by Archaia Brno, Inv. No. 06767-2006.

on the shorter sides only a squared piece of timber was set beneath the remaining central column. In one of the structures in Veselá Street, the horizontal sill beams were intentionally burnt to increase its durability, or older burnt elements were secondarily used.

In both design variants, the posts were secured by the horizontal elements of the wall structure. The simplest documented variant was apparently the setting of these elements (beams) between the post and the wall of the excavated pit. Nevertheless, it is impossible to rule out a solution in which horizonal elements were anchored in the groove carved into the posts. Horizontal elements in the documented cases were mainly split logs, boards or planks, but it is also possible to consider log segments or logs of a smaller diameter.

In the construction of the walls, it is also possible to assume the use of the wattle technique, which is documented in one of the structures in Veselá Street, along the northern wall of which a series of small post holes with a diameter of 5 cm at intervals of 20–25 cm was documented. In a way, however, it is not a ‘typical’ basement and it cannot be ruled out that the building represents a specific type of structure.

The walls of some of the basements were not lined with wood, and a possible explanation for this absence is the use of a construction with sill beams set directly on the floor without being anchored in the trenches.

In several cases supplemental masonry structures were used in basements, typically the brickwork of one of the walls, which was evidently a structural element for supporting the connected front wall of the corresponding house.

In addition to securing the walls, structures dividing the space into several parts were also documented in the basements. Clear evidence is board partitions in the basements from 17 Svobody Square and 4 Kobližná Street. The interior of another basement from Veselá Street featured a unique light wall about 25–30 cm wide and 0.7 m high with a stone base and with an above-ground part built from small bricks (Fig. 94). Additional possible evidence of the presence of a partition is a plinth of remaining subsoil on the axis of one of the basements from Panenská Street. The post and stake holes documented in many of these buildings were probably also related to the construction of the partitions.

Due to the indicated fragmentation of the remains of medieval building structures, great emphasis is placed on the evaluation of large assemblages (thousands of pieces) of burnt daub with impressions of

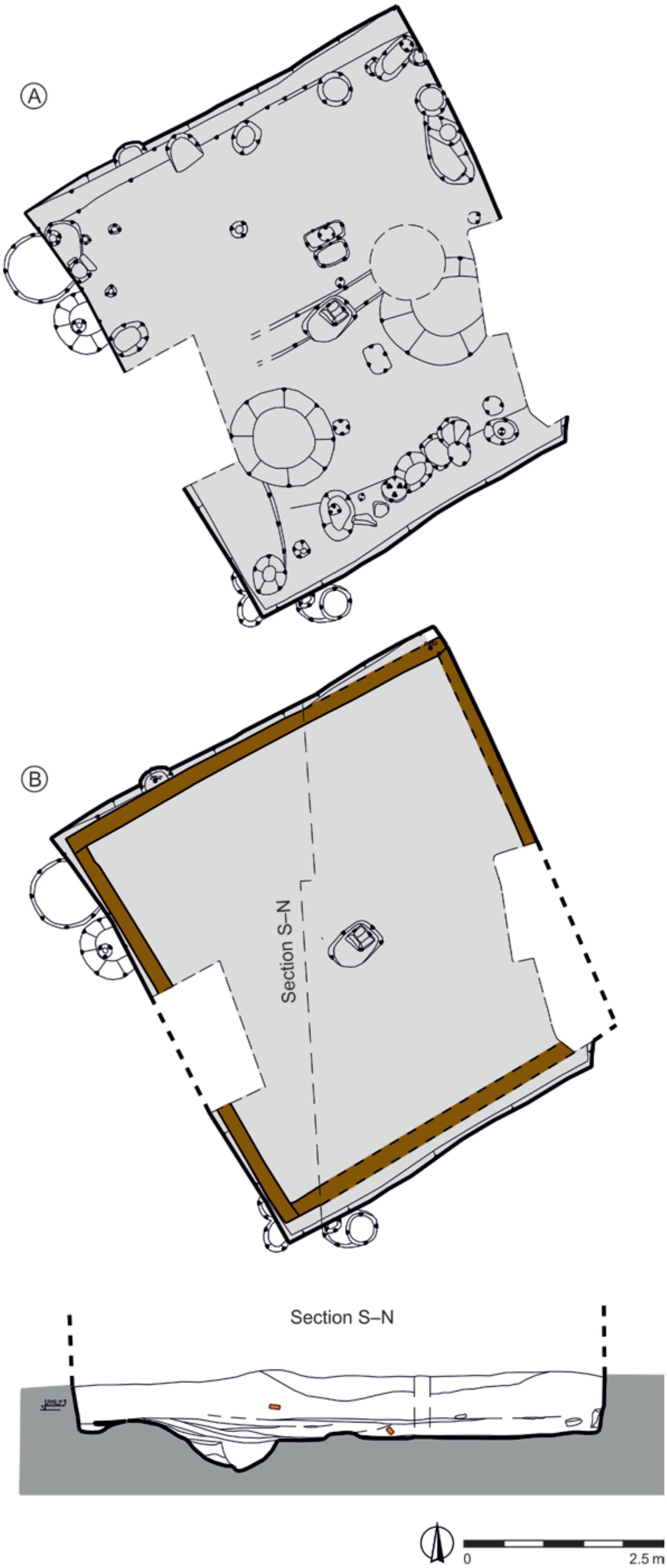


Fig. 93. Brno, 1 Panenská Street, plot No. 501/1. Ground plan and cross-section of Basement 1 abandoned in the late phase at the end of the 15th or early 16th centuries. A – Early phase; B – late phase. Drawing by M. Peška, P. Staněk.

Fig. 94. Brno, Veselá Street, plot No. 593/2. View from south towards fill strata of Basement s. u. g. 5 from wood-and-clay house. Photo by Archaia Brno, Inv. No. 01837-2016.

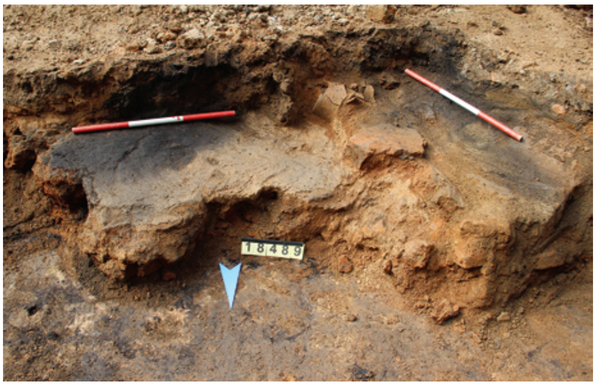


Fig. 95. Veselá Street, plot No. 593/2. Rubble of wall preserved in fill of Basement 2 from the 13th century. Photo by Archaia Brno, Inv. No. 09387-2016.

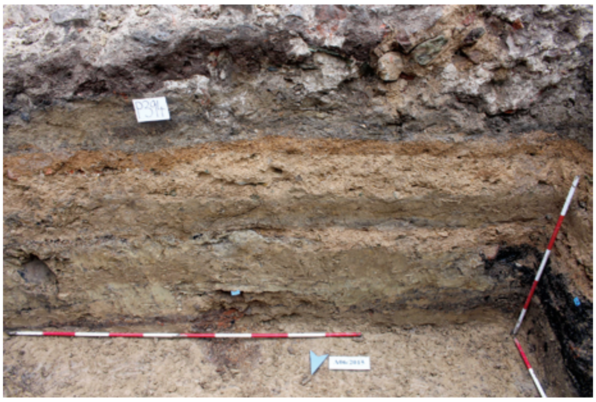


Fig. 96. Brno, Veselá Street, plot No. 593/2. Floor strata of Basement 10. Photo by Archaia Brno, Inv. No. 01662-2016.

charred structural elements (cf. Zůbek 2019b). In several structures, the entire assemblage of imprints was analysed, while others were only sampled or described on the spot. In contrast, uncharred daub has no or only minimal information potential. The largest assemblages of burnt daub come from fire rubble of wood-and-clay structures. In the conditions of Brno, they are most often the fill of basements of former wood-and-clay buildings, though in many cases they were also used to fill pits of a round or rectangular plan and multiple metres deep, which are interpreted here as latrines. The 'surface' strata in Brno are mostly not preserved, yet there is also evidence of fire rubble on the surface of the former terrain. However, these are relatively nondescript small layers, often documented only in section, from which no larger assemblage of fragments of burnt daub was obtained. To date, no context has been recorded in Brno that could be described as the complete *in situ* rubble of a wood-and-clay structure. The studied collections of fragments of burnt daub confirm that the load-bearing part of the structure of the houses consisted of wooden elements. Daub served as the fill and insulation material of walls and the ceiling. The testimony of assemblages on the actual technological design of buildings is not conclusive. The use of a frame structure (perhaps using the half-timbering technique) and log construction (probably supplemented with the groove technique) can be considered. Wattle is documented, though its use was mainly as a supplemental structure for separate building parts (e.g. filling the roof gable). In large assemblages, the manifestation of all construction solutions is quite often recorded, which leads to the consideration of combinations of different construction techniques on a single building (Fig. 95).

All of the basements had a clay floor. The most frequently documented layer was at the very bottom of the basement, which is formed as a result of movement and operational processes and is referred to as the walking layer. In a small number of cases, the floor level rose (up to 0.5 m) as a result of reconstruction or rising groundwater (Fig. 96). Non-clay floor treatments were recorded in only four cases and were composed of a thin layer of small pebbles, gravel or sand.

Some basements were also supplemented with structures bored from their walls into the surrounding terrain. These were apparently small cellars that expanded the utility space of the basements (many of them could also have had an overlapping function as a hideaway). They may also have served as

Fig. 97. Brno, 1 Panenská Street, plot No. 501/1. View of uncovered entrance neck of Basement 9 from the turn of the 13th and 14th centuries. Photo by Archaia Brno, Inv. No. 07961-2009.

a source of loess for making repairs to the actual house standing over the basement. Smaller spaces of a 'storage' character were also documented. One example is a small well-preserved cellar in the southeast corner of one of the basements in Veselá Street, the floorplan of which was in the shape of a circle segment with a diameter of 1.1 m and which had a height of 1 m.

Basement 11 from Panenská Street is for now the only case in which a niche (width 0.35 m, depth and height 0.4 m) was carved into the wall. It could have been accessible through the wooden lining of the wall or could have been a hiding place behind it.

In the majority of cases, access to the cellars was through an outdoor entrance represented by a pit emerging from the cellar space; ladders and wooden staircases may also have been employed. The term 'entrance neck' is typically used for the recessed space outside of the cellar's floor plan – usually a rectangular pit whose width is commonly in the 1.2–1.8 m range. Entrance necks with a turn are not recorded in Brno and occur only in small numbers at other sites. The bottom of the recessed space is usually slanted, stepped or flat. In some cases, the original steps were flattened by the repeated foot traffic. Elsewhere, attempts were made to prevent this erosion by installing wooden risers secured with pegs (Fig. 97). In Basement 10 in Panenská Street, a layer of soil was added to transform the original stairs into a ramp. The entrance structures continued into the interior in only rare cases. For example, a one-metre-long ramp made from a block of remaining subsoil extended into Basement of s. u. g. 14 from Veselá Street. However, it is assumed that it was connected to a pit in the exterior. The walls of the entrances were secured by a wooden construction or stone walls built with clay binder or, in rare cases, mortar (Fig. 98). It is even possible that the walls of these entrance pits were not secured (this would mainly have concerned narrow entrances in which a structure would have further restricted movement). The form of the wooden structure was documented in Basement of s. u. g. 2 from 17 Svobody Square, where it was made of boards set behind posts. It is possible that some of the many small post holes recorded in entrance spaces were not only used to secure wooden stairs but could also have been part of the structure of the wattle walls. Multiple phases of changes and repairs were documented in certain entrance necks. The only direct evidence of an entrance being equipped with a gate is the iron fittings present on the wooden jambs in Basement of s. u. g. 2 from 17 Svobody Square. Large iron keys are occasionally found in the fire rubble. It is assumed that entrance necks opened into the interior of the

Fig. 98. Veselá Street, plot No. 593/2. View from northwest towards uncovered entrance neck of Basement 18 of wood-and-clay house from the turn of the 13th and 14th centuries. Photo by Archaia Brno, Inv. No. 26913-2015.

house, passageway, the rear part of the courtyard and also into the public space of streets and squares. The presence of two entrances was not recorded in any of the basements.

It is thought that the majority of the roofs of the Brno wood-and-clay houses were covered with organic material – shingles and thatch. Although the fire rubble contains fragments of flat terracotta roof tiles, this typically involves individual pieces or small assemblages that probably only covered small exposed areas, e.g. the space around a heating device (Holub et al. 2005a, 64; 2005b).

8. The abandonment and filling of basements of wood-and-clay houses

Wood-and-clay houses were abandoned for two basic reasons. The first was a fire, the second the simple removal of the building. A relatively clear criterion for determining the cause is the fill of the subsurface structures themselves, but especially the fire rubble. There were a variety of reasons for the common removal of a house and its subsequent backfill, including new construction plans, a change in the spatial layout, the end of the structure's durability, or a change in the use of a particular area. Nicely documenting the last of these reasons is a case from Rašínová Street, where the pit of an abandoned basement was used for burials as part of the expansion of the cemetery at Church of St James. The spontaneous collapse of damaged or dilapidated structures should also be kept in mind, and it can likewise be noted that the investigated contexts often suggest the dismantling of the wooden construction of the basement walls for secondary use (e.g. the well timbering) or for fuel. Also documented are cases in which parts of the construction elements were discarded in a refuse pit (Merta et al. 2003). In several cases it has likewise been demonstrated that the structure was at least partially left in place, and in very rare cases the use of the basement pits of wood-and-clay houses has been documented in the construction of a Gothic masonry cellar. The basements were typically backfilled in a one-off event, but there are also cases in which the basements were backfilled with waste over a longer period of time, which was why macroremains from the basement fills in Veselá Street were also analysed. These were mainly backfills consisting primarily of redeposited material from the surrounding area (diaspores of rubble site vegetation) and contemporary waste – utility species (Fig. 99; see Chapter 10).

Destruction by fire was documented in roughly 50% of the excavated structures, and in addition to the burnt relics of wooden constructions and daub rubble, it is also confirmed by the burnt walls of the basements themselves. However, in some contexts with burnt walls or bottom, there is evidence that the basement was cleared after the fire and its function restored. However, the burn could also have occurred as a result of basement tempering during a significant drop in temperature that would otherwise have damaged the stored goods. The structure from 19 Orlí Street is the only case where part of the fire rubble remained in the basement, thus raising the floor level of the restored building.

The dominant component of the fire rubble and levelling is fragments of burnt daub. In the vast majority of cases, on the basis of these fragments and when compared to the overall archaeological context, it is possible to state that the original rubble had been searched ('picked through') in order to retrieve all reusable objects, building and structural elements. An important step was probably the compaction of the heterogeneous fire fill so that the area could be used for new development. The actual fills are lacking the larger, more intact parts of the clay walls, which must have collapsed into the basements in at least some cases; mostly only individual fragments are present. Moreover, no larger pieces

Fig. 99. Veselá Street, plot No. 593/2. View of burnt rubble in the wall of wood-and-clay Basement 9. Photo by Archaia Brno, Inv. No. 2696-2016.

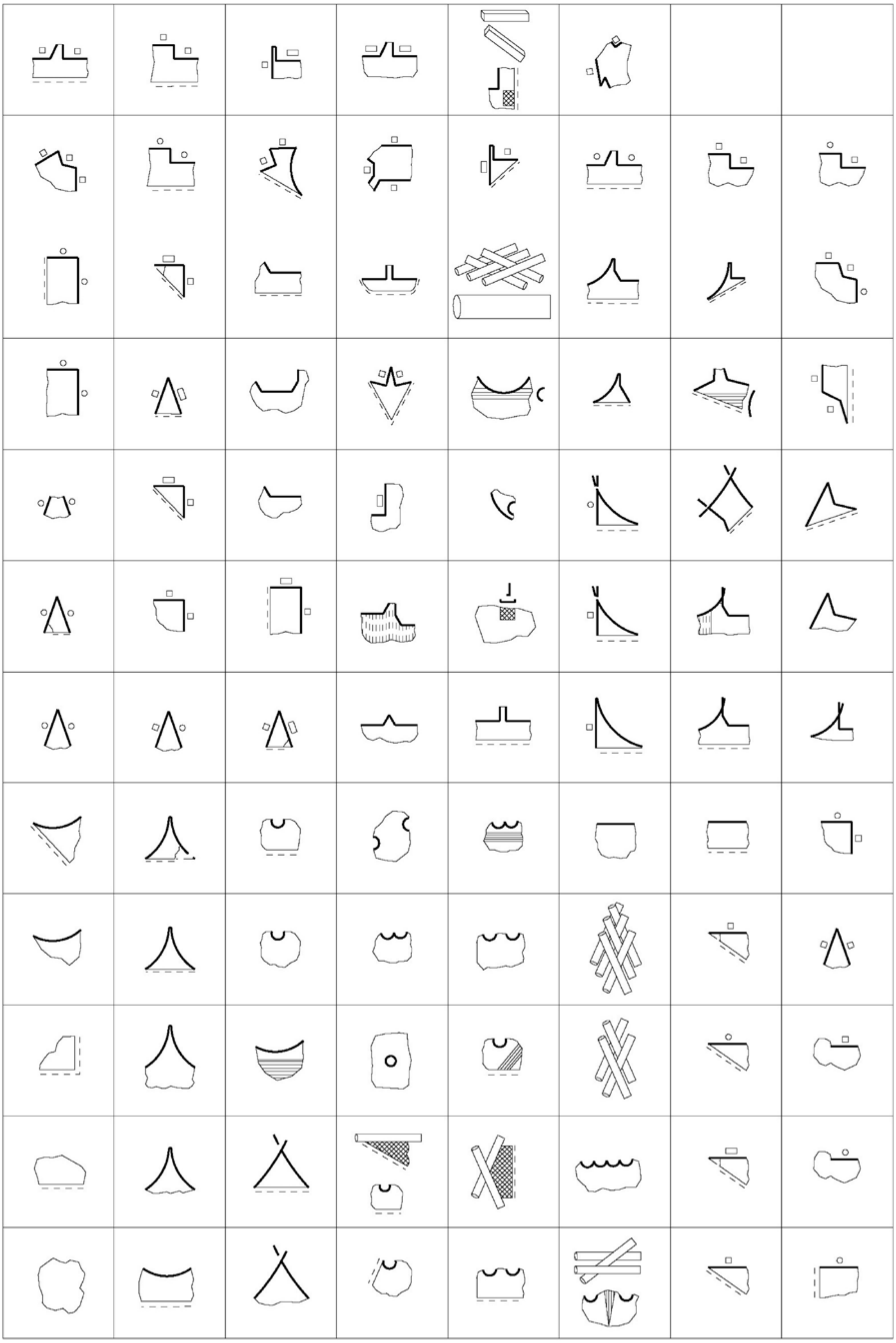


Fig. 100. Brno. Selected imprints of burnt daub from fills of former basements of wood-and-clay houses in Brno. Drawing by A. Zůbek.

of charred or burnt wooden structural elements (or traces of them) were recorded. During the conservation of the destruction horizon following a fire, the occurrence of construction hardware and objects from households or farm buildings would also be expected. And yet, finds of pottery vessels, even in fragmented form, are rare. Assemblages of iron artefacts also do not occur in large numbers.

The discovery of two structures that were not thoroughly searched or were left in their original destroyed state is quite exceptional, e.g. s. u. g. 58 from 7 Josefská Street and s. u. g. 2 in Veselá Street (unpublished). In addition to the context, it is the present furnishings that support this interpretation. The first case was a relatively large collection of iron artefacts, mostly composed of construction hardware. In the second case, large blocks of former clay (daub) walls and a larger assemblage of finds were present (Fig. 100). Furnishings included several types of kitchen ware, and iron artefacts were represented in larger numbers. Two charred pieces of bread were a rare find in Brno conditions.

9. Source of construction material

Fir and oak (occasionally beech) were most often used as a building material for structural elements. It is assumed that mainly sources from the nearby surroundings were used, as these areas had not yet been completely deforested during the 13th century. The greater part of medieval Brno lies on loess and loess soils with a thickness of up to dozens of metres, on which a black soil type (chernozem) with an average thickness of ca 0.6 m formed during the Holocene. As such, the geological subsoil of Brno is highly suitable for clay construction. It is assumed that house owners first used sources of clay from their own neighbourhood. The first material was clay extracted during the excavation of the pits for the wood-and-clay basements, the quantity of which in some cases could be more than 200 m^3, though it was typically in the range of 25–80 m^3. Another source of material was pits for latrines, more than 140 of which have been documented to date in the historical core of the city. These structures are the most numerous at the beginning of the 13th century, and the amount of clay extracted from them was less than in the case of the basements (7–25 m^3). Cases involving exceptional depths (up to 13 m), the one-off fill of many of them and a minimal amount of faecal waste suggest an interpretation as extraction shafts rather than cesspits (Fig. 101). For the sake of comparison, 9 m^3 of clay is needed to coat a three-compartment log house (Netolický, Vařeka 2015). The numerous pits associated with everyday life undoubtedly served as secondary sources of clay. The fact that the dwellings on a plot often respect each other spatially should not be overlooked. One of the main reasons for this situation may have been

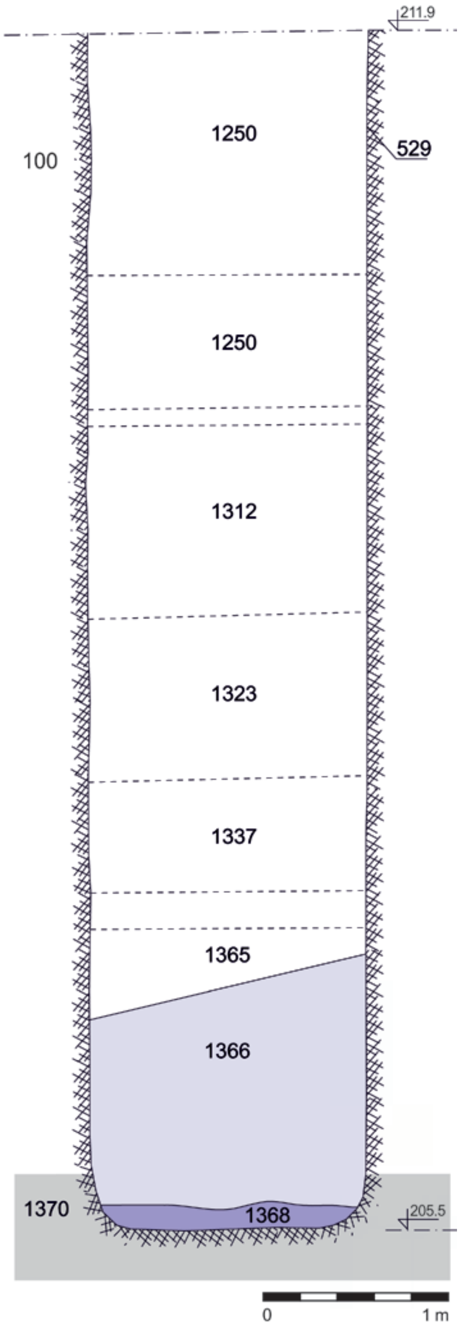


Fig. 101. Brno, Římské Square (project No. A32/2020). Cross-section of round 'loess extraction pit' from the 15th century, secondarily used as cesspit. 100 – Loess subsoil; 1370 – gravel; above 1365 – homogenous fill with tertiary waste. Drawing by L. Sedláčková.

the desire to obtain building materials for a new house. The clay for repairing walls and coatings was probably obtained directly from beneath the basement floors or from their walls, as evidenced by the numerous small excavations within most of the documented buildings. The small cellars bored from basements into the surrounding loess ('loch' cellars) are another possible source of material. The partial recycling of daub from houses not destroyed by fire can also be assumed. The final two sources of earth that can be considered are 'loch' cellars and large clay pits in the suburbs. From the first half of the 13th century, they were used for the extraction of clay for the supplementary production of bricks, which, however, did not develop more significantly until the 14th and 15th centuries. However, due to the ownership of these plots, the possibility of obtaining raw material cheaply for Brno burghers was rather limited.

10. House furnishings

Knowledge of the above-ground parts of wood-and-clay houses is minimal, and even less is known about their furnishings. The floors on the ground level of dwellings were made of clay, and no other flooring method has yet been identified. Cases are documented relatively often in which the floor consists of a structural layer, usually with a dominant share of ochre loess – in several cases apparently only clay extracted from the loess subsoil. However, the identification of the presence of an organic component in many layers clearly demonstrated their origin from the mass of the daub. It is likely that daub from the rubble of an earlier building was used, but the possibility that the floor was formed from newly prepared daub cannot be ruled out. The surface of these layers is smooth, compacted and mostly has a thin grey (trampled) small layer, which represents the active part of the floor and is the result of movement and operational processes in the interior of the house. This was followed by another ochre layer of a new floor finish in several cases. This was a common phenomenon in Brno, and these layers can even repeat themselves, perhaps representing the rehabilitation of the floor of the same house or possibly reflecting significant structural modifications of the entire building or even the creation of a new one.

Micromorphology, which can study the sedimentary record in detail, has been utilised in the interpretation of the active floor layers in order to achieve a more objective assessment of the investigated context with the desired contribution of answers to the questions of the principle of floor formation, its modification and the functional use of the respective space. To a certain extent, its analysis confirmed the interpretation of the respective layers as the walking layer. However, only a small collection has been evaluated so far, and therefore the results are still rather inconclusive and more or less merely informative (Lisá et al. 2020b; 2021; see Chapter 8, 10).

Evidence of actual furnishings is scarce in Brno, even in the case that the building succumbed to fire, raising the possibility of the frequent recycling of most objects, including vessels, and the careful sifting through destruction fills. Several documented sections also suggest this situation.

The space above the cellar was probably covered by a wooden structure, which is documented in several cases in the form of collapsed burnt structures. Plank floors can be expected in the upper parts of two-storey houses. Although fragments of fired clay tiles are quite often present in the fire rubble, their numbers are always insignificant. They evidently did not cover continuous floors in the houses, only areas of heavier traffic, e.g. around heating devices. The aforementioned recycling of this valuable building material also cannot be ruled out.

The existence of heating devices necessary for the operation of the kitchen and for warming the interior must likewise be assumed for all dwellings. These objects are represented in the archaeological record in only small numbers, with the majority having been documented during excavations in Veselá Street in 2015–2016. These were exclusively simple hearth-like objects created on the floor level of the above-ground parts of wood-and-clay houses. Remarkable evidence of a heating device of a more complex character, which had collapsed from the ground floor into the cellar, was the context investigated in the fill of the burnt-out basement in Mozartova Street. It contained mainly fragments of burnt mortar, as well as brick fragments, stones, potsherds, including a whole pot, and elements referred to as 'wall tiles'. These are square 19.5 × 19.5 cm slabs with a thickness of 2–2.5 cm made from fired clay, with the face featuring a green to blackish-green glaze. The brick-orange firing of the tiles is irregular, and some of them are deformed, a circumstance possibly caused by an imperfect production process, the result of a fire or perhaps thermal stress from the operation of the heating device. The tiles could have been an easy-to-maintain part of the heating device's cladding that simultaneously accumulated heat. An iron tripod that probably held vessels during cooking was also found in the rubble (Holub et al. 2003, 80).

Certainly, some of the small post holes relatively frequently documented at the level of the earth floors are related to the building furnishings. For example, they may indicate the presence of fixed pieces of furniture in the floor. However, none of the contexts investigated has yet been interpreted more precisely.

11. Layout of plot development

The actual location of the wood-and-clay building on the plot raises considerations about the non-domestic or residential character of the uncovered buildings. However, the location of the oldest buildings and their development on individual city plots can be reconstructed to only a limited extent, the main cause of which is the fact that their parts situated close to streets and squares were destroyed by masonry cellars in later periods. Another reason is the limited surface scope of the excavations and the lack of knowledge of the boundaries of the original parcellation. The town books are preserved in Brno only since the middle of the 14th century and unfortunately provide no information concerning these matters; later historical plans from the 18th and 19th centuries are only a guide. In most cases, the only clues to the subsurface basements under study or their location are the size, orientation and direction of entrances. Their absence on a plot is also key information.

The basic scheme of the layout of the wood-and-clay buildings on the burgher plots consisted of the owner's dwelling standing at the head of the plot and the non-domestic area in the back. The houses were probably mostly rectangular in plan, with the gables oriented along the street line. They stood at the boundaries of relatively narrow plots, and the rear part of the plot was reached along the sides of the houses (Fig. 102). The relics uncovered in the back of the plots are often interpreted as non-domestic in nature. Certain Brno find contexts, and especially comparison with the testimony of written sources, urge prudence in this respect. In many cases, the authors of this work lean towards their residential function. These dwellings were probably the homes of tenants, who are listed in large numbers in the Brno tax books from the 14th century (e.g. Mendl ed. 1935; Urbánková, Wihodová eds. 2008). Of course, some of them may have shared space in the owner's house, or occupied only a part of a courtyard building that otherwise served a non-domestic function. In terms of a separate entrance, plots accessible from public space from two directions were the most suitable for the construction of tenement houses. The first group

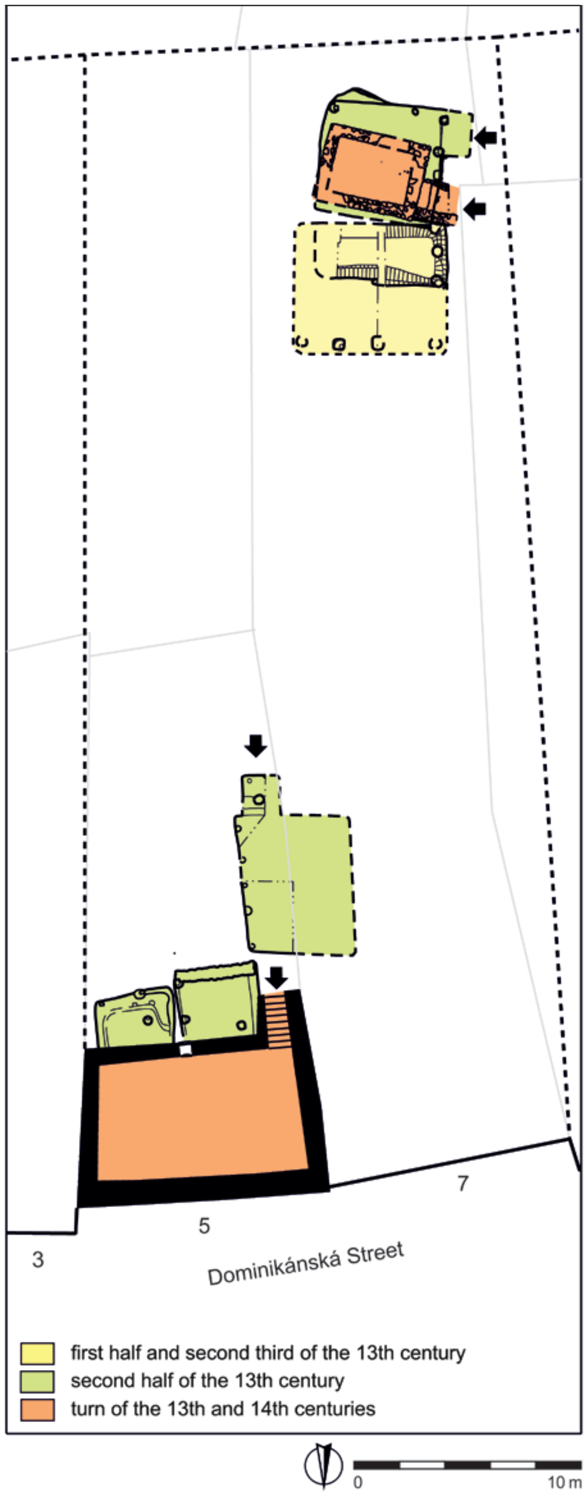


Fig. 102. Brno. Construction development at 5 and 7 Dominikánská Street in the 13th century. Drawing by D. Merta, M. Peška.

consists of corner plots, the second is composed of those adjacent to the rear boundary of the ring road along the town walls. Nevertheless, tenement houses were probably also built in areas enclosed by several plots. They probably used small alleys into courtyards or common access from the front of the plot.

As mentioned above, very little is known about buildings other than dwellings. And yet, they were certainly part of the development on many plots, i.e. spaces associated with craft production, stables and storage buildings. As archaeology does not usually provide us with much direct evidence for a functional interpretation of documented contexts, attempts are made to bridge this gap by means of intensive micromorphological sampling of the floor layers (see Chapter 8).

12. Information regarding the spatial layout of buildings

No direct evidence exists of the scope and overall form of the wood-and-clay houses of high medieval Brno, in particular, the relationship of the basement with the assumed or existing above-ground part of the house. The question is whether it will be possible to change this situation in Brno in the future. Offering certain hope is a detailed evaluation of the exceptional contexts documented during the archaeological excavations of the former five medieval plots in Veselá Street from 2015 to 2017, which produced an unprecedented amount of quantitative and qualitative information about the above-ground parts of the wood-and-clay buildings (Fig. 103).

Fig. 103. Brno, Veselá Street, plot No. 593/2. Excavation area with marked basements of wood-and-clay houses. Drawing by M. Peška, A. Zůbek.

It can be assumed that the wood-and-clay buildings of medieval Brno had a certain uniform character in general, but the form of individual buildings was far from being strictly unified. It was influenced by a number of factors, including the purpose of the buildings, the economic standing of their owners, the layout and size of the building plot and the configuration of the relevant terrain.

A rectangular floor plan is assumed for most of the wood-and-clay buildings. Serving as the upper size limit is the house belonging to the basement of s. u. g. 2 from 17 Svobody Square. With its dimensions of 17 × 7 m, it can be assumed that there was a basement beneath most of the ground plan. If the facade reached the street line, the length of the house would be 21–23 m (Fig. 104). The volume of fire rubble (1.1 m) found in the interior of the basement suggests that the building had an upper floor. It must be stressed that this house standing on an exposed plot situated by Dolní Market (now Svobody Square) is representative of buildings owned by wealthy burghers. And yet, in general it seems that multi-storey houses were an exception. Several other smaller basements whose rear walls were within 20–24 m from the street were investigated, and these structures could have been the basements of the rear parts of possible houses of this length. It is therefore possible that they were also some kind of analogical stone chambers ('kamenate'; Merta, Peška 2010). However, they could also have been detached single-compartment and one-storey houses on a simple plan. In another group, the rear wall is 15–17 m from the street. However, there is no doubt that the houses also had a multi-compartment layout. In several preserved relics of the above-ground parts, there is direct evidence of the construction of partitions dividing the interior.

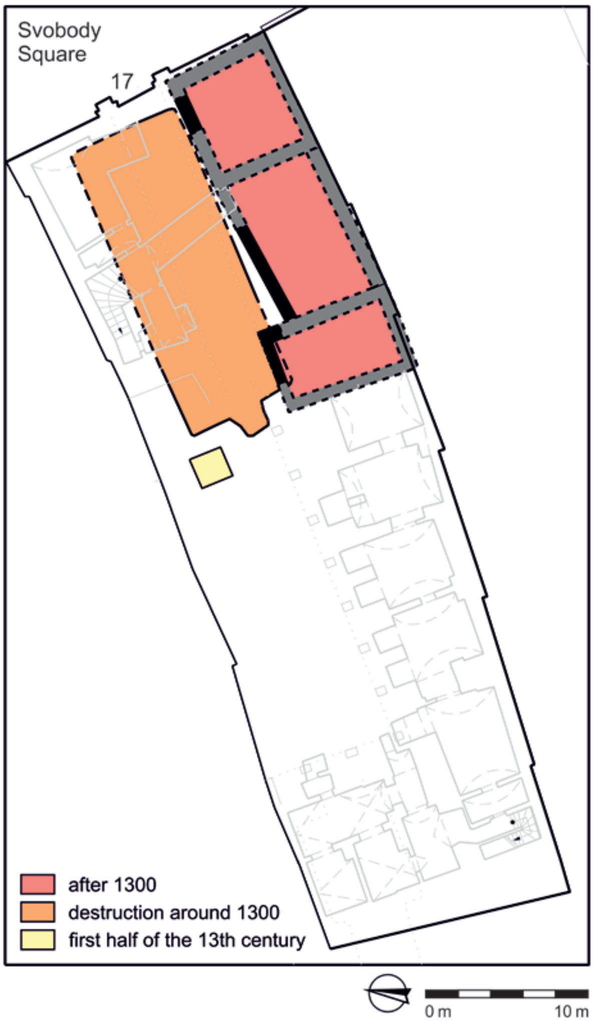


Fig. 104. Brno, 17 Svobody Square. Ground plan of Basement s. u. g. 2 of wood-and-clay house abandoned at the turn of the 13th and 14th centuries. Drawing by M. Peška.

13. Time frame

Chronological questions are connected both with absolute data obtained from dendrochronology and the specific stratigraphic context, including an evaluation of the finds. In many cases in Brno, several basements of different ages disturb each other (e.g. during excavations in Panenská and Veselá streets; Fig. 105), a fact that raises questions about the lifespan of these houses. Dendrochronology, for example, determined that one of the examined houses at 17 Svobody Square was built in 1243 and was destroyed by fire at the turn of the 14th century, as documented by ceramic finds from the collapsed rubble (Procházka, Peška 2007, 209–216). It therefore stood for more than 50 years, which is longer than the generally assumed average lifespan of around 25 years. Absolute dates obtained from wooden and burnt elements used in the construction are from the period 1235–1293 (see Chapter 9). Although the disappearance of the latest basements is dated by ceramic finds to the end of the 14th century, most of these buildings disappeared between the end of the 13th and the middle of the 14th century (Holub et al. 2005a; 2007). While Brno was already dominated by buildings with a masonry core in the pre-Hussite period, wood-and-clay structures did not disappear entirely. Archaeologically documented are the basements of wood-and-clay houses standing in Panenská Street, which disappeared only in the second half of the 15th to the beginning of the 16th century (Fig. 106).

Fig. 105. Brno, 1 Panenská Street, plot No. 501/1. Overall view of ongoing excavation from town walls. Photo by Archaia Brno, Inv. No. 19547-2009.

14. Conclusion

The long-term goal of the research of the earliest development in Brno is to understand the forms and changes of the Moravian medieval towns between the 12th and 14th century. The authors are convinced that a careful typological analysis of wood-and-clay constructions and the spatial layout of former buildings can be one of the paths to a better understanding of the cultural exchange between the more developed regions of Western Europe and the Czech lands. Given the fact that in 13th-century Brno, apart from pure clay, practically all wood-and-clay techniques are found, this is a very difficult task. Despite nearly four decades of intensive excavations, efforts in this regard are still in the early stages. However, there are numerous clues that provide some idea of the chronology and origin of some types of construction. The oldest are undoubtedly post-built structures whose use in wood-and-clay cellars is documented as early as around 1200, but they continue to occur throughout the 13th century. In the case of frame constructions, the dates are slightly later, mostly after 1235. Most of the prosperous early agglomerations of the emerging Central European towns at this time were populated mainly by German colonists. Here, newcomers encountered the original techniques of local construction, but they also brought new skills from their homeland. Frame construction ('Holzrahmenbau') can be unambiguously regarded as a foreign element in the local environment. And yet, its use in many places in Moravia did not extend beyond the threshold of the modern period and in some regions, it disappeared completely. Unlike many German-speaking lands, there is no place in Moravia or in the adjacent areas where frame or half-timbered construction became so domesticated that its tradition survived until the 19th or 20th century.

Wood and clay provided Brno, especially at the beginning, with a very accessible, thermally comfortable and undoubtedly cheap option for burgher housing. The simplicity of the buildings and perhaps the possibility of self-help construction, welcomed no doubt by the poorer groups of the town's inhabitants, certainly led to a great variety of techniques and forms of these early houses, as has been shown in this short study. The overall form of the houses remains hidden for the time being, but the unprocessed excavations in Panenská and Veselá streets in particular point to indications of a regular arrangement of buildings on the plot. In general, the above-ground parts of houses and buildings without cellars in Brno are mostly unknown. However, with certain wood-and-clay basements it is often possible to consider rear cellars of multi-compartment houses, as was the case with masonry chambers ('kamenate'). Although the wood-and-clay houses were predominantly ground-floor structures, due to the thickness of the destruction fills (with some even exceeding 1 m), at least some of them can be assumed to have upper floors. In exceptional cases it was also possible to document buildings built entirely according to Western European models, as in the case of the large house with a frame structure at 17 Svobody Square. While the lifespan of these buildings varied, based on the findings the authors lean towards an average period of around 25 years, which may be considered provisional by some, but the authors are inclined to consider a house for one generation given the short life of the inhabitants of medieval towns.

The gradual transition to masonry architecture in Brno from the end of the 13th century had numerous reasons, including frequent fires at the turn of the 14th century, an adequate supply of stone in nearby quarries (see Chapter 21), the considerable deforestation of the close surrounding area resulting in a lack of wood, the development of brickmaking based on rich sources of loess, but the main reason was clearly economic prosperity and the subsequent construction of more opulent and formal houses. Nevertheless, thanks to archaeological excavations, wood-and-clay development remains unique evidence of the rapid growth of the town in the first century of its existence.

Fig. 106. Brno, 1 Panenská Street, plot No. 501/1. Excavation area with marked basements of wood-and-clay houses. Drawing by M. Peška.

Chapter 7

The beginnings of masonry burgher architecture in Brno

Václav Kolařík – David Merta –
Marek Peška – Antonín Zůbek

1. Introduction

Brno is one of the few Bohemian and Moravian towns where, just decades after its foundation, evidence exists of masonry houses in addition to wood-and-clay buildings, clearly the result of the presence of a wealthy patriciate documented reliably in written sources in the 14th century (Mezník 1963). The nearby (ca 1.5 km away) quarry for Devonian siltstone and sandstone at Červený Hill had been in use since the 12th century for the construction of Romanesque churches, and the Petrov and Špilberk sites in the centre of town had outcrops of lower quality metabasite. Jurassic limestone from Stránská skála hill, 5 km away, was very popular for architectural elements. As such, there was sufficient building material in Brno, and by the middle of the 13th century at the latest, smallformat fired bricks and quicklime were also used, especially for sacred buildings and the town fortifications (Holub 2011, 98; Holub et al. 2015; 2019). The roughly one-kilometre-long wall around the town with four gates was completed sometime after the middle of the 13th century. The entrance areas of wood-and-clay basements were also occasionally built with masonry (see Chapter 6). It is therefore possible to state that construction from stone, brick and mortar was fully developed in Brno at least before the middle of the 13th century.

Unfortunately, there are no written sources for the earliest masonry buildings in Brno, making it necessary to rely exclusively on archaeological, architectural and iconographic sources for their identification. Brno's historical buildings were largely destroyed during the period of 'Brno redevelopment' at the turn of the 20th century, during which 238 of a total of 571 buildings were demolished and subsequently rebuilt. The destruction fluidly continued during the 20th century and today only slightly more than 100 historical buildings are still standing, of which less than ten remain without substantial reconstruction. As such, only a fraction of the former burgher development is available today. Greater research interest in Gothic buildings began in the 1960s and continued with greater intensity from the 1980s to the first decade of the new millennium, mainly in the form of building-historical surveys accompanying the reconstruction of the historical urban centre. The result of this research was the identification of a group of ca 130 partially preserved medieval buildings, and these were progressively classified, interpreted and comprehensively described in numerous professional studies (Holub et al. 2007; 2013; Merta 2001; Merta et al. 2004; Merta, Peška 2001; 2010; Peška, Merta 2009; Procházka et al. 2006). Due to the nearly complete rehabilitation of the historical centre, this group can be regarded as essentially closed and any future additions of other buildings will be rare (Fig. 107).

The group of Brno's oldest medieval profane buildings is highly variable in terms of typology and can be dated to the period between the 13th and early 15th century (Holub et al. 2013, 461–467). Absolute dating represents a specific problem. Besides several architectural details with low chronological sensitivity (8 Radnická Street, 2 Minoritská Street, 7 Zelný trh Square and 16 Orlí Street), it is necessary to rely on construction-technological traits and archaeological layers. Dendrochronological dating is highly rare

Fig. 107. Reconstruction plan of Brno as of ca 1300 with plan of preserved historical cellar spaces as the background. Light green – preserved historical burgher houses; dark green – existing churches and historical ecclesiastical complexes; yellow – masonry structures demonstrably built in the second third of the 13th century; grey circlets – archaeologically excavated torsos of former medieval buildings; red – defunct tower-like structures. 1 – 8 Radnická Street (Old Town Hall); 2 – 7 Zelný trh Square; 3 – 16 Orlí Street; 4 – 2 Minoritská Street; 5 – Friars Minor friary; 6 – Dominikánské Square – former Cistercian nunnery; 7 – 8 Svobody Square; 8 – 2 Jakubské Square – 4 Rašínova Street; 9 – 10 Česká Street; 10 – former Dominican priory; 11 – 18 Svobody Square; 12 – 17 Svobody Square; 13 – 9 Svobody Square; 14 – 4/6 Jánská Street; 15 – 13 Kapucínské Square; 16 – 2 Petrov hill; 17 – 7 Dominikánská Street. Drawing by M. Peška.

(8 Svobody Square). And yet, despite these difficulties, it has been possible to typologically distinguish several distinctive groups of buildings with roots dating as far back as the 13th century representing the rudiments of later large medieval burger houses and Renaissance and Baroque palaces – fully masonry houses, tower houses and 'kamenate' (Peška, Merta 2009, 94).

For an understanding of the entire situation, it should be said that there were buildings that probably did not have a more substantial and longer-standing wood-and-clay predecessor on the plots (8 Radnická Street, Dominikánské Square – tower house), but rather a certain transitional element in the form of a stone chamber ('kamenate'). Construction modifications and the expansion of the first masonry houses (Dominikánské Square, 2 Minoritská Street, 10 Česká Street etc.) often occurred simultaneously with the development of wood-and-clay construction, which reached its peak in Brno in the second half of the 13th century (see Chapter 6). Construction development from wood-and-clay structures to stone buildings is also well-documented archaeologically on many plots (10 Česká Street, 7 Dominikánská Street, 1, 17 Svobody Square etc.; Holub et al. 2013, 463–465).

Overall, it can be said that despite the modest number of medieval houses mostly preserved in a very fragmented state, the accompanying archaeological excavations have revealed the form and character of the oldest masonry buildings from the 13th century. However, in contrast to assessments in older studies, the following paragraphs focus only on the layer of the earliest houses.

2. The first fully masonry burgher houses

While these were masonry buildings without wood-and-clay parts extending their spatial layout, the above-ground parts could have been, for example, of half-timbered or log construction, as direct evidence is missing for this determination (Peška, Merta 2009, 94; Holub et al. 2013, 467–470). Tower houses are a certain sub-type of these structures. A characteristic trait of this group is their placement along the street line. In terms of floor plan and internal layout, this is a highly variable group of single- or multi-compartment structures oriented both parallel and perpendicular to the street. However, it appears that simple floor plans predominate. The foundations of houses built on a square floor plan are also documented in several cases. Today's state of knowledge also brings with it a number of unresolved issues. The layout of the above-ground part of most of these houses has not yet been clearly documented. A multi-compartment layout seems most likely for rectangular buildings. While only part of a house could have a cellar, in the case of houses with an arc, a basement is assumed for the entire floor plan (Dominikánské Square – the 'House of the Cistercian Nuns', St James House I, 9 Dominikánská Street etc.). These considerations are complicated by the fact that with only a few exceptions (e.g. 8 Svobody Square), the foundation walls of the former above-ground parts also succumbed to the later expansion of the cellars. The problem with the entire group of more than twenty houses is their dating. Some of them can be dated on the basis of art-historical elements to the middle of the 13th century (e.g. the Old Town Hall – 8 Radnická Street; Fig. 108), exceptionally using archaeological finds and stratigraphy to the 13th century (e.g. the Friars Minor friary; Procházka 2003) or dendrodates to the end of the 13th century (9 Svobody Square – after 1278), or on the basis of the character of the masonry and the use of small-format bricks (Holub et al. 2015, 324–326). The Old Town Hall, a two-storey building on a roughly square 15 × 15 m floor plan, is by far the most important building in the entire group. On the right side of the ground floor is a wide and open passageway with a barrel vault,

Fig. 108. Brno, 8 Radnická Street (Old Town Hall). Vaulted first-floor chamber with a segment of keystone. Photo by D. Merta.

on the left side a vaulted basement with an entrance from the passageway. The upper floor has a large hall over the basement and two rooms of approximately the same size over the passageway. The building's most significant element is a roughly 5 × 4.5 m 'chamber' with a groin vault with wedge-shaped ribs set on profiled corbels. This space included sedilia (seats) in an opening for an early Gothic window facing the street and a safe in the north wall. An excavation in 2012 also documented a masonry gable and the vault of 'kamenate' from small-format bricks. The building can be dated on the basis of stonemason elements to the period after 1240. It is a unique structure not only for Brno but for the urban milieu in the Czech lands in general. While Brno written sources from the beginning of the 14th century speak of a building called the *iudicium* (courthouse), its location cannot be reliably pinpointed on the basis of period sources. However, it can be identified with the later consistory, which served as an official building where the town council met and the town books were kept, important town documents were stored, the court sat, and where merchants had their shops. The large passageway was undoubtedly used for the inspection of goods and it can be assumed that the building was also a 'mercantile' house belonging to the Brno municipality from its beginning. In its early days, it was certainly one of the dominant features of the newly founded town along with sacred buildings. The dimensions of this building surpass all known early Gothic houses in Jihlava, although the 12-m-wide house at 16 Masarykovo Square at least comes somewhat close to the Brno Old Town Hall. Another interesting Brno house is a two-part building with a cellar at 8 Svobody Square with a separate internal staircase and a semi-circular stone portal in the basement (Kováčik et al. 2001). The layout of this house is conspicuously similar to certain Romanesque buildings in Prague (Dragoun et al. 2003, 71, 113, 123 etc.). Another very interesting and atypical structure is two-compartment vaulted cellar at 2 Petrova Street, which can be dated to the 13th century on the basis of the primary use of small-format bricks. Though clearly with multiple rooms, the above-ground layout of the house is unfortunately uncertain. The other documented houses mostly have smaller dimensions and their incomplete state often renders a reliable interpretation of their former inner layout impossible. Compared to the houses in Jihlava, the absence of early Gothic arcades in Brno is notable. Buildings with a full masonry construction are the foundation of the development of towns in the Czech lands in the late medieval and early modern periods. And yet, they are also a cultural phenomenon shared with, for example, former Hungarian towns such as Trnava and Bratislava, where multi-storey buildings with basements and beam ceilings have also been found and which are, similar to the houses in Brno, often divided at the level of the basement by up to two arcs supporting the partitions on the upper floors. In Bratislava, the construction of these houses is dated from the end of the 13th century to the beginning of the 14th century, in Jihlava as early as the mid-13th century (cf. Ferus, Baxa 2006; Staník, Žuffová 1995), a chronological discrepancy that could also be caused by a lack of dating support.

3. 'Stone house' type structures

In an attempt to create a typology of the earliest masonry houses in Brno, the past two decades have seen the identification of 11 one-room buildings with nearly identical characteristics (Merta, Peška 2010). These buildings have a square, sometimes slightly trapezoidal or rectangular, floor plan set at the rear of the plot and were part of former wood-and-clay houses. Due to later reconstructions and the building of cellars in their vicinity, we have only a large amount of indirect evidence for this interpretation, with exceptions such as at 16 Orlí Street. Nevertheless,

Fig. 109. Brno, 7 Zelný trh Square. Detail of early Gothic window on the second (?) floor. Photo by M. Peška.

Fig. 110. Brno, 2 Minoritská Street. Vaulted chamber ('kamenate') with a keystone. Photo by M. Peška.

these buildings are well known in German-speaking countries since the 12th century and were named 'kamenate' (masonry chamber, 'steinwerk', *caminata*, *camera lapida*, *domus lignea cum caminata*). It is also possible to find many analogies to these structures (cf. Piekalski 2004a). In the majority of documented cases, the Brno 'kamenate' survived the demise of their wood-and-clay parts, even though they were later significantly rebuilt and mostly their basement parts were preserved. For the most part these were mainly ground-floor spaces with basements or which were partially recessed into the ground. Remarkable evidence of the existence of an upper floor is a small early Gothic window at 7 Zelný trh Square (Fig. 109). Though the majority of Brno 'kamenate' were built with beam ceilings, a rib vault has also been found (2 Minoritská Street; Fig. 110). The characteristics and genesis of 'kamenate' with references to the literature are discussed in more detail in the chapter on the medieval houses in Jihlava (see Chapter 11). In the past, these buildings in Brno were also presented as the earliest masonry cores, which later became the foundations for multi-compartment Gothic and in time even Renaissance burgher houses. The oldest 'kamenate' comes from the very beginning of the town (2 Minoritská Street, 7 Zelný trh Square). However, in the absence of dating support, it is assumed that some of the documented stone houses were not built until the 14th century.

4. Tower houses

High medieval profane tower buildings have been a subject of scholarly interest for many years throughout nearly all of Europe. The towers of northern Italian and imperial cities are particularly well known, of which the houses in Reims, Zurich, Prague, Wrocław, Vienna and Bratislava stand out and are especially close to those in Moravia. Bohumil Samek was the first to address the issue of the existence of these houses in Brno in his short study on the Old Town Hall from 1963 (Samek 1963). It is somewhat paradoxical that the only tower building that could be proved from his list was a defunct house that stood in the middle of the northern front of the former Rybný Market (now Dominikánské Square, in medieval written sources *Forum Piscium*). Despite their earlier opinions, the authors of this text following an evaluation of the excavation of the Old Town Hall in 2012 came to the opinion that the town hall tower in fact dates to the subsequent medieval and Renaissance reconstruction of the building. The entire issue of Brno's tower buildings, with references to other literature, is discussed in detail in a study from 2019 (Merta, Peška 2019; 2007). Today, there are only two younger standing towers in the area of the historical centre of Brno, namely in the area of the aforementioned Old Town Hall (10 Radnická Street) and in the former provostry (Bishop's Court – 2 Muzejní Street). And yet, neither of these belongs to the group of Romanesque or early Gothic residential towers. Four buildings of this type can be hypothetically interpreted only from iconographic sources, i.e. 17th-century vedute of Brno (18 Svobody Square, 4/6 Jánská Street, 9 Svobody Square, 13 Kapucínské Square). The foundations of additional likely tower buildings were uncovered in an archaeological excavation at 2 Jakubské Square / 4 Rašínova Street. By far the most important and conclusive tower building is the aforementioned tower that stood in the middle of the former northern front of Rybný Market adjacent to the later convent of Cistercian nuns and the 'Royal Chapel'. The tower is very clearly depicted on the veduta of the Swedish siege of Brno from 1645. The foundations of the tower were verified beneath the pavement of today's square during an as yet unpublished rescue archaeological excavation from 2019. The former free-standing tower with a wide entrance from the courtyard did not have a basement. The inner dimensions were 6 × 4.8 m, the outer dimensions ca 8.5 × 7.5 m. The walls were around 1.3 m thick, with the western wall having a width of 1.8 m, leading to speculation of a staircase built into that wall. The tower can be dated to the first half of the 13th century, and an archaeological excavation also revealed that a wood-and-clay (pre-urban?) timber frame building previously stood at the site, albeit

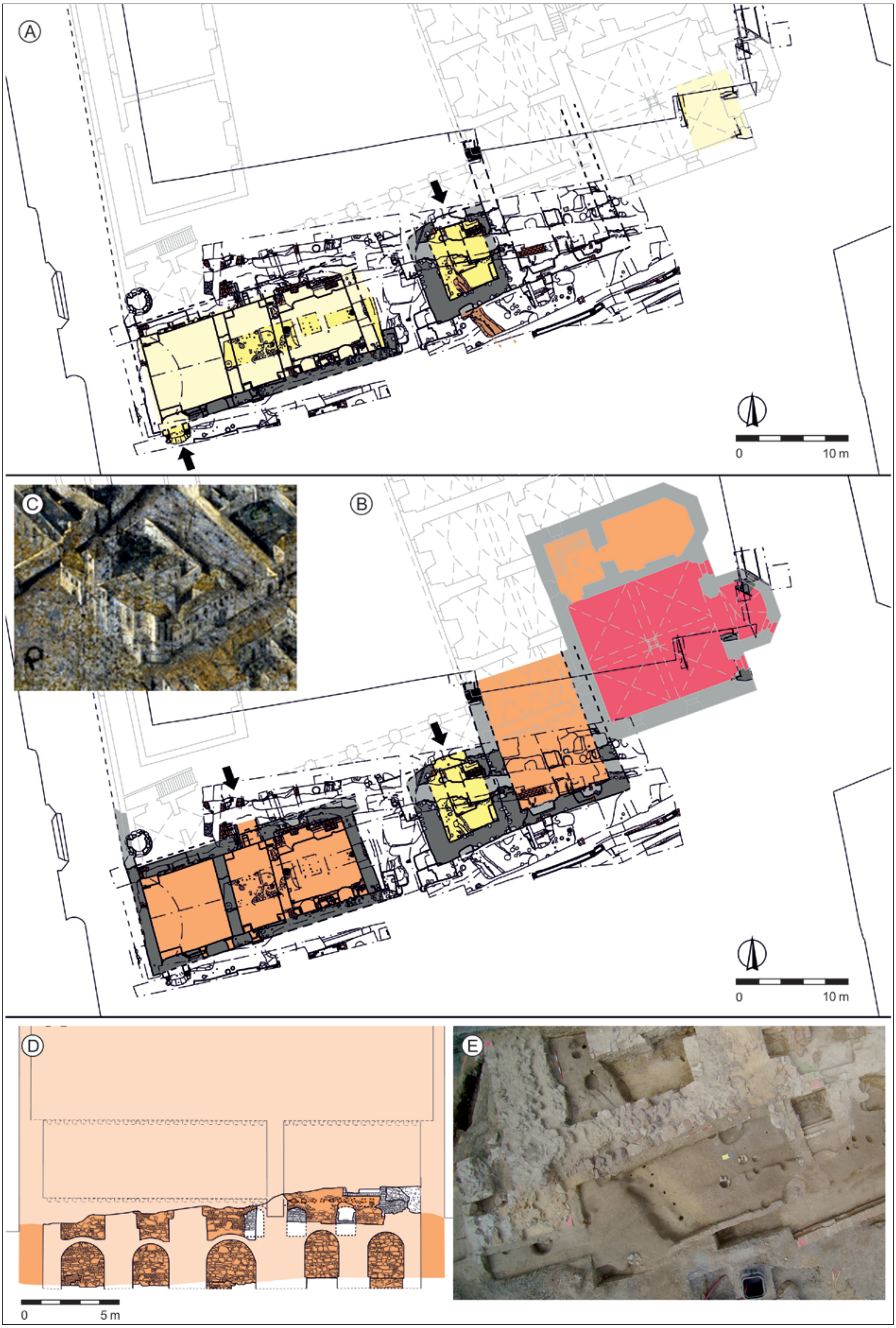

A
0
10 m
B
C
0
10 m
D
0
5 m
E

Fig. 112. Selection of layouts and spatial arrangements of Brno's earliest stone houses. Yellow – buildings demonstrably built in the second third of the 13th century; green – after mid-13th century; orange – late 13th and early 14th centuries; A – 8 Radnická Street (Old Town Hall); B – 2 Minoritská Street; C – 7 Zelný trh Square; D – 1 Svobody Square; E – 10 Česká Street; F – 8 Svobody Square; G – 16 Orlí Street; H – Friars Minor friary. Earlier wood-and-clay buildings are also marked with dashed lines for houses E, F and G. Drawing by M. Peška.

← **Fig. 111.** Brno. Dominikánské Square – Cistercian nunnery. Brown – building from the first third of the 13th century; yellow – buildings from the second third of the 13th century; orange – buildings from the late 13th and early 14th centuries; red – Chapel of the Virgin Mary from the early 14th century. A – former wood-and-clay buildings and tower house in the second third of the 13th century; B – buildings of north frontage of Dominikánské Square in the early 14th century; C – inset from veduta by H. J. Beyer and H. J. Zeiser from 1645 (© BCM); D – front facade of a corner two-room house from the late 14th century with preserved masonry parts; E – aerial view of part of excavated area from 2017 with foundations of tower house in upper right corner of photograph and earlier post-built structure. Photo by Archaia Brno, Inv. No. 4390-2018. Drawing by M. Peška.

with an orientation that completely diverged from the later urban parcellation. It is generally held that this was the house of Mikuláš of Věž, in the vicinity of which Bohemian King Wenceslaus II founded the Chapel of the Virgin Mary in 1297 (Fig. 111). In the case of the other houses mentioned above, their interpretation is more or less speculation based on the testimonial possibilities of the sources relating to these buildings, despite the fact that they clearly existed in the past. It is also not clear whether there were more of these buildings in high medieval Brno. However, it is certainly no coincidence that some of the sites at which towers are documented belonged to the early Brno patriciate.

5. Conclusion

The previous studies also presented several three-compartment structures whose layout is typical for many medieval burgher houses (in greater detail in Chapter 11). And yet, the majority of these houses have undergone a review in recent decades and it appears that none of them were originally designed in this manner and that all of them are the result of gradual building development. The most interesting example is the house at 2 Minoritská Street, which can serve as a very good comparison to the Jihlava house at 16 Masarykovo Square (see Chapter 11). Although the structure in Minoritská Street has not undergone archaeological investigation, based on a building-historical survey its development can be divided into three basic phases. A slightly recessed stone chamber ('kamenate') vaulted with wedge ribs and built around 1250 is documented at the site. The presumed front wood-and-clay (?) part was replaced (still in the 13th century) by a cellar along the street, with an entrance in the middle part leading on an L-shaped staircase to the courtyard. However, the construction of the cellar beneath the rear 'stone house' and the connection of all three parts did not occur until the Late Middle Ages (Fig. 112). The majority of the oldest buildings probably underwent a similar development, resulting in houses with a passageway or maashaus (parlour).

In addition to Jihlava, Brno is another Moravian town where, relatively soon after its founding, the first masonry houses appeared alongside the predominantly wood-and-clay burgher development. The existence of similar buildings can also be assumed in two other large Moravian royal towns – Olomouc and Znojmo. Nevertheless, given the considerable survival of historic houses to the present day, a larger set of these buildings would probably already have been identified and evaluated by art historians or architectural historians. At the very least, some of the older preserved architectural details on standing burgher houses would be known. As such, the authors are of the opinion that the groups of buildings in Brno and Jihlava are to a certain extent unique. Evidence of other masonry houses from the 13th century could certainly still be found, albeit in a substantially more modest scope. The preliminary evaluation of the layout of the earliest buildings conducted by Josef Bláha (Bláha 1999) is encouraging. The character of the other Moravian towns in this period remained wood-and-clay.

Chapter 8

What is the micromorphological difference between the floors of cellars and above-ground floors in non-masonry buildings in medieval Brno?

Lenka Lisá

1. Introduction

The issue of the identification of the formation processes of floor structures and the methodological approach using micromorphology in the archaeological context, its benefits and limitations, have already been mentioned in the introductory micromorphological chapter (see Chapter 1). At the same time, the concept of dividing floor sandwiches into active, reactive and passive layers has already been introduced. Therefore, we can move straight to the application of micromorphological analyses on floor sandwiches from the area of medieval Brno, where the most extensive set of morphological samples from floor horizons of both subsurface and above-ground structures dating from the early 13th century to the mid-14th century has been processed to date. But what do we know about the oldest architecture and especially about the floor levels of the buildings of that time?

The oldest phase of Brno burgher architecture is represented mainly by wood-and-clay buildings. Masonry burgher architecture appears locally in the late phases of the 13th century (Holub et al. 2005a; 2013; 2015, 315–323; see Chapter 6). Most of the building remains have been located in recessed parts, such as wood-and-clay cellars. These are the most typical record of the non-masonry buildings in medieval Brno. Above-ground floors are extremely rare due to their poor preservation.

Knowledge of the above-ground parts of buildings is still limited, complicated and often essentially impossible due to the largescale destruction of the medieval terrain. The mentioned surface layers are missing in many places. The northwestern and southeastern parts of the city centre hold a privileged position in this respect, where the terrain gradually increased by up to 2 m during the Middle Ages and the formation has been preserved to this day on relatively large areas. In the southeastern part, it is the site in Františkánská and Josefská streets. However, a large number of archaeological events took place here in the initial period of systematic research in Brno and did not sufficiently extract information concerning the above-ground parts of buildings (Procházka 2000, 52–60; Procházka, Zůbek 2012). New research, which will be carried out during planned investment and revitalisation events in this area, can be a promise for the future. In the northwestern part of the city, this mainly concerns the area around Besední and Veselá streets. Other smaller sites in the city centre include Biskupská Street, and partial information on the above-ground parts of the development was obtained from the plot of House No. 7 (Borský et al. 2016, 215–218). In most cases, only solitary post holes were preserved from above-ground structures. Less common are relics of flooring, formed mostly by clay layers with observable 'footprints'. We usually do not know the complete floor plans and precise construction solutions of buildings.

The recessed spaces, mostly with rectangular or square floor plans, served as cellars for houses or farm buildings. Their walls were reinforced with wooden structures and the spaces were accessible by a suspended entrance staircase or entrance neck. The location of basements on plots is usually diverse. In the courtyard, they probably belonged more to farm buildings. In the case of smaller buildings (e.g. granaries), the entire space could have been a basement. It can be assumed that the basements, which are tied to the front of the plot, belonged to the relevant houses that stood at their head. The size of these basements varied, and in Brno cases documented to date are in the range of 16 to 157.5 m^2. Some were divided by partitions into sub-spaces. In the case of smaller basements, we assume that they were located under only part of the house. For some larger buildings, it is possible that the basements occupied almost the entire floor plan of the house (e.g. Basement s. u. g. 2 from 17 Svobody Square with an area of 120 m^2; Holub et al. 2005a, 89–90).

More detailed information on the identification of above-ground or subsurface floor sets can be provided by the method of micromorphology in the archaeological context. The main question posed by the mikromorphological analysis was therefore directed at the identification of the formation processes of floor horizons and also at the identification of the differences between above-ground and subsurface floor sets. Although in some cases it is possible to distinguish above-ground structures, or their floor levels from subsurface, their identification is often very difficult and micromorphological analysis could contribute to a closer specification of both the use and location of a given floor set within a building.

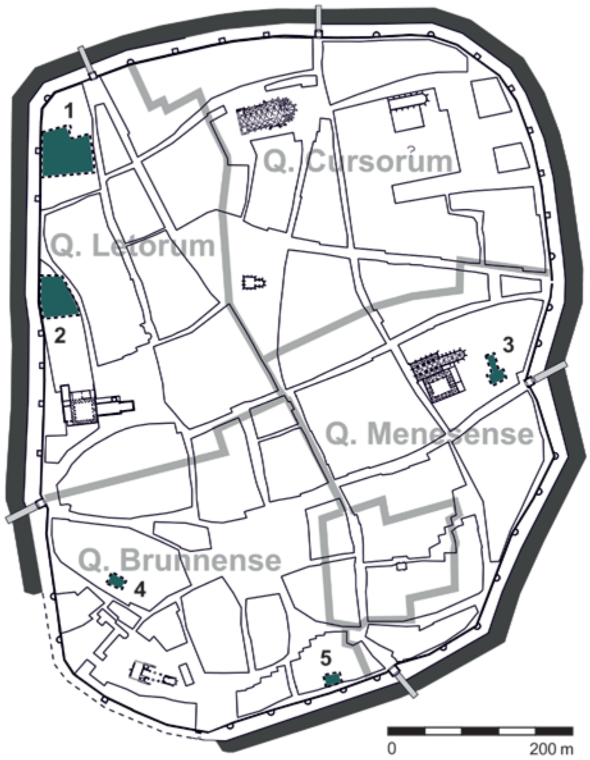


Fig. 113. Brno. Localisation of studied sites and the historical quarters inside medieval Brno. 1 – Veselá Street; 2 – Panenská Street; 3 – Orlí Street; 4 – Biskupská Street; 5 – Bašty. Drawing by M. Peška.

2. Study material

The first samples for micromorphological analysis from the context of medieval buildings were collected during the excavation in Brno in 2008 to an increased extent and systematically in the last five years. The collection obtained from the area of medieval Brno already includes over 200 specimens (approximately 25 in the form of cuts), most of which are tied to contexts related to the unaltered medieval buildings of Brno and its historical suburbs. So far, the results of the analysis of samples from the floor layers of the above-ground parts of four buildings examined in 2015 during the archaeological excavation on plot No. 601 in Veselá Street have been evaluated and published (Lisá et al. 2020b). In addition, the findings obtained from a sample taken from the bottom of a medieval storage pit examined in 2008 in the courtyard of the house at 2 Bašty / 8 Josefská were published (Lisá et al. 2017).

A detailed identification of individual floor sets is published in Lisá et al. (2021). Samples obtained during the rescue excavation carried out by Archaia Brno during the years 2008 to 2015 were processed in this work. They come from a total of five different sites of the former inner city (Fig. 113). Three of them (Bašty, Biskupská and Orlí) are located in the southern half of its plan, while the plots in Veselá and Panenská streets were situated in the northwest corner of the city centre. The inner city has been divided into four districts (quarters; see Vičar 1965) at least since the 14th century. The examined plots in Bašty and Biskupská streets were part of the Brno Quarter (*Quartale Brunnense*), Orlí belonged to the Měnínská Quarter (*Quartale Menesense*) and Veselá and Panenská streets belonged to the Veselá Quarter (*Quartale Letorum*; see Fig. 113).

3. Results and discussion

3.1 Main types of active layers detected in studied sites

Floor sandwiches detected in the contexts of the floors of medieval buildings and basements can be divided into three main groups:

1. The active layers have a visible direction predisposed by the deposition of hay, straw or a grate. They usually have positions with a rectified matrix due to pressure or dry sweeping. They show no

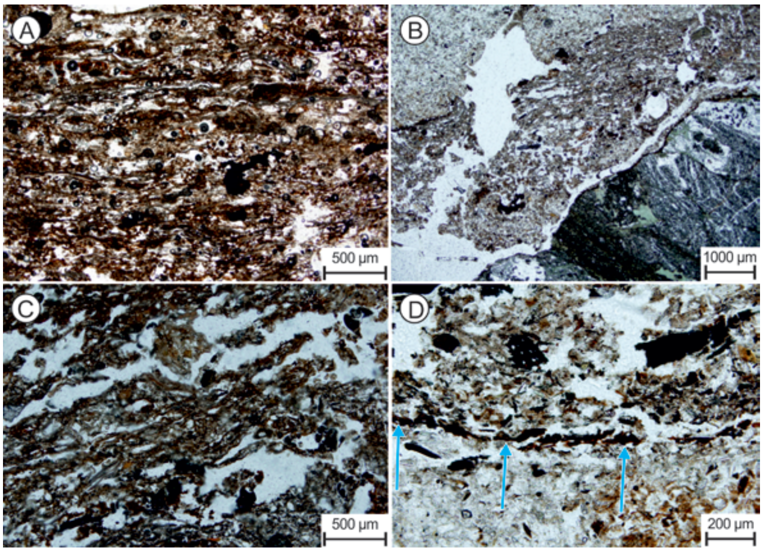


Fig. 114. Brno. The micromorphological characterisation of features from active layers with visible predisposition of organic matter (hay, straw, organic mat). Author L. Lisá.

signs of illuviation (2–4 Bašty, s. u. g. 57; 7 Biskupská, s. u. 283/284; Veselá, s. u. g. 1, 4; see Fig. 114 for a more detailed photo documentation).

2. The active layers were formed by trampled layer, the mineral matrix shows a partial alignment, but neither the active nor the underlying passive layer show signs of illuviation. It is therefore possible that the surface could have been mechanically treated in a dry way (sweeping) or the rectification was because of mere pressure due to walking (2–4 Bašty, s. u. g. 59; 7 Biskupská; 19 Orlí, Samples 5, 6 [lower active layer], 2 Panenská – all three active layers; see Fig. 115 for more detailed photo documentation).
3. The active layers penetrated only by trampled layer do not show any signs of layering or preference orientation. They may in some places also contain fragments of deposited hay straw or mats. However, they also contain a number of illuviation substances detectable in the active layer itself or in the passive layer below it, which indicates the probability of wet surface treatment (7 Biskupská; 19 Orlí, Samples 6, 7 [upper active layer]; Panenská, plot No. 501/1, Basements 1, 3, 4; Veselá, Basements 2, 3; see Fig. 116 for more detailed photo documentation).

If we divide the types of active layers according to the previously mentioned division, it is clear that 1) active layers with the deposition of organic components were captured in five cases (three of which belong to above-ground houses and one to the basement); 2) active layers that do not show any signs of

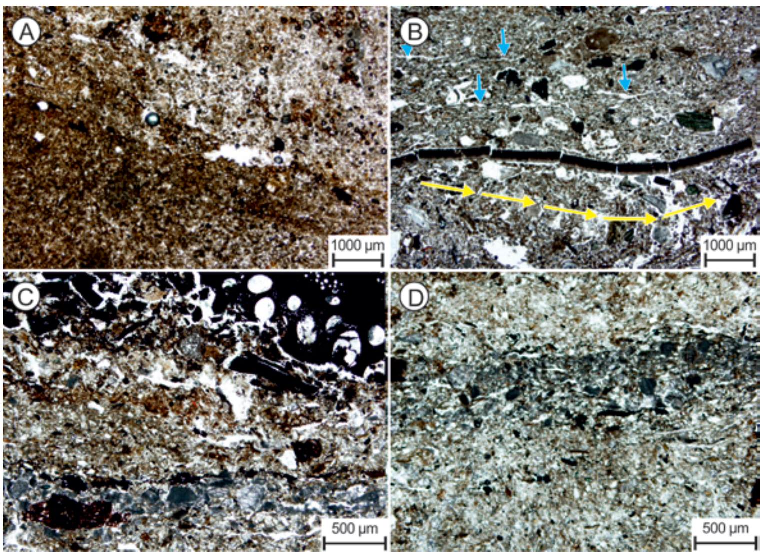


Fig. 115. Brno. Active layers formed by trampling and its mineral matrix show visible orientation. Illuviation is missing there. Author L. Lisá.

layering or preference orientation and also do not show signs of illuviation were detected in seven cases (in five cases these were basements and two were above-ground structures); 3) active layers, which were formed by trampled layer with possible deposition of organic component and are affected by leaking solutions, were detected in eight cases (i.e. three above-ground buildings and five basements). It is clear from the above that the treatment of walkable active layers is not uniform and it is not possible to evaluate the layer as a basement or floor of an above-ground building according to the method of treatment. It is likely that the ways in which the active layer was formed will depend on the specific context, i.e. localisation within the plot and the related use of the above-ground structure, as demonstrated in the case of the Veselá site (Lisá et al. 2020b).

3.2 Type of active layer as a reflection of the localisation of the floor in the building

However, it is clear that the deposition of organic mats or hay and straw was tied within the studied set of floors almost exclusively to above-ground structures. Nevertheless, exceptions can be found in this respect as well. This may be the case of, for example, the deposition of hay or straw in the basement of a modern house in Tišnov, which probably served as a layer against possible freezing (Lisá et al. 2009). Floor levels created by trampled layer without wet sweeping were detected only in basements and in one case (2 Panenská) in an above-ground structure. A similar find was recently published from a smaller cellar in Královo Pole dating to the end of the 13th century (Lisá, Kolařík 2020). Here, too, the matrix orientation was relatively well developed, but the marks after wet sweeping were not indicated. The big question is the interpretation of contexts where the direction is obvious on the surface and in the active layer itself or under it there are clear illuviations. Such layers could probably be mechanically treated or the mineral fraction was rectified by mechanical pressure during repeated walking. The archaeologist's repeated question is whether it is possible for basements to be swept. Such a possibility seems quite unlikely from today's point of view, but it cannot be ruled out, even from the perspective of the then rural society it is more than probable. In some cases, the layers even appear to have a grain size distribution, so that possible sweeping cannot definitely be excluded. The formation of alluvial laminates is in any case evidence of seeping water. This could be part of the treatment (wet sweeping), but it is also possible that the basements were relatively damp and contained water. The soil crusts captured in the case of 1 Panenská basement would correspond to this. It is therefore still an unresolved question of how to approach the interpretation of such types of layers.

3.3 Information read from the passive layer

Passive layers are an integral part of the floor set and provide very important information for the interpretation of possible differences between above-ground and recessed structures. It is obvious that the length of the active use in the form of surface loading together with less intensive surface treatment is sooner or later reflected in the structure of the passive layer. The 'reactive layer' begins to form in the upper part of the passive layer. Examples of passive layers are described in Fig. 117.

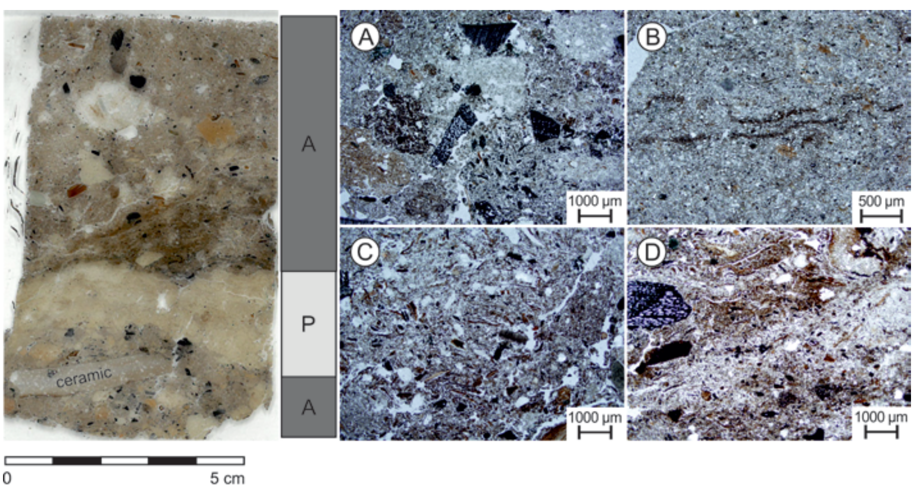


Fig. 116. Brno. Active layers formed by trampling show a particular orientation of the mineral matrix. These may also include organic residues and are often influenced by percolating solutions bringing the fine-grained matrix and clay down the section. Author L. Lisá.

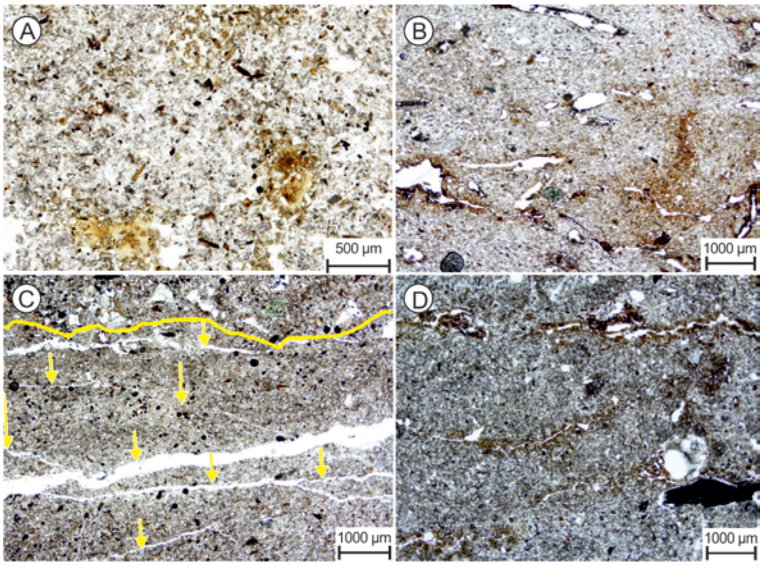


Fig. 117. Brno. Passive and reactive layers as an important identification factor for floor set interpretations. Author L. Lisá.

Information on the length and intensity of use is usually best seen in the presence, absence or intensity of the formation of horizontal pores in the layer below the active layer. Active layers with intense mechanical loading were identified in the case of samples in 1–3 Panenská, 19 Orlí, 75/08/07 and in Basements Veselá S1 and S3. In the case of samples from 1, 3 Panenská and 19 Orlí, 75/08/07 sites, these are basements, while in the case of samples from 2 Panenská and Veselá sites, they are above-ground structures. Especially in the case of samples from the Veselá site, there are always two and two floors in superposition, and Samples S1 and S3 come from older buildings (Lisá et al. 2020b). It is therefore a question whether the horizontal cracks in the case of the Veselá site are not related to the loading from the overburden due to the construction and use of the later phases of the building. If we accept this fact, the presence of horizontal pores under the active layer is bound exclusively to the active layers in the basements. In the case of the basement in Královo Pole (Lisá, Kolařík 2020) or the basement in Tišnov (Lisá et al. 2009), horizontal pores related to mechanical pressure in the overburden were also indicated. However, the presence of horizontal pores need not generally be linked to basements. During the research of floors in Dolní Něměí in the Na Mlýně Museum, a floor sandwich of a more or less continuous floor emerging from the end of the 18th to almost the middle of the 19th century was indicated (Lisá et al. 2020a; Lisá, Lisý 2019). In this case, it was an intensive surface treatment by wet sweeping with a supply of organic matter. Horizontal pores were very well developed in the lower parts of about 15 cm set of floors.

Finally, it is possible to read information from the floor horizons about the type of material that was used to create the passive layer. In most cases, the passive layer is either loess or redeposited loess, while in some cases it was possible to indicate the passive layer as the destruction of a structural element by melting or incineration. The passive layer, which is unsorted, whether it contains fragments of rocks or unburnt or burnt wood, could not have arisen in the given context without human intervention.

4. Conclusion

The presented study compares the formation processes of the floor sandwiches of medieval houses from the end of the 13th and the beginning of the 14th century in Brno. The study included floor sandwiches for basements and above-ground buildings. A total of 11 basement floor mats and eight floor sandwiches of above-ground buildings were studied. This part included already published sandwiches of above-ground buildings from the Veselá site. The methods of surface treatment of active layers and the type of material of passive layers is not completely uniform either between basements or between above-ground structures. However, it can be stated that in the case of Brno, the passive layers of floor sandwiches are created almost exclusively from loess or loess material, which in the past was part of a building element or secondary backfill, which are the result of post-deposition processes. Active layers can be divided into three basic types. Those that are formed mainly by the accumulation of organic mats or hay or straw and are not washed with water. These types of surfaces are usually bound to above-ground features. The second type of active layer is those formed by the trampled layer and which show signs of at least partial alignment, or the passive layers under these trampled layers are formed by horizontal pores, which indicates high mechanical pressure. These types of active floors are usually tied to dry basements. The last large group of active layers, which interweaves across basements and above-ground features, is active layers formed by at least partially directed mineral fraction with intensive presence of inflows documenting flowing solutions (fluids?). These types of active layers can be interpreted as penetrated due to wet sweeping, sweeping or mechanical direction of trampling and exposed to the short-term presence of stagnant water.

Chapter 9

Dendrochronological dating of wood-and-clay houses in Brno

Michal Rybníček – † Jitka Vrbová-Dvorská –
Tomáš Kyncl – Tomáš Kolář

1. Introduction

Since 1999, dendrochronology has been used to date the oldest foundations of the wood-and-clay houses within the area of the City of Brno. The dendrochronological dating of these buildings has often been made more difficult by the fact that the samples were carbonised. An analysis of this type of material is almost always complicated by the high degree of wood decay, the fragility of charcoal and a small number of quantifiable tree rings for reliable dendrochronological dating. This chapter provides an overview of timber samples from these wood-and-clay houses that have been subjected to dendrochronological analysis thus far.

2. Methods

Samples for a dendrochronological analysis were taken using an increment borer (cores) or a chainsaw (cross-sections). The surface of the samples had to be sliced off by a razor blade or a break was made so that the boundaries of the tree rings were clearly visible. The tree-ring widths (TRW) on the samples were measured using the VIAS TimeTable (Vienna Institute for Archaeological Science, Vienna, Austria) measuring system with an accuracy of 0.01 mm. The TRW series obtained were synchronised using PAST4 software (© SCIEM). The degree of similarity between the TRW series was assessed by t-tests (TBP – Baillie, Pilcher 1973; THO – Hollstein 1980) and Gleichläufigkeit (Eckstein, Bauch 1969). The TRW series that correlated significantly at the 99% confidence limit was compiled into a mean TRW series. The mean TRW series were dated according to the Czech oak and fir TRW chronologies (Prokop et al. 2017; Kyncl 2017, 144). Finally, reliably dated mean TRW series were used to compile the regional TRW chronologies.

3. Results

All the samples were identified by anatomic features as oak (*Quercus* spp.) or fir (*Abies* spp.). A total of nineteen oak and nineteen fir samples were subjected to dendrochronological dating. Some of the dated samples contained an outermost ring (the so-called waney edge; wk), so we were able to specify the year the sampled tree was felled. If the waney edge is missing, an estimation of missing rings to the waney edge is only possible in the case of oak samples if the border between heartwood and sapwood is preserved (ks). Oaks growing in the territory of the Czech Republic contain 5–25 sapwood tree rings based on the tree age and location type (Rybníček et al. 2006; Prokop et al. 2017). The other dated samples contained neither the outermost ring nor sapwood tree rings (ak). Thus, only the year after which the tree was felled could be identified (Tab. 2). The oak and fir regional TRW chronologies range from 1080–1291 and 1117–1293, respectively (Graph 1).

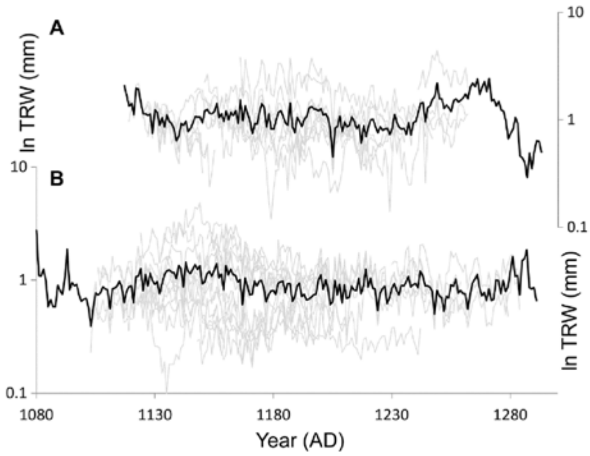
4. Conclusion

The research on the wood-and-clay houses showed that even carbonised wood, which is very often excluded from dendrochronological analyses, can be successfully dated in terms of dendrochronology.

Number of samples	Archaeological evidence	Tree species	Number of tree rings	Number of non-measured tree rings and the outermost ring	Dendrochronological dating
Panenská Street (A14/09)					
1	996	oak	49	10 ak	after 1181
4 Kobližná Street – Utility tunnel K7					
2	1	oak	50	30 ks	1316–1336
3	2	oak	62	3 ks	1204–1306
4	3	oak	79	3 ks	1282–1302
5	16	oak	134	1 ks	1260–1274
6	4	fir	64	1 ak	after 1215
7	1.1	fir	53	1 ak	after 1294
8	1.2	fir	69	2 ak	after 1263
10 Orlí Street (A46/2006)					
9	2	fir	32	1 ak	after 1151
10	3	fir	24	3 ak	after 1158
11	4	fir	29	1 ak	after 1150
12	5	fir	34	2 ak	after 1154
13	6	fir	27	1 ak	after 1183
Mint Master's Cellar					
14	1	fir	101	1 ak	after 1247
Mahen Library					
15	443	oak	73	4 ak	after 1185
16	11/302	fir	53	1 swk	summer 1209
17	288	fir	70	1 ak	after 1221
18	1434	fir	51	2 ak	after 1234
19	1434b	fir	49	1 swk	summer 1235
20	143	fir	53	1 wwk	1235/1236
Panenská Street (A14/09)					
21	2907/3	oak	44	1 ak	after 1188
22	3358/2	oak	103	6 ks	1248
23	3358/3	fir	51	6 ak	after 1183
24	3358/6	fir	99	ak	after 1262
Veselá Street, plot No. 593/2					
25	4985	fir	38	ak	after 1203
26	4987	oak	67	1 ak	after 1198
27	3991	oak	124	ak	after 1252
28	2991	oak	112	1 ak	after 1224
29	4982	oak	73	1 ak	after 1206
30	4983	oak	75	1 ak	after 1213
31	4984	oak	57	1 ak	after 1214
32	3966	oak	97	1 ak	after 1217
33	4928	oak	92	1 ak	after 1203
34	4929	oak	65	1 ak	after 1218
35	5951	fir	86	11 ak	after 1213
36	5922	oak	108	swk	summer 1262
7 Biskupská Street					
37	post	oak	163	15 ks	1257–1272
38	191	fir	62	2 ak	after 1257

Tab. 2. The results of the dating of samples from Brno. The samples contain heartwood rings (ak), sapwood rings (ks), or waney edges (wk, swk – including only earlywood, wwk – also including latewood).

From the overview of the dated samples, it is clear that some of the dated samples contained a small number of tree rings. As they were part of a larger set of samples from the given area, it was possible to compile mean TRW series from them that could be subsequently reliably dendrochronologically dated. From the perspective of dendrochronology, archaeological research is a valuable source of dendrological material, which can serve for the creation of TRW chronologies for the territory of the Czech Republic, or more specifically Moravia. The creation of these TRW chronologies is essential for the dendrochronological dating of samples found in the relevant territory.



Graph 1. Synchronisation of the fir (A) and oak (B) individual tree-ring series (grey) and mean tree-ring series (black). Author M. Rybníček.

Chapter 10

Veselá Street, Brno – Results of archaeobotanical analyses

Petr Kočár – Romana Kočárová

1. Introduction

Material gathered during a rescue excavation caused by the construction of Janáček Culture Centre in Veselá Street, Brno, plots No. 593/2, 601 was used for archaeobotanical analyses with 54 sediment samples chosen (see Fig. 24 in Chapter 6). The samples were primarily taken from the cellars of high medieval houses although some were also taken from the floor levels of above-ground parts of the houses. All the samples can be tentatively dated to the second half of the 13th or the first half of the 14th centuries. The samples were processed by flotation using a system of sieves with the smallest mesh diameter of 0.25 mm and dried at room temperature. The volume of the samples was 2–20 l, with an average of 6.5 l (Tab. 3). Altogether, 326.5 l of sediment was processed by flotation.

The remnants of plants (especially seeds and fruits) were selected and classified under a stereoscopic microscope. The samples were sorted in their full volume except for the sample from a stratigraphic unit (hereinafter s. u.) 15132, which was rich in finds with 50% of the sediment sorted from this particular sample. The palaeobotanical material was determined using a comparable collection of plant diaspores and basic literature for the determination of plant macroremains (Anderberg 1994; Beijerinck 1947; Berggren 1969; 1981; Bertsch 1941; Katz et al. 1965; Schermann 1967).

Charcoal and fragments of non-charred wood with a size fraction exceeding 2 mm were analysed by a light microscope adapted for observation in incident light (episcopic microscope). After breaking the charcoals, fresh fracture surfaces (transversal, radial and tangential fracture) were observed under the magnifications of 50×, 100× and 200×. The number and masses of charcoal fragments in the processed samples were recorded. The literature for the determination of wood and charcoal (Schweingruber 1978) and an online guide to the determination of wood and charcoal of Central European woody plants (Schoch et al. 2004) were also used.

2. Results of botanical analyses

The results of archaeobotanical macroremains analysis and wood and charcoal analysis are presented in Tab. 4 (macroremains), Tab. 5 (the mass of wood and charcoal fragments)and Tab. 6 (the number of wood and charcoal fragments).

Altogether 1,361 plant macroremains – especially plant seeds and fruits – and 1,551 wood and charcoal fragments (with a total mass of 150 g) have been analysed. The presence of 62 well-determinable herbaceous plant taxa has been demonstrated, including 19 useful species and 21 woody plant taxa.

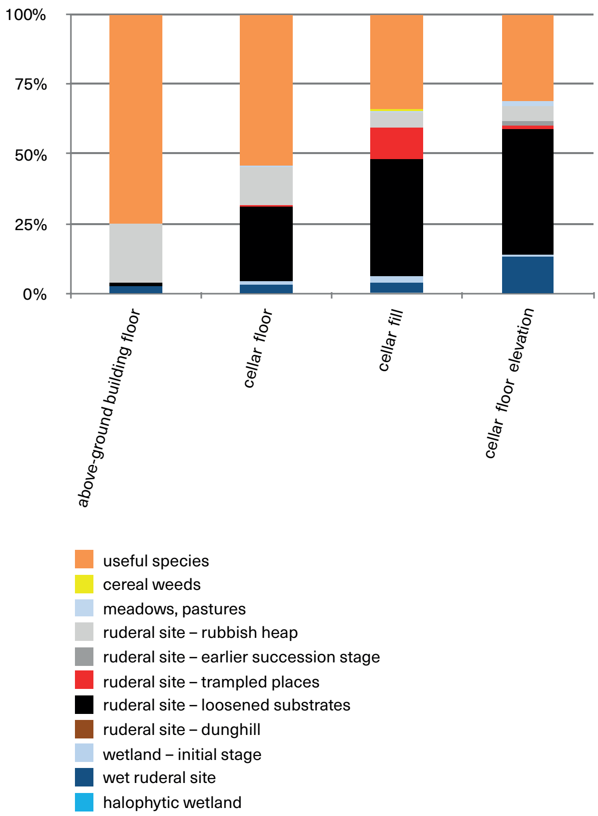
The results of charcoal and non-charred wood analyses are very similar in all the samples. The charcoal set is dominated by oak and beech in all the analysed samples. The individual contexts show only small differences in the representation of the two taxa (they are approximately balanced). The other more represented taxa are hornbeam and linden. Other woody plants were detected as admixtures.

In contrast, the results of macroremains analysis (Graph 2) show a marked difference between the individual context categories. However, when looking at the macroremains sets from the individual features in detail, the results outlined above need to be somewhat relativised. There are large differences between the individual features, which most likely reflects the complex genesis and demise of the individual stratigraphic units.

s. u.	volume (l)	interpretation	context
125	?	floor layers	above-ground wood and clay house
2142	?	floor layers	above-ground wood and clay house
2149	?	floor layers	above-ground wood and clay house
9182	10	cellar fill	cellar 017
9429	10	cellar fill	cellar 017
9431	10	cellar floor	cellar 017
9431/2	2	cellar floor	cellar 017
9436	2	cellar floor	cellar 017
9439	1.5	cellar floor	cellar 017
9472	10	cellar floor	cellar 017
9472	2	cellar floor	cellar 017
9474	?	cellar floor	cellar 017
9475	1.5	cellar floor	cellar 017
9483	10	cellar floor	cellar 017
9485	1.5	cellar floor	cellar 017
11141	10	cellar floor	cellar 013
11141	3	cellar floor	cellar 013
11141	1	cellar floor	cellar 013
11143	3	cellar floor elevation	cellar 013
11146	10	cellar floor elevation	cellar 013
11146	2.5	cellar floor elevation	cellar 013
11146	10	cellar floor elevation	cellar 013
11147	2.5	cellar floor elevation	cellar 013
11147	1.5	cellar floor elevation	cellar 013
11235	10	cellar floor elevation	cellar 013
11235	3	cellar floor elevation	cellar 013
11236	10	cellar floor	cellar 013
11236	2	cellar floor	cellar 013
11238	2	cellar floor	cellar 013
11238	10	cellar floor	cellar 013
11240	2	cellar floor	cellar 013
11281	3	cellar floor elevation	cellar 013
11282	2	cellar floor elevation	cellar 013
15132	10	cellar fill	cellar 005
15132	10	cellar fill	cellar 005
15133	10	cellar fill	cellar 005
15162	10	cellar fill	cellar 005
15173	4	cellar floor	cellar 005
15176	10	cellar fill	cellar 005
15272	2	floor (tread) in cellar	cellar 010
15373	2	cellar floor	cellar 008
15373	20	cellar floor	cellar 008
15485	1.5	cellar floor	cellar 016
18402	1	fire (charcoal) in cellar	cellar 011
18433	10	cellar floor	cellar 001
18438	10	cellar fill	cellar 001
18440	10	cellar fill	cellar 001
18440/2	10	cellar fill	cellar 001
18442/2	10	cellar fill	cellar 001
18444	8	cellar floor	cellar 001
18484	10	cellar floor	cellar 002
19238	10	cellar floor	cellar 004
19261	10	cellar fill/floor	cellar 015
19267 (1?267)	10	cellar fill/floor	cellar 014

Tab. 3. Brno – Veselá Street. List of samples.

A common assortment of high medieval useful species has been documented in the examined samples. The detected cereal species included oat (*Avena sativa*, *Avena* sp.), common barley (*Hordeum vulgare* s.l.), common millet (*Panicum miliaceum*), rye (*Secale cereale*) and common wheat (*Triticum aestivum*). One legume species was also documented, lentil (*Lens culinaris*), and one oleaginous plant species, hemp (*Cannabis sativa*). Three commonly registered fruit and nut species were also registered: cherry (*Cerasus* sp.), walnut (*Juglans regia*) and thermophilic grapevine (*Vitis vinifera*); from the imported useful species, it was the common fig (*Ficus carica*). Of the wild-growing (gathered) species, the commonly occurring rubus species were documented – European dewberry (*Rubus caesius*), red raspberry (*Rubus idaeus*) and European blackberry (*Rubus fruticosus*), along with wild strawberry (*Fragaria vesca*) and winter cherry (*Physalis alkekegii*). These species may have grown in the local vegetation and may have been gathered and cultivated. The gathering of two elderberry species (*Sambucus ebulus* and *Sambucus nigra*) can also be potentially considered.



Graph 2. Brno – Veselá Street. Results of the archaeobotanical macroremains analysis, plant macroremains ratios of ecological groups of plants in the individual types of sampled stratigraphic units (n=1,341).

Poor sets of plant remains affected by decomposition (the seeds were preserved in a strongly corroded state; species with resistant seeds and fruits are more substantially represented) were detected in the **floor layers of above-ground structures** (s. u. 125, 2142, 2149). Resistant macroremains of some useful plants (raspberry) principally predominate in the sets.

Archaeologists presume that these stratigraphic units primarily consisted of unfired daub. The genesis of the s. u. 125 sample was somewhat different, as it consisted of thin structural or reconstruction layers and also thin treading layers between them. A mixed sample was taken for archaeobotanical analysis. The considerable occurrence of some useful plants is interesting. This can probably be explained by a secondary penetration of macroremains of useful plants into the (cracked) daub layers as a consequence of the use of these floors. The random inclusion of plant macroremains during the preparation of the daub cannot be ruled out either, as various waste material can get into it accidentally.

The **floor layers of the cellars** also show a high ratio of seeds and fruits of useful species (over 50%). Besides the reconstruction layers and adaptations, the floor layers in the cellars principally originate from use and tread. Therefore, the macroremains should, to a certain extent, reflect the activities connected with the use of these cellars, especially the storage of food (grapevine, blackberry, raspberry etc.).

A higher ratio of coniferous tree charcoal, especially fir and pine, which is rarely documented in Moravia, has been observed in the samples from the floors. These may represent the remnants of the charcoal of resinous wood used in the production of torches.

Contexts described as **cellar fill** and cellar floor elevation contain rich sets with a slight predominance of local vegetation seeds (trodden and aerated substrates, marsh-rubble vegetation etc.). Species of weedy communities and meadows or pastures were also detected (an allochthonous component of the archaeobotanical spectrum, which entered the studied samples together with waste). Diaspores of useful species only comprise about one-third of the archaeobotanical set. These are fills, mostly of redeposited material from the neighbourhood (diaspores of rubble vegetation) and of contemporary waste (useful species).

The manifestation of stratigraphic units interpreted as **cellar floor elevation** (principally cellar s. u. 013) is similar to that of the cellar fill. This confirms that similar material (redeposited material from the neighbourhood and possibly waste) was used for the elevation. The users probably did not mind. They either did not try to use a different or more suitable material or had none at their disposal.

3. Conclusions from the botanical analyses

The outcome of the botanical analyses (anthracology, xylotomy and macroremains) of the samples from the cellars of houses in Veselá Street, Brno demonstrate a relatively unified character of the charcoal and wood sets and, on the contrary, considerable differences in the sets of plant seeds and fruits gathered from the individual types of stratigraphic units.

The charcoal sets primarily consisted of oak and beech charcoals and other woody plants from oak-hornbeam forests and beechwoods. The unified character possibly indicates the secondary nature of most of these charcoal sets (secondarily moved waste, trodden material etc.). Fir, probably from construction timber, predominates in the non-charred wood set. Perhaps the only interesting difference is the higher ratio of coniferous tree charcoal in the floor levels of house cellars, which may be linked to the use of torches for lighting in these underground spaces.

Poor sets of resistant macroremains (seeds and fruits) were detected in the **floor layers of the above-ground structures**. The sets probably originated from a secondary penetration of the macroremains into daub layers due to the use of these floors. A random inclusion of plant macroremains during the preparation of the daub cannot be ruled out (charred macroremains of field crops are present, for instance).

The **floor layers of the cellars** also show a high ratio of seeds and fruits of useful species (over 50%). Besides the reconstruction layers and adaptations, the floor layers in the cellars principally originate from use and tread. The macroremains thus perhaps first and foremost reflect the storage of food in the cellars of houses.

Cellar fill and **cellar floor elevation** contexts contain rich sets of macroremains with a slight predominance of local vegetation seeds (trodden vegetation and aerated substrates). Marsh-rubble vegetation may perhaps indicate a succession of marsh vegetation in disappearing subsurface features. These are fills consisting mostly of redeposited material from the neighbourhood (diaspores of rubble vegetation) and contemporary waste (useful species).

	Acinos arvensis	*Agrostemma githago*	*Agrostemma githago*	*Atriplex sp.*	*Avena sativa*	*Avena sp.*	*Avena sp.*	*Avena sp.*	*Betula pendula*	*Cannabis sativa*	*Carex caryophyllea*	*Carex hirta*	*Carex hirta*	*Centaurea cyanus*	*Cerasus sp.*	*Cerealia*	*Cerealia*	*Cirsium/Caruus*	*Echium vulgare*	*Eleocharis sp.*	*Euphorbia esula*	*Euphorbia helioscopia*	*Fallopia convolvulus*	*Ficus carica*	*Fragaria vesca*	*Fumaria officinalis*	*Fumaria officinalis subsp. officinalis*	*Fumaria officinalis subsp. wirtgenii*	*Galeopsis tetrahit/bifida/pubescens*	*Galium spurium*	*Glaucium corniculatum*	*Hordeum vulgare*	*Hordeum vulgare subsp. coeleste*	*Hyoscyamus niger*	*Chenopodium album*	*Chenopodium hybridum*	*Chenopodium murale*	*Chenopodium polyspermum*	*Juglans regia*
	basil thyme	**corncockle**	**corncockle**	**saltbush**	**green oat**	**oat**	**oat**	**oat**	**silver birch**	**hemp**	**spring sedge**	**hairy sedge**	**hairy sedge**	**cornflower**	**cherry/sour cherry**	**cereals**	**cereals**	**thistle**	**viper's bugloss**	**spike-rush**	**leafy spurge**	**sun spurge**	**basil thyme**	**fig**	**wild strawberry**	**common fumitory**	**true common fumitory**	**Wirtgen's common fumitory**	**common/bifid/hairy hemp-nettle**	**false cleavers**	**red horned-poppy**	**barley**	**naked barley**	**black henbane**	**white goosefoot**	**hybrid goosefoot**	**nettle-leaved goosefoot**	**manyseed goosefoot**	**common walnut**
	sch	s	s	a	clm	ca	ca	ca	s	a	a	a	a	a	st	ca	st	a	sch	a	s	s	a	a	a	fru	fru	fru	sch	a	s	ca	ca	s	a	a	a	a	sh
s. u.	nchr	nchr	chr	nchr	chr	chr	chr	fr chr	nchr	fr nchr	nchr	nchr	nchr	nchr	fr nchr	fr chr	fr chr	fr nchr	nchr	nchr	nchr	nchr	nchr	nchr	nchr	fr nchr	nchr	nchr	nchr	chr	nchr	chr	chr	nchr	nchr	nchr	nchr	nchr	fr nchr
125						4						2				1																			1				
2 142																																							
2 149																																							
2 149																																							
9 182																											1												
9 429																																							
9 429																																							
9 431/2																																							
9 436																																			9			1	
9 472																						1		2			1				2								
9 472																																							
9 474																																							
9 483												1														2	2				1								
9 485																																			1				
11 141																																			1				
11 141																							1		1						2				1				
11 143	1			2														1							4										11	1		9	
11 146																1																							
11 146							5	2																		2	1	1							2	2		1	1
11 146												1					1			1					2		1				2			8	16	1		15	
11 147				1								1													3						1				7	1		3	
11 147															1										2										8		2		
11 235																										1									16				
11 235																										1									9	1			
11 236												1																											
11 236																				1																			
11 238		1				1					1		3												1						1			1					
11 238						1																																	
11 240																	1														1								
11 281																									2					1	1								
11 282									1																														
15 132												4								1					1	3	8	3							2				
15 132				4									6							14			7			2	1				2				116	1			
15 133					1								1							3													1		3	1			
15 162								1																											1				
15 173																																							
15 176													1																						2				
15 272																								1							1					1			
15 373																										1					1								
15 373									1																							1							
18 402																																							
18 433						1						2												1							3								
18 438																					1																		
18 440																																							
18 440/2							1																			1	2				1				2				
18 442/2																																							
18 444										2		2																			32			4	4				
18 484						5							1		1												1		1		1			1	2	1			
19 238																			1												2								
19 261	1		1	5																		1									1			1	124	4		13	
19 267						1								1																	2								
Total	2	1	1	12	1	13	6	3	2	2	1	14	12	1	2	2	2	1	1	20	1	2	8	4	16	13	18	4	1	1	57	1	1	15	338	14	2	42	1

Tab. 4. Brno – Veselá Street. Results of the archaeobotanical macroremains analysis.
Legend: a – achene, ca – caryopsis, chr – charred macroremain, clm – caryopsis in a lemma, co – ear cob element, d – diaspore (seed, fruit), fr – fragment, fru – fruit, gc – germinated caryopsis, nchr – non-charred macro-remain, s – seed, sch – schizocarp, sh – shell, st – stone.

white dead-nettle *Lamium album*	common henbit *Lamium amplexicaule*	lentil *Lens culinaris*	ball mustard *Neslia paniculata*	proso millet *Panicum miliaceum*	pale persicaria *Persicaria lapathifolia*	winter cherry *Physalis alkekegii*	grasses *Poaceae*	field needleleaf *Polycnemum arvense*	equal-leaved knotgrass *Polygonum arenastrum*	common purslane *Portulaca oleracea*	cinquefoil *Potentilla sp.*	meadow buttercup *Ranunculus acris*	meadow buttercup *Ranunculus acris*	wild mignonette *Reseda lutea*	European dewberry *Rubus caesius*	European blackberry *Rubus fruticosus*	red raspberry *Rubus idaeus*	dwarf elder *Sambucus ebulus*	dwarf elder *Sambucus ebulus*	elderberry *Sambucus nigra*	rye *Secale cereale*	rye *Secale cereale*	rye *Secale cereale*	common club-rush *Schoenoplectus cf. lacustris*	grey club-rush *Schoenoplectus tabernaemontanii*	bladder campion? *Silene cf. vulgaris*	field/annual yellow woundwort *Stachys arvensis/annua*	lesser stitchwort *Stellaria graminea*	field pennycress *Thlaspi arvense*	common wheat *Triticum aestivum*	common wheat *Triticum aestivum*	common wheat *Triticum aestivum*	common nettle *Urtica dioica*	annual nettle *Urtica urens*	field pansy/heartsease *Viola aevensis/tricolor*	common grapevine *Vitis vinifera*	common grapevine *Vitis vinifera*	undetermined *Indeterminata*	Total
sch	sch	s	fru	ca	a	s	ca	a	a	a	a	a	a	s	st	st	st	s	s	s	ca	ca	co	a	a	s	sch	s	s	ca	gc	ca	a	a	s	st	st	d	
nchr	nchr	chr	nchr	chr	nchr	nchr	chr	nchr	nchr	nchr	nchr	nchr	nchr	nchr	nchr	nchr	nchr	nchr	nchr	nchr	chr	chr	chr	nchr	nchr	nchr	nchr	nchr	nchr	chr	chr	chr	nchr	nchr	nchr	nchr	nchr	nchr	
													fr						fr	fr		fr										fr					fr		
															4		32	2			2						7			3		1							59
														1		4	4										2												11
																	1										4												5
																	1	1									1			2		1							7
																	1																						1
										1				1													1												13
																1	6		1								7										2	1	24
																											1												1
	2																3	1	1								2												15
											1						1																						3
																	1																						2
																2	4		1								1												13
	2									1		1	1				2										1						1				3		41
																																							1
		1		2						1						1	2	2			1	1	3				4			2								4	41
	1							1									5										1			1								2	59
																1	2																						20
1																1																						1	16
																1	1										1												20
																2	3										2											1	19
																1	2										1									1			6
				2											1	1	8										1									1			15
												1				2	1										2					1				3	2		21
														2			2																			1	3		9
																																							2
																	4				1						1			1						2	3		16
																																							1
															1	2		3						1	1		2									1	5		38
			1		1									3	2	2	1	1		1						2	3	1	1							11	1	1	185
																		1							1					1						3		1	17
															1	1		1												2						3			10
																	1																			2	3		6
															1		3			1	3									1	2					4	4		22
																2	2										1									6	6		20
		1																			1						1												5
																					1									1									4
				1													17	2			1	2	2				4			10		7				1			54
																	1													1		2							5
															2		3			1	3	1								10	1					1			22
				1											14	3	30	1		1							6			13	1							3	80
																	3	1			7	1					3			17		1							33
															1	1	3				1	1					11			4								4	70
						1											5				1									7									28
															2	3	3	1									1										3		16
				1			1		1	77	1			1		1		1								1	2							1	1	4	4		248
																1	51	4			1						1			2									64
1	5	2	1	7	1	1	1	1	1	80	2	2	1	8	29	33	209	22	3	4	23	6	5	1	2	3	75	1	1	78	4	13	1	1	1	44	39	18	1,368

		Abies	*Abies*	*Abies/Picea*	*Abies/Picea*	*Acer*	*Alnus*	*Betula*	*Betula/Alnus*	*Carpinus*	*Cornus*	*Corylus*	*Fagus*	*cf. Fagus*	*Fagus*	*Fraxinus*	*cf. Fraxinus*
		fir	**fir**	**fir/spruce**	**fir/spruce**	**maple**	**alder**	**birch**	**birch/alder**	**hornbeam**	**dogwood**	**hazel**	**beech**	**beech?**	**beech**	**ash**	**ash?**
s. u.		chc	wd	chc	wd	chc	chc	chc	chc	chc	chc	chc	chc	chc	wd	chc	chc
125						0.245						0.015	1.334				
2 142								0.015					0.231				
2 149										0.315			0.358				0.008
1 572					0.025								0.853				
9 182				0.031		0.008			0.017	0.140			0.618				
9 429										0.207			1.858				
9 429								0.040		0.039	0.120	0.101	0.847				
9 436																	
9 439																	
9 472							0.015			0.025			0.812				
9 472																	
9 475													0.045				
9 483		0.020								0.033			0.991				
9 485													0.009				
11 141						0.014							0.294				
11 141		0.025		0.104	0.098					0.387			0.569			0.028	
11 143										0.025			0.042				
11 146					0.190	0.016							0.061				
11 146	neg.																
11 147								0.015					0.020				
11 147													0.014				
11 235													0.014				
11 235																	
11 236					0.064					0.337			0.610				
11 236				0.006		0.022				0.027			0.216				
11 238		0.081				0.036				0.059			0.227				
11 240				0.032		0.108	0.010		0.012	0.223			0.315			0.005	
11 281								0.052					0.271				
11 282	neg.																
15 132		0.047											2.418		0.015		
15 162		0.146	4.400	0.041	4.272	0.040		0.045		0.139		0.062	0.906				
15 173													0.385				
15 176			0.043	0.053	0.306	0.030		0.030		0.068			0.410				
15 373		0.009					0.055	0.075	0.008	0.039			0.396				
15 373		7.153										0.628	1.638				
15 485																	
18 402																	
18 433				0.014				0.083		0.106			0.562				
18 438				0.010									0.068				
18 440													0.669				
18 440/2					0.027			0.076		0.448			0.755				
18 442/2						0.342				0.733			1.660			0.023	
18 484		0.016		0.076						0.504			2.817		0.050		
9 431/2														0.007			
19 261						0.009		0.013							0.257		
19 238										0.036			0.319				
18 444						0.038							0.098				
11 238		0.128			0.076	0.051		0.035		0.233			1.114				
11 146													0.116				
16 267?						0.021							0.654				
15 133				0.621	0.213	0.011		0.018		0.026			0.878				
Total		**7.623**	**4.443**	**0.988**	**5.271**	**0.989**	**0.080**	**0.495**	**0.037**	**4.149**	**0.120**	**0.806**	**26.470**	**0.007**	**0.322**	**0.055**	**0.008**

Tab. 5. Brno – Veselá Street. Results of anthracology and xylotomy analyses, mass (g) of analysed charcoal and non-charred wood fragments. Legend: chc – charcoal, wd – wood.

Picea	*Pinus*	*Pinus*	*Pomoideae*	*Populus*	*Populus/Salix*	*Prunus*	*Quercus*	*Quercus*	*Tilia*	*Ulmus*	*cf. Ulmus*	*Conifera ind.*	*Conifera ind.*	*Dicotyledoneae*	*Dicotyledoneae*			
spruce	pine	pine	apple family	poplar	poplar/willow	plum	oak	oak	linden	elm	elm?	conifer	conifer	broad-leaved tree	broad-leaved tree	bark	remnant	remnant
chc	chc	wd	chc	chc	chc	chc	chc	wd	chc	chc	chc	chc	wd	chc	wd	wd	chc	wd
							0.705			0.017							3.062	
							0.350										0.326	
							0.062	0.007			0.016	0.005	0.018	0.024			0.349	
							0.512		0.045								0.424	0.060
					0.013		0.560			0.020							0.563	
							0.207										3.328	
							0.263			0.098							1.981	
							0.020											
	0.006				0.014												0.009	
					0.045		0.515										0.335	
							0.038											
					0.017													
						0.075	0.311										0.563	
				0.009			0.014											
							0.664										0.333	
							0.062										0.059	
							0.417										0.045	0.251
							0.019											
																	0.037	
							0.120											
				0.164			2.273										6.227	
0.059							0.323		0.029				0.009				0.235	
					0.053		0.805			0.010							0.484	
							0.308										0.361	
							0.158										0.177	
							4.493								0.031		27.947	
					0.057		1.256		0.103								1.753	3.894
							0.173										0.034	
			0.091				0.322	0.018	0.057	0.026							0.663	0.396
	0.018		0.072				0.216										0.313	
									0.081								25.826	
							0.006											
							68.241										74.435	
			0.020		0.062		0.301										0.422	
					0.009		0.046										0.029	
			0.033				0.620		0.100								1.514	
							0.883					0.069					4.453	
					0.290		0.818										7.930	
	0.050	0.25					0.430	0.047		0.051						0.500	15.517	0.622
	0.022						0.146	0.227	0.009							3.732	0.010	
	0.016		0.038				0.207										0.59	
	0.005						0.384						0.007				0.012	
						0.041	0.522						0.112					
							0.012										0.036	
			0.021			0.061	2.380										1.718	
			0.025				0.716		0.173	0.026							0.467	
0.059	**0.116**	**0.25**	**0.301**	**0.172**	**0.560**	**0.177**	**90.879**	**0.298**	**0.598**	**0.248**	**0.016**	**0.074**	**0.146**	**0.024**	**0.031**	**4.232**		

		Abies	*Abies*	*Abies/Picea*	*Abies/Picea*	*Acer*	*Alnus*	*Betula*	*Betula/Alnus*	*Carpinus*	*Cornus*	*Corylus*	*Fagus*	*cf. Fagus*	*Fagus*	*Fraxinus*	*cf. Fraxinus*	*Picea*	*Pinus*	*Pinus*	*Pomoideae*	*Populus*	*Populus/Salix*	*Prunus*	*Quercus*	*Quercus*	*Tilia*	*Ulmus*	*cf. Ulmus*	*Conifera ind.*	*Conifera ind.*	*Dicotyledoneae*	*Dicotyledoneae*	*Indeterminata*	
		fir	**fir**	**fir/spruce**	**fir/spruce**	**maple**	**alder**	**birch**	**birch/alder**	**hornbeam**	**dogwood**	**hazel**	**beech**	**beech?**	**beech**	**ash**	**ash?**	**spruce**	**pine**	**pine**	**apple family**	**poplar**	**poplar/willow**	**plum**	**oak**	**oak**	**linden**	**elm**	**elm?**	**conifer**	**conifer**	**broad-leaved tree**	**broad-leaved tree**	**bark**	**Total**
s. u.		chc	wd	chc	wd	chc	chc	chc	chc	chc	chc	chc	chc	chc	wd	chc	chc	chc	chc	wd	chc	chc	chc	chc	chc	wd	chc	chc	chc	chc	wd	chc	wd	wd	
125						3						1	27												18			1							**50**
2 142								1					13												16										**30**
2 149										9			19				1								8	1			2	1	1	2			**44**
1 572					3								24												24		2								**53**
9 182				2		1			1	3			21										1		20			1							**50**
9 429										2			19												4										**25**
9 429								1		1	1	1	10												10			1							**25**
9 436																									1										**1**
9 439																			1				1												**2**
9 472							1			1			26										2		20										**50**
9 472																									2										**2**
9 475													2										1												**3**
9 483		1								1			27											1	20										**50**
9 485													1																						**1**
11 141						1							6									1			2										**10**
11 141		1		4	7					5			18			1									21										**57**
11 143										1			2												1										**4**
11 146					12	1							2												3										**18**
11 146	neg.																																		
11 147								1					2												1										**4**
11 147													1																						**1**
11 235													1																						**1**
11 235																									4										**4**
11 236					3					6			10									1			33										**53**
11 236				1		2				1			10					1							15		1				1				**32**
11 238		2				3				1			10										3		30			1							**50**
11 240				2		10	1		1	4			11			1									17										**47**
11 281								1					7												9										**17**
11 282	neg.																																		
15 132		1											13		1										36								1		**52**
15 162		6	6	3	44	1		1		3		1	14										1		19		1								**100**
15 173													6												7										**13**
15 176			1	4	15	1		2		5			14								1				20	1	2	1							**67**
15 373		1					1	3	1	2			15						1		1				8										**33**
15 373		10										1	5														1								**17**
15 485																									1										**1**
18 402																									50										**50**
18 433				1				4		3			15								1		3		17										**44**
18 438				1									4										1		3										**9**
18 440													6								1				15		3								**25**
18 440/2					2			1		2			12												9					1					**27**
18 442/2						1				11			24			1							3		10										**50**
18 484		2		3						4			30		1				1	2					9	1		1						1	**55**
9 431/2														1																					**1**
19 261						1		1							16				4						10	1	1							40	**74**
19 238										5			15						2		1				20										**43**
18 444						1							9						1						22						1				**34**
11 238		2			4	2		1		3			18											1	23						8				**62**
11 146													3												2										**5**
16 267?						1							13								1			1	34										**50**
15 133				5	5	1		1		1			12								1				26		2	1							**55**
Total		26	7	26	95	30	3	18	3	74	1	4	497	1	18	3	1	1	10	2	7	2	16	3	620	4	13	7	2	2	11	2	1	41	1,551

Tab. 6. Brno – Veselá Street. Results of anthracology and xylotomy analyses, numbers of analysed charcoal and non-charred wood fragments. Legend: chc – charcoal, wd – wood.

Chapter 11

A contribution to the beginnings of early burgher architecture in Jihlava

Marek Peška – David Merta

1. The origin and significance of Jihlava until the end of the Middle Ages

The town of Jihlava was founded in the middle of the Bohemian-Moravian Highlands, a region that was difficult to pass and uninhabited for a large part. A secondary long-distance route from the Danube region to the land around the River Elbe in Bohemia passed through it from prehistory. The route increased in importance towards the end of the Early Middle Ages as a link between the appanage Duchy of Znojmo and the Přemyslid centre in Prague. The first mention from 1226 concerns a settlement near the Church of St John the Baptist close to a ford across the River Jihlava. The beginnings of the town are inseparably linked to silver-bearing veins in nearby Staré Hory, where the first mines were probably opened as early as the late 1230s. Several decades later, Jihlava's mining district became one of the richest silver deposits in Europe. The generous foundation of the 'new' Jihlava on a regular orthogonal layout (Fig. 118) with

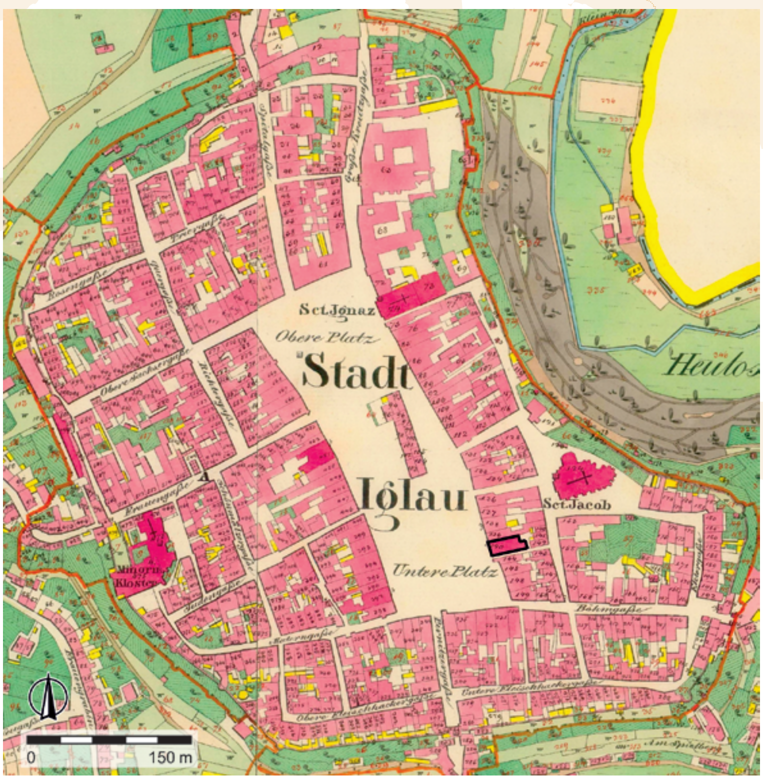


Fig. 118. Jihlava. The city on the Stable Cadastre map from 1835 with House No. 16 in Masarykovo Square marked. © CUZK Jihlava, modified by M. Peška.

an area of approximately 36 ha took place between 1240 and 1243 and is usually linked to the Master of the Mint Eberhard, a member of the royal councils of Wenceslas I and Ottokar II. Although the town's privilege is not preserved, a no less interesting deed is available to us – the oldest construction rules in the Czech lands issued by Ottokar II in 1270. The aim was to regulate the initial burgher development, which had perhaps been somewhat unmanaged. The extraordinary significance of the town also manifested itself after the death of King Ottokar II on the Marchfeld in 1278. It was there that the Přemyslid and Habsburg dynasties were united by the marriage of Prince Wenceslas and Judith (Guta), the daughter of Rudolf of Habsburg, the following year. Throughout the Middle Ages, Jihlava was one of the four largest towns in Moravia, an important buttress of royal power and the main market in the region of the Bohemian-Moravian Highlands. The town square in Jihlava (with the upper and lower markets) with an area of almost 3.6 ha is one of the largest in the Czech lands. Due to the great but very brief economic boom that only lasted until the end of the 13th century, when most of the silver deposits ran out, and due to the subsequent two centuries of stagnation, a unique architectural assemblage of buildings from the end of the Přemyslid era remained preserved in the town. Besides the town walls, the parish church and two mendicant convents, there is a small group of houses with numerous early Gothic stone elements. These document the extraordinary wealth that had been gathered by the burghers of Jihlava during the very short period of existence of the town. Most medieval burgher buildings eventually gave way to exceptional economic prosperity and numerous fires in the 16th century. Large parts of the houses were demolished and others were rebuilt. Regardless of this, Jihlava acquired a Renaissance character it has retained to this day. It was at this time that the town reached its historical peak (cf. Měřínský et al. 2009; Hoffmann et al. 2000).

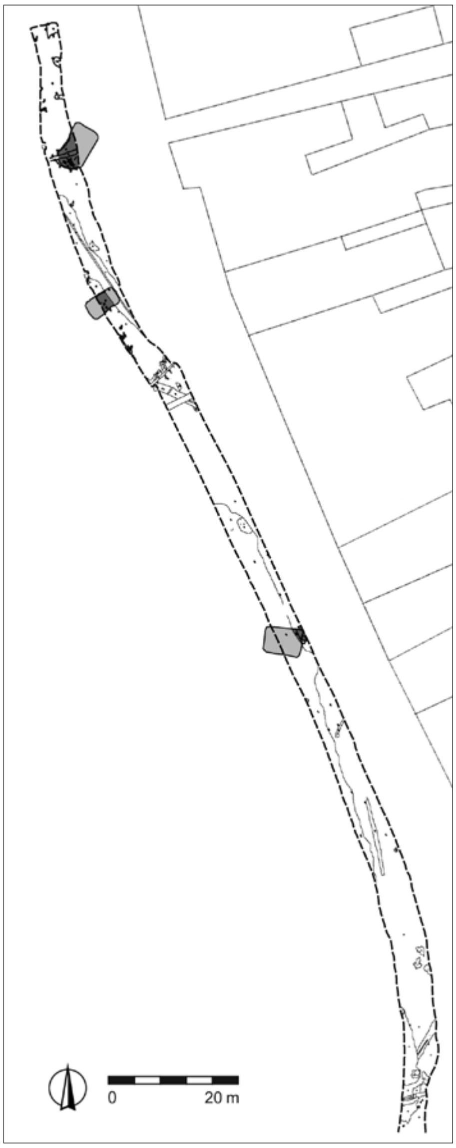


Fig. 119. Jihlava. Masarykovo Square, roadway north of the Prior department store. Plan of the 2002 excavation with three fragmentarily documented remnants of wood-and-clay buildings. After Hejhal et al. 2004, 127, Fig. 1.

2. The condition of the earliest buildings in Jihlava from an archaeological perspective

Although rescue excavations have been underway in Jihlava with various intensities and interruptions since the 1980s, we still do not have a comprehensive notion of the appearance of the earliest buildings. In comparison with Brno, for instance, smaller archaeological projects have been carried out in Jihlava that usually only contained parts of urban plots rather than the whole. The rocky bed also plays a part as it was more demanding in terms of digging structures into it. Nonetheless, it has already been proven that like in other Bohemian and Moravian towns, the earliest layer of urban houses consisted of wood-and-clay buildings that are mostly found on burgher plots. An exception to this is the form of a group of sunken buildings excavated in the upper part of present-day Masarykovo (formerly the upper market) Square. The remnants of three former wood-and-clay structures were uncovered there under the roadway near the department store that today stands in the place of a block of houses formerly called Jihlava's Špalíček. No heating devices were documented in any of them. The small rectangular features with a flat bottom shallowly (ca 0.5 m) recessed into the bedrock are generally dated to the second half of the 13th century. They may have been buildings related to the operation of the marketplace or houses hastily built in the town wall area before Ottokar II issued his construction rules (Fig. 119). However, in general, we have no indications to date concerning the non-observance of boundaries between the plots and public roads. No complete summary of the fragments of wood-and-clay buildings in Jihlava has been made yet, but they mostly have the form of detected smaller parts of basements or above-ground structures such as fragments of floors and wall infills originating from fires or entrances. There is evidence of both post-built structures and framing (Hrubý 2009, 69–70). To date, there are no complete layouts available from Jihlava. A particular inspiration for consideration of the appearance of the former houses may come from the contexts excavated in the nearby mining settlement of Staré Hory, which was closely connected with the town (Crkal et al. 2019, 892–903; see Chapter 18). Besides the state of research, the reasons for the absence of a larger number of finds of these buildings may include, for instance, the construction of earlier basements in the place of later stone cellars and their possible periodic renovation. This would be supported by several finds of floor levels or, more precisely, stratigraphies below the foundations of the perimeter walls of Gothic cellars (47 Masarykovo Square, 6 U Mincovny Street; Fig. 120a, b) and trenches after frame structure documented under

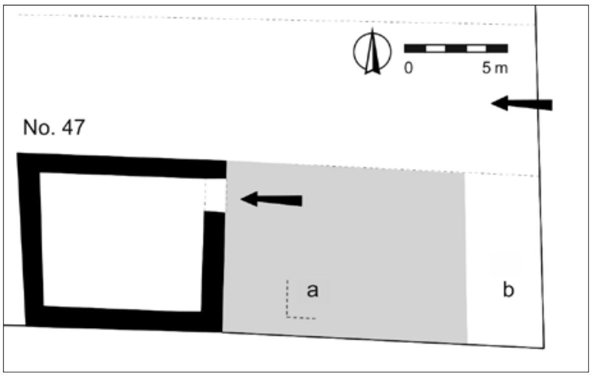


Fig. 120a. Jihlava, 47 Masarykovo Square. Plot with a 13th-century masonry chamber ('kamenate') and the location of a section through earlier floor strata. Drawing by M. Peška.

Fig. 120b. Jihlava, 47 Masarykovo Square. View of the floor strata of an earlier wood-and-clay building below the foundation of the Gothic cellar. Photo by Archaia Brno, Inv. No. 28844-2018.

Fig. 121a. Jihlava, 15 Masarykovo Square. View of a cellar floor with embedded trenches for an earlier beam structure of a wood-and-clay house. Photo by Archaia Brno, Inv. No. 23778-2012.

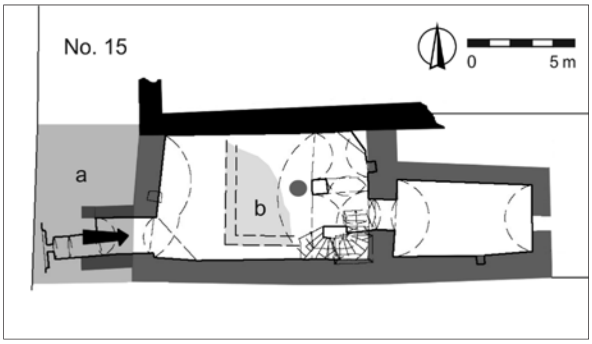


Fig. 121b. Jihlava, 15 Masarykovo Square. Medieval cellar context (14th century?). A – Trenches for sill beam plate of a wood-and-clay house; B – presumed arcade. Drawing by M. Peška.

the floor of a Gothic cellar at 15 Masarykovo Square (Merta, Peška 2013, 178; Fig. 121a, b). It appears that the excavations for the basements of wood-and-clay houses might have been, for a greater part, utilised when they were replaced by masonry. This is a relatively important difference compared to Brno, for example, which is rich in loess soils and where sunken timber-supported cellars were not regularly renewed. On the contrary, new excavations were also used to mine material for the construction of new houses (see Chapter 6).

3. The first stone houses in Jihlava

Members of Jihlava's patriciate started to build the first stone houses soon after the foundation of the town. This was revealed during the renovation of the historical core in the second half of the 20th century, which brought several important finds from the early Gothic period, starting in the 1260s, within the framework of a complex survey of house blocks. Following Aleš Vošahlík's attempt at summarising information about these masonry buildings in the early 1980s (Vošahlík 1981), knowledge has not been considerably advanced in the following decades, even though many new, modern building-historical surveys are available at present. The last attempt at dating has been a brief chapter in Petr Hrubý's *Dějiny Jihlavy* (History of Jihlava; see Hrubý 2009, 70–73). The most visible example of early Gothic secular architecture in Jihlava is House No. 39 standing on the corner of Masarykovo Square and Židovská Street, which was built sometime in the third quarter of the 13th century. Arcades borne by two massive columns with exceptionally valuable stonemason decoration, walled-up sometime in the late 14th century, were renewed in its front facade during a reconstruction of the house in 1985–1987. (Fig. 122a). Another remarkable house, No. 31, includes a vaulted storage room and a walled-up arcade; House No. 44 features artistically excellently rendered sedilia, while another house, No. 4, includes both sedilia and a walled-up arcade. Somewhat later, perhaps from the final third of the 13th century, are two houses, No. 66 and 67, with an exceptional almost five-metre-high arcade with sharply pointed arches in the front facade (Fig. 122b, c). Many other houses in the town square conceal cellar spaces from the 13th century and other details in the form of portals and window jambs. It is certainly no coincidence that the earliest buildings are mostly situated close to what was the main market, along which stood more than 60 houses in the Middle Ages. We can say this is a unique assemblage that has in the Czech lands a certain analogue only in Prague. Brno has many 13th-century masonry buildings, but except for the town hall, they lack more considerable art-history value. Moreover, most of them appeared several decades after their counterparts in Jihlava (Peška, Merta 2009, 91–94). No similar buildings have yet been observed in Znojmo or

Fig. 122. Jihlava, 39 Masarykovo Square. A – Early Gothic house with an arcade; B – the passageway (after the mid-13th century); C – the vaulting of the chamber (after the mid-13th century). Photo by Š. Kochan.

Fig. 123. Jihlava. The fresco of an assault on the town of Jihlava in 1402 preserved on the west wall of the presbytery of the Friars Minor Church of the Assumption of the Virgin Mary. After Hoffmann et al. 2000, map sheet No. 28, Fig. 19.

Olomouc. A fundamental source for the knowledge of medieval buildings is a depiction of an assault on Jihlava in 1402 on the epistle side of the presbytery of the Friars Minor Church of the Assumption of the Virgin Mary. The extraordinarily large, more than six-metre-long fresco was long undervalued although it has recently been proven that it came into existence not long after the fatal event, probably before 1436, as documented by an original inscription in a lower corner. The fresco depicts an attack on the town in the area of the friary, as well as a thanksgiving procession that subsequently took place every year until 1526 in the town square in Jihlava. As it is not merely a schematic depiction of a cluster of buildings but a realistic expression of Jihlava's appearance in the early 15th century, it has been possible to identify numerous details. This fresco is unparalleled in its period not only in the Czech lands but probably in all of Central and Eastern Europe (Pisková 2009, 156; Fig. 123). Most burgher houses near the square are depicted as one or two-storey buildings and except for three, had no arcades. These arcades were a characteristic feature of most burgher houses along the upper and lower town square in the late 13th century (cf. Vošahlík 1981), but they were gradually walled-up from the 14th century, as documented by numerous building-historical surveys. The first floors usually contained a logged living room, which may indicate the traditional use of log construction when building wood-and-clay buildings in places where there was limited clay available in the area. However, nothing in the depiction testifies to a flammable form of the houses at that time. Nevertheless, new unpublished excavations from recent years (4, 6 Joštova and 13 Havířská streets) indicate that at least some buildings in the side streets probably remained wood-and-clay until the end of the Middle Ages and were not fully replaced by Renaissance houses until the 16th century (Fig. 124). However, the first comprehensive surveys of Jihlava houses accompanied by archaeological excavations (e.g. 1 and 2 Masarykovo Square; Hejhal et al. 2004, 192–205) carried out over the past two decades show a considerably more complex development than the one presumed in the past based solely on building-historical surveys. One such example is the excavation of House No. 16 in Masarykovo Square.

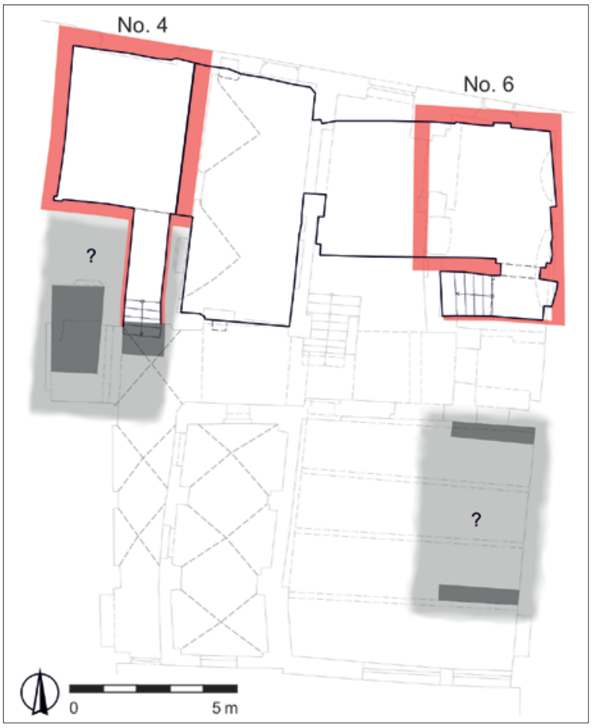


Fig. 124. Jihlava, 4 and 6 Joštova Street. Red – earliest masonry cellars on plots from the late Gothic period; dark grey – detected sections of former wood-and-clay buildings vanished during the 15th century; light grey – hypothetical extent of some wood-and-clay buildings. Drawing by M. Peška.

4. Early Gothic house at 16 Masarykovo Square

As a result of an archaeological and building-historical survey from 2012, this is one of the best-examined early Gothic houses, not only in the territory of Jihlava (Fig. 125). Vault infills, perimeter walls and partitions on the ground floor were gradually revealed by test pits and other excavations. These results gradually made it possible to describe the earliest development of the house.

The beginnings of housing development on the plot, dating back to the 13th century, are connected with finds of wood-and-clay buildings. Two test pits situated in the passageway (Fig. 126) detected floor strata and, in one case, perhaps a part of a sill beam (s. u. g. 2) and fireplace (s. u. g. 1). According to our interpretation, these contexts belonged to earlier wood-and-clay buildings dated, based on pottery fragments, to the period around the mid-13th century. These were above-ground, slightly sunken structures (ca 0.5 m). Based on the current, very limited discoveries, we do not know whether there were two buildings or one large house. To check our interpretation, micromorphology samples and a comparison sample from earlier floor strata under the front part of the passageway were taken and are evaluated in Chapter 11. The earliest preserved masonry part of the house, the rear cellar, is situated in the proximity of these finds. We consider it to be the original recessed masonry chamber ('kamenate') that was either added to an unknown wood-and-clay section of the house or was part of it from the beginning. Regrettably, the question of the contemporaneousness of the excavated earlier wood-and-clay building remains and this cellar has not been convincingly resolved due to limited research and the disturbed character of the archaeological contexts.

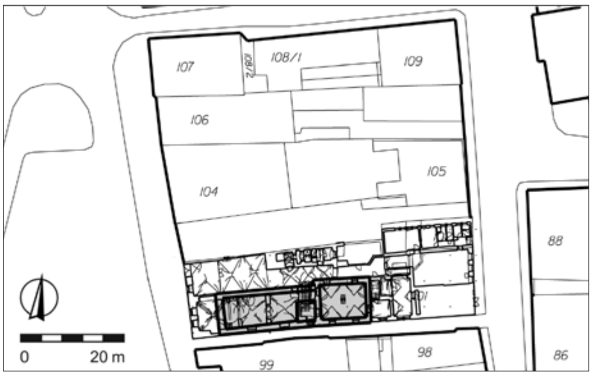


Fig. 125. Jihlava. The location of House No. 16 in Masarykovo Square. Drawing by M. Peška.

The 'kamenate' was accessible via an entrance neck in the northwest corner. The relieving arch of the entrance in the shape of a pointed arch was bricked with small-format bricks; the jamb is comprised exclusively of stone masonry. Surprisingly, the structure can be dated to the period after 1235 based on the dating of samples taken from a joist anchor in its west wall.

The above-ground parts of the house are not preserved and were probably built from non-durable materials. A masonry chamber ('kamenate'), also

Fig. 126. Jihlava. The ground plan of the house at 16 Masarykovo Square with the described archaeological sections marked. Grey – archaeologically examined areas. Drawing by M. Peška.

Fig. 127. Jihlava, 16 Masarykovo Square. A view of the south wall of the house with preserved cellar ceiling beams from 1259/1260. Photo by Archaia Brno, Inv. No. 352-2012.

called 'steinwerk', *caminata*, *camera lapida*, *domus lignea cum caminata*, was a specific type of building known across most of Central and Western Europe (cf. Piekalski 2004a; Fehring 1986). This represents the rudiments of a masonry house and in Czech professional literature is often called the masonry core of the house (cf. Merta, Peška 2010; Dragoun 1984). A similar type of building in the rural milieu is a granary ('Speicher' in German; Felgenhauer-Schmiedt 2002, 260). In the Middle Ages, these chambers were the basis of most houses in the upper and lower market squares in Jihlava and generally comprise the earliest layer of masonry burgher architecture in the Czech lands. However, in Moravia before 1300, they can only be considered to be in Brno, Znojmo, Olomouc and Jihlava (cf. Hejhal et al. 2004, 221). In most of these buildings, the appearance of their front above-ground parts is unknown because they were usually fitted with cellars in the following centuries. There are even considerations of a single-room multi-storey layout. Nevertheless, it must be pointed out that 'kamenate' chambers as the basic layout element of medieval houses remained in use in Jihlava until the end of the Middle Ages.

An addition, uniquely dated to 1260, was of fundamental importance for the development of the house at 16 Masarykovo Square. Seven identical dendrochronology dates (1259/60) have been acquired from the cellar ceiling beams (Fig. 127) and the entrance sill to the underground strongroom in the central part of the house. Judging from this, the construction took place soon after 1260. A depth-oriented rectangular cellar was built in the front part of the house, which replaced a presumed wood-and-clay above-ground building and was added to the rear chamber ('kamenate'). The new basement was accessible through a long entrance neck from the town square and an angled entrance from the passageway of the house. This latter entrance was fitted with a simple, pointed-bevelled portal situated in the northeast corner of the front cellar. An earlier entrance neck into the 'kamenate' chamber was transformed into a small corridor vaulted by a stone barrel vault connecting the front cellar and a newly built square cellar between the front and rear cellars (Fig. 128). This unlit area can be considered as a type of strongroom. The front cellar was illuminated by three small narrow pointed windows directed into a narrow alley. The long entrance neck and the present-day shifted street facade indicate the existence of an arcade. All the basement spaces had flat ceilings, which are perhaps best documented by beams walled into the longer perimeter walls on which the ceiling beams of the cellar were mounted in intervals. The Gothic ground floor was approximately 1 m higher than the present-day level. No above-ground structures of the house or arcade are preserved. This once again leads to considerations of its original wood-and-clay character. In general, it can be stated that the house was three-compartment, depth-oriented with an arcade into the square and a free passageway to the courtyard. The overall length of the house excluding the arcade was a respectable 29.5 m and it was 8.1–8.6 m wide (the 'kamenate' protrudes ca 0.5 m from the front part of the house). This means that the house occupied an area of almost 230 m^2 without the arcade and its usable area on the ground floor was ca 150 m^2. The front (largest) compartment can be considered a production or trading area (hall). The central part (above the strongroom and the corridor connecting the cellars) was a smoke kitchen with a chimney hood and a small hall interconnecting the front and rear parts of the house. After all, the kitchen remained in this area until the modern period. The rear compartment was comprised of the 'kamenate' chamber. The raised ground floor (approximately 1 m) was presumably entered from a low wooden gallery or landing that also covered the entrance neck to the basement in the passageway.

Fig. 128. Jihlava. The ground plan and section of the house at 16 Masarykovo Square. Red – masonry chamber built after 1235; orange – cellar added in 1260; pink – ground floor built after 1330; s. u. g. 1 and s. u. g. 2 – documented parts of earlier wood-and-clay buildings; red line marks a partition dividing Feature s. u. g. 2 into two parts. Drawing by M. Peška.

5. Three-compartment burgher house layout in the context of burgher architecture in Bohemia

Let us pause for a while and discuss the find of a house with the three-compartment layout since it is important for the understanding of the general development of burgher architecture in the Czech lands. The discussion on this issue was opened within rural architecture by new finds made in the 1970s during the excavations of the deserted Moravian medieval villages of Mstěnice and Pfaffenschlag (Nekuda 1975; 2002, 255–265). Apparently, it was the influence of the contemporary archaeological interpretation, which did not really consider the archaeology of what was not found. In this case, the existence of vanished above-ground wood-and-clay structures, which gave rise to the consideration of the possibility that the three-compartment house had its roots in the Slavic period and that it came into existence by the interconnection of two separate buildings situated close to each other – a recessed chamber and a sitting room, connected under a single common roof by a 'new' hall. This traditional layout with a small hall with a smoke kitchen in the central part of the house and a multi-storey chamber and sitting room along the sides reportedly stabilised over the next two centuries (Frolec 1982, 67–68). Buildings of this type occur to this day all over the Czech lands wherever buildings dating back at least to the 17th century are preserved; ethnologists generally call them granary houses (Syrová-Anýžová, Škabrada eds. 2018, 252). A somewhat different hypothesis was presented in the early 1980s by the outstanding Czech art historian Václav Mencl, namely that burghers knew this type of house as early as the second half of the 13th century and that the gentry used it as their rural manor houses in the 14th century. Moreover, he added the opinion that a stone granary (called 'kamenate' in the urban milieu) was attached to the one-storey residential house in the phase when this house was still single-compartment, i.e. without a hall (Mencl 1980, 156–165). In the late 1990s, Jiří Škabrada added another opinion that the three-compartment rural layout with a sitting room (with an empty space for the entrance hall without a kitchen) could be considered a reduction of the existing more advanced house structures that included indirect heating with an oven in the sitting room. As an example, he named the three-compartment structure of one of the Romanesque houses in Řetězová Street in Prague and the palace of Bezděz Castle from the second half of the 13th century (Škabrada 1998, 33–37). Based on the findings we have made so far concerning the house at 16 Masarykovo Square, we are inclined towards the opinion that the last hypothesis is the closest to reality. The primary burgher houses with a masonry ('kamenate') part, to which a sitting room and a hall with smoke operations were added concurrently, was probably the closest to the original rural house. The three-compartment structure came into existence as early as 1260 under the influence of higher social strata. The central part was divided into two rooms, which means that a smoke kitchen with a chimney hood and indirect heating of both or one of the side rooms – a rear 'kamenate' and a sitting room/workshop/shop near the street – can be considered. The question of the entrance remains unresolved; in the town, it might have led directly into the front sitting room/workshop/shop. Regardless, this is probably the earliest proven example of this type of house in the Czech lands and these burgher houses likely became models for the emergence of a three-compartment structuring of rural houses with a smoke kitchen situated in the central part. Another three-compartment building documented within nearby Jihlava town hall suggests that finds of similar 13th-century layouts can be expected in the future elsewhere in Jihlava (Hejhal et al. 2004, 207).

The next Gothic building phase of the house at 16 Masarykovo Square started with the demolition of the whole ground floor although this need not have been a one-time project from the construction perspective. The house was extended as far as the present-day street front. This means that the arcade area was built up, which also meant a prolongation of the entrance neck so that it ended on the level of the new front facade. The front cellar was divided by a pointed relieving arch that bore a new partition on the ground floor. The central cellar/strongroom was fitted with a brick barrel vault. The rear cellar below the former ('kamenate') chamber received a new ceiling. The beams of this ceiling are dated to 1329/1330. The ground floor of the chamber ('kamenate') was newly conceived as a logged room, as documented by imprints of round logs in its north perimeter wall; these were later replaced by brick masonry. The new ground floor level now corresponded with the elevation profile of the passageway and the nearby kitchen. The front hall (workshop) was illuminated by three windows opening through the south wall into the adjacent alley. Parts of the side window jambs and a segmental relieving arch bricked with high Gothic bricks were preserved; the smaller stone windows that were set into them did not survive. It is not clear whether the passageway was also built up in this phase. With certain caution, this whole building phase can be dated to 1329/1330 based on the data acquired from the ceiling beam of the rear chamber. The area above the passageway was also built up by the end of the 14th century, which gave the house another storey. Further medieval building activities have not been reliably identified, even though they are more than likely.

6. Conclusion

The results of the research on House No. 16 in Masarykovo Square have provided a fascinating view of the dynamics of building activity in the first decades of the existence of Jihlava and evidence of the very early stabilisation of burgher buildings. Several final questions or considerations need to be added. One of these is whether the excavated remains of wood-and-clay buildings might indeed have been provisional houses, as presumed by many Czech archaeologists in the past. Might a later or contemporary chamber ('kamenate') with a following non-masonry above-ground part in the direction of the street have been a cheaper and standard type of house that the plot owner could have easily afforded at the time?

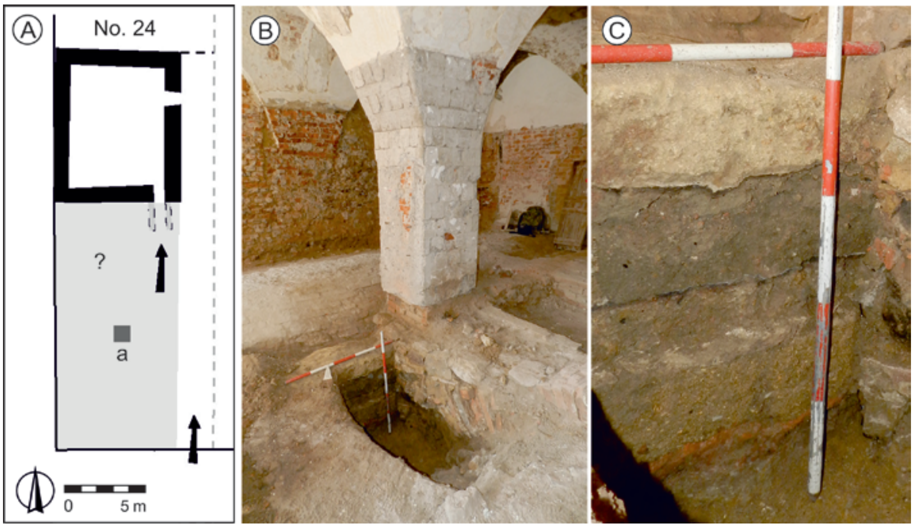


Fig. 129. Jihlava.
A – 24 Palackého Street, the plot with a rear chamber ('kamenate' – 13th–14th century) with the presumed location of an earlier wood-and-clay building; B – a small terrain block with floor strata in the lower part of the former wood-and-clay phase of the house; C – a view of a section within a room. Author M. Peška.

A corroborating fact is that in many of Jihlava's preserved 'kamenate' chambers, we encounter the replacement of the non-masonry part only much later. However, there is only exceptional and modest evidence of the existence of front parts without cellars, such as the house at 24 Palackého Street (Fig. 129). The subsequent three-compartment layout of the house is also remarkable and might have been a kind of higher social standing, as suggested above in the case of the palace of Bezděz Castle, the Romanesque house in Řetězová Street in Prague and other case studies from regions situated west of this country. Although we do not know and will maybe never know the answers to these questions, we can state that the house at 16 Masarykovo Square represents one of the most interesting contexts from the sphere of early burgher buildings in the Czech lands. Future research in the territory of Jihlava will perhaps bring more valuable contributions to the knowledge of Bohemian and Moravian towns.

Chapter 12

The question of wood-and-clay buildings on the plot of 16 Masarykovo Square in Jihlava from the perspective of micromorphology

Lenka Lisá – Marek Peška

1. Introduction

The early Gothic house on the plot of 16 Masarykovo Square is currently one of the best-known early Gothic houses in our territory thanks to an archaeological and building-historical survey from 2012. Given the good preservation of the individual construction phases, the oldest development of the house can be understood. Detailed information resulting from the archaeological research is given in the chapter on the development of Jihlava (see Chapter 11). Even though a large part of the recent building is underground today, some archaeological assemblages from the older phases of the building have been completely preserved in the space of today's passageway (see Fig. 126 in Chapter 11). Very limited excavations around the perimeter of the walls captured a number of floor levels and two contexts that can be interpreted as the remains of older wood-and-clay structures. Their interpretation is very important due to the discovery of an exceptionally dated Gothic house built just after 1260. Micromorphological analysis of sediments in an archaeological context is one of the tools of geoarchaeological analysis that can often be used to obtain important information that is imperceptible from a macroscopic point of view (Macphail, Goldberg 2018). In the following context, it was applied primarily with a view towards describing in more detail the formation processes of the floor levels and thereby interpreting both the possible use of the examined areas and, at the same time, uncovering the methods of modifying walking levels that were used in the Middle Ages. Another objective of the micromorphological analysis was to confirm or refute the primary archaeological interpretations.

2. Methodological approach

In addition to dendrochronological dating, a micromorphological evaluation of the formation processes of the floor levels was part of the complex building-historical and archaeological research at 16 Masarykovo Square. These floor sandwiches can often become an important sedimentary archive for understanding the use of individual spaces of wood-and-clay buildings. A total of three samples were taken from the excavated context, always in such a way that they covered the surface of the layer marked during the research as the 'floor'. However, it is often only an active trampled layer differing by the colour of the preserved microlayers and density of the floor itself, because the floor as such is often the result of a rather complex formation process (see Chapter 1). Considering that the basal parts of the fills of the monitored features had a complicated stratigraphy, a total of three relatively long blocks of sediment (20–25 cm) were taken from different parts of the basement. These were fixed in stretch cling film and after drying and impregnation, thin 7 × 12 cm sections were made from them. These thin sections covered the original sampling area of Samples 1 and 2 with two thin sections and Sample 3 with three thin sections. The sections were prepared at the University of Cambridge in the United Kingdom and were subsequently studied under a binocular and polarizing microscope at magnifications of 8–400× and described according to the methodology of Stoops (2003).

3. Results

3.1 Context s. u. g. 1 in Test pit S10

In the passageway by the northern wall of the masonry brick house from 1260, a small part, apparently above-ground (?) of the wood-and-clay construction of s. u. g. 1 was captured. The size of the area was 1.4 × 0.5 m and it was located to the left from the entrance to the oldest underground chamber (after 1235), which once stood alone or was part of some above-ground wood-and-clay building (see Fig. 128 in Chapter 11; Fig. 130, 131). By its nature, the context seemed like a disturbed floor formation. Due to the limited scope of the excavations carried out during the reconstruction of the existing building at 16 Masarykovo Square and the disturbance of the immediate surroundings, it was not possible to expand the research. On the geological bedrock, approximately 1.1 m below the current floor, was uneven Backfill 145, which had the character of a weathered substrate. Pit 144 filled with redeposited fire destruction was recessed into this layer. This pit was already related to the floor arrangements of the unknown Building s. u. g. 1 (Layers 156 to 149 from the bottom to the top). Walking levels 147, 148 and perhaps also partially buried Hearth 155 with charcoal rich Layers/Slabs 154 and 156 were represented in the assemblage. A small number of ceramic finds date the context to the period around the middle of the 13th century or earlier. The assemblage was

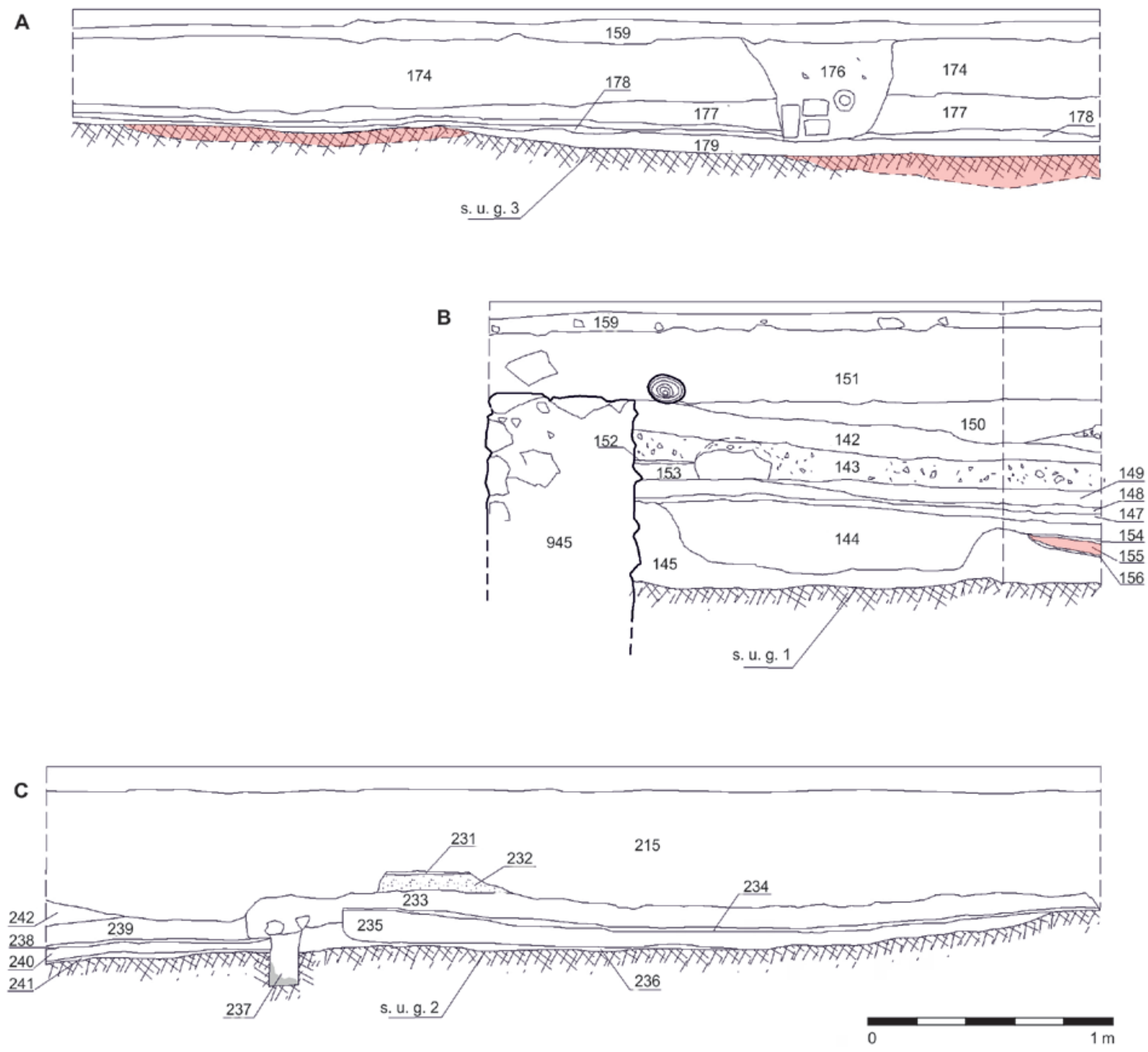


Fig. 130. Jihlava. Sections through documented contexts. A – Test Pit S10, Section R1a – stratigraphy above the trench of vanished wood-and-clay Building s. u. g. 1; B – Test pit S10, Section R1b – floor strata denoted as s. u. g. 3; C – Test pit S14, Section R2 – stratigraphy above the trench of the vanished wood-and-clay Building s. u. g. 1. Author M. Peška.

Fig. 131. Jihlava. View into Test pit S10 and Section R1a. Floor strata formed on burnt geological bedrock that was part of vanished wood-and-clay Building s. u. g. 1. Photo by Archaia Brno, Inv. No. 1346-2012.

covered by Mortar layer 143, which is already linked to the construction of the brick house. Considering that the ground level from the 13th century is not known from the immediate surroundings, it can only be estimated based on the floors of the ground level of the stone building from 1260 that the recessed space was relatively shallow, perhaps ca 0.6 m into the former weak soil cover. In order to verify the archaeological interpretations, a micromorphological sample was taken from the floor sandwich.

Within this part of the building, at least three passive and three active trampled layers were gradually created. Two active layers and three passive layers are captured in the set of thin sections, which measures a total of 25 cm (Fig. 132), and the set ends with a passive layer with a number of horizontal pores (Fig. 133). This is also why we assume that there was a functional active floor layer above this layer. These pores are created during repeated aggradation of the trampled layer on the surface and are very typical of the passive layer located directly under the trampled part of the floor. The passive layers themselves are made up of unsorted clay-like dusty sediment with an admixture of coarse sand,

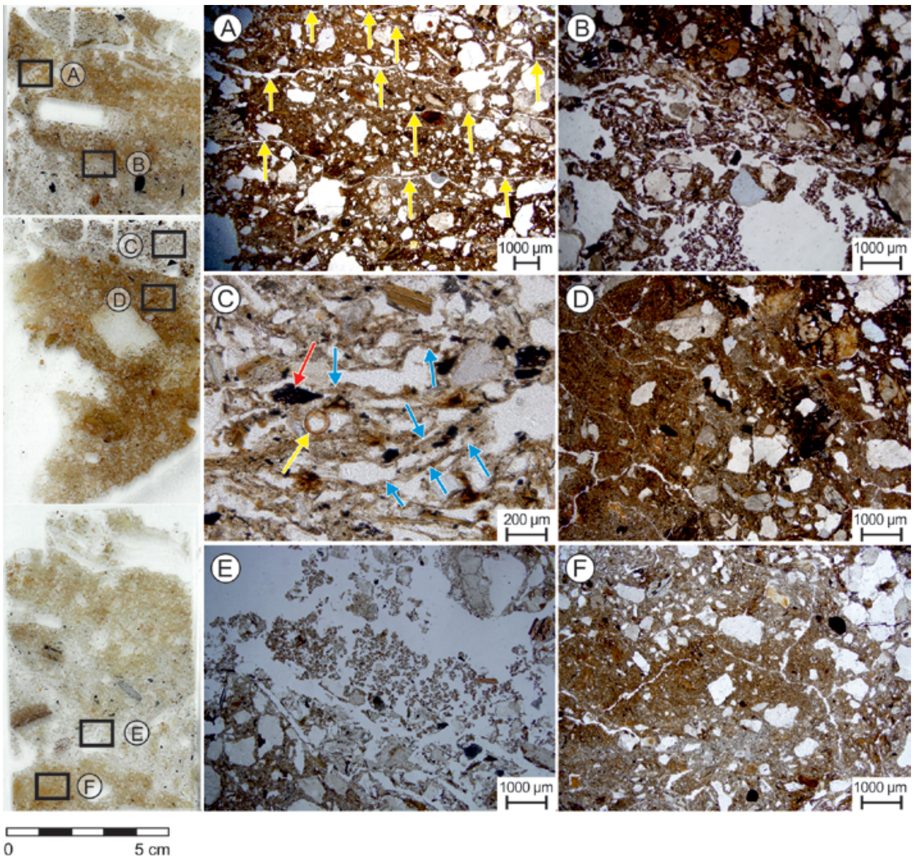


Fig. 132. Jihlava, 16 Masarykovo Square. Context s. u. g. 1. A – Unsorted passive layer with the number of horizontal pores (yellow arrows); B – transition between passive and active layer. The active layer is loose with a presence of horizontally oriented decomposed organic matter; C – detail of active layer with the horizontally oriented decomposed organic matter highlighted by the presence of articulated phytoliths (blue arrows), charcoal (red arrow) and parasites (yellow arrow); D – horizontal pores of passive layer with the presence of Fe/Mn nodules; E – loose active layer with granular microstructure and occasional microcharcoal; F – horizontal and vertical cracks of passive layer; all pictures were taken in PPL (plane-polarised light). Author L. Lisá.

with occasional charcoal but without the presence of supplied organic matter. The transition between the active and passive layers is always sharp (Fig. 132). The two active layers captured in the studied thin sections have a thickness of approximately 3–4 cm and are porous (Fig. 132), characterised by the amount of horizontally deposited organic matter highlighted by the presence of articulated phytoliths (Fig. 132c, blue arrows) with the occasional presence of microcharcoal (Fig. 132c, red arrow) and possibly parasites (Fig. 132c). The passive layer on which the active layer sits always has more or less the same character and is highlighted by the presence of horizontal pores (Fig. 132d). The lowest active layer (Fig. 132e) is very similar to the lowest active layer of Feature 2 (Fig. 132e) due to its granular microstructure as a result of the activity of microfauna. It is very porous and contains decomposed organic matter and occasional microcharcoal. The passive layer lying below it does not deviate in any way from those that were captured in the higher parts of this sequence. Again, it contains a number of horizontal pores (Fig. 132f) reflecting repeated pressure.

3.2 Context s. u. g. 2 in Test pit S14

In the passageway by the southern wall of the late Gothic extension against the masonry chamber (‘kamenate’), a part of the abandoned wood-and-clay building was excavated. Only a small area measuring 6 × 0.6 m was documented (see Fig. 128 in Chapter 11; Fig. 130, 133). The only structural element excavated was burnt Wooden pile 237 embedded in the floor in the north-south direction, which divided the context into two somewhat different parts (Fig. 134). The entire assemblage was greatly disturbed by recent Backfill 215. In the western part of the building, Trampled layer 236 was placed on the floor, which was covered by Walking level 235 and on top of it by Layer 234 formed by fire. A fragment of the Floor sandwich 231 to 233 rested on it. In the eastern part of the building, separated by the beam, the bedrock gradually became deeper by about 0.35 cm compared to the western part. Several Floor layers 238 to 241 were deposited on the geological bedrock. On top of them was Layer 242 with a series of laminar footings. It is not entirely clear whether these are two buildings or two phases of the same building. Nevertheless, the ceramic material dates the context prior to the middle of the 13th century. To verify the interpretation, a micromorphological sample was taken as in the case of s. u. g. 1. Due to the different levels of the oldest floor in the case of Buildings s. u. g. 1 (1.1 m) and s. u. g. 2 (0.7 m) and the different nature of their floors, it is likely that these are two separate wood-and-clay buildings.

The second studied floor sandwich was characterised by a relatively thick, macroscopically homogeneous trampled layer. At a closer look (Fig. 135), however, it is clear that the active layer itself has been repeatedly repaired and thus has the character of a kind of structural active layer. The uppermost part of the active layer, which was affected by the fire

Fig. 133. Jihlava. View into Test pit S14 and Section R2. Floor strata formed on burnt geological bedrock that was part of vanished wood-and-clay Building s. u. g. 2. Photo by Archaia Brno, Inv. No. 1891-2012.

Fig. 134. Jihlava. View into Test pit S14 to the floor with a remnant of a burnt wooden beam of former wood-and-clay Building s. u. g. 2. Photo by Archaia Brno, Inv. No. 23990-2012.

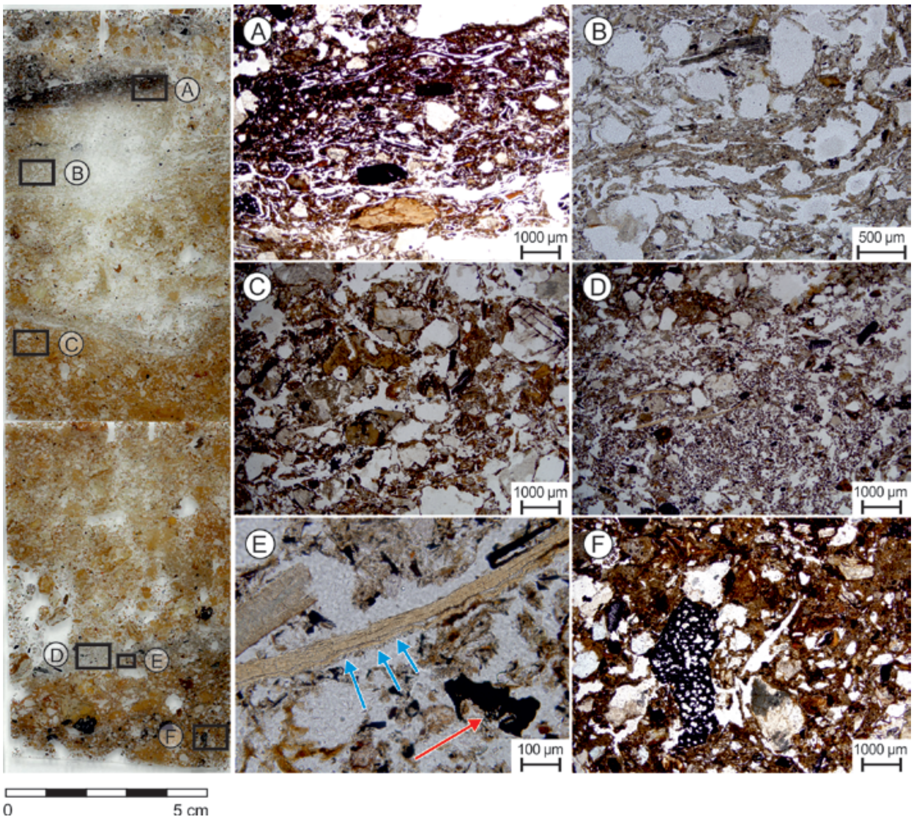


Fig. 135. Jihlava, 16 Masarykovo Square. Context s. u. g. 2. A – Partly burned active floor layer with horizontally oriented organic matter; B – articulated phytoliths as a fragment of horizontally oriented organic matter of the active floor, visible microcharcoal; C – unsorted material of probably sanitary layers. These layers contain decomposed organic matter without orientation and were probably applied intentionally; D – horizon with the granular microstructure as a result of the microfauna action; E – fish bone is marked by blue arrows, charcoal is marked by the red arrow; F – rubified layer containing charcoal. Visible clay coating; all pictures were taken in PPL. Author L. Lisá.

and therefore shows signs of burning (Fig. 135), is most clearly preserved. The active trampled layer is made up of a quantity of horizontally placed organic matter that has been partially burnt, with the occurrence of occasional charcoals, phytoliths and even bone fragments. However, the amount of kitchen waste is minimal compared to the s. u. g. 3 structure. Towards the bedrock, there are occasional accumulations of organic matter preserved mainly as horizontally placed articulated phytoliths (Fig. 135). These accumulations are interspersed with horizons that are unsorted, consisting of clay-silty sediment with clasts of coarser sand and an abundance of partially decomposed or decomposed organic matter and occasional charcoals (Fig. 135c). Rather than a tread, these layers create the impression of erasures, the composition of which was organic matter. Similar practices were described in the modern era (Lisá et al. 2020a). This situation basically repeats itself in the entire studied set of sediments and a ca 1–2-cm-thick layer in which horizontally deposited decomposed organic matter predominates or charcoals are more visible macroscopically. One such layer was detected almost at the base of the floor set. It is made up of decomposed organic matter and charcoals and probably contained a higher amount of organic matter. Today, it appears mainly in the form of the excrement of microfauna (eaters) and thus creates a granular microstructure (Fig. 135d). However, fragments of fish bones were also detected here (Fig. 135e). The lowest layer in the studied set contains many microcharcoals and again bears signs of burning. It is questionable whether this burning reflects some larger events or only the establishment of a smaller fire in the basement area.

3.3 Context s. u. g. 3 in Test pit S10

In the front part of the passageway of the house at 16 Masarykovo Square, in Test pit S10 placed along the north wall of the house from the year 1260, the floor level situated at the geological bedrock, which is probably related to its walking and non-domestic function, was documented (see Fig. 128 in Chapter 11; Fig. 136). The geological bedrock excavated there was strongly burned in several places and Floor and Trampled layers 178 to 179 were formed on it. These layers were covered by Embankment layer 174 raising the floor of the passageway to the current level. A micromorphological sample was also taken from this context. The goal of the sampling was the possibility to interpret the formation processes and to compare this sample with the context in the s. u. g. 1 and s. u. g. 2 structures.

Fig. 136. Jihlava. View into Test pit S10 and Section R1b. Floor strata denoted as s. u. g. 3. Photo by Archaia Brno, Inv. No. 1426-2012.

Within this sample, it was possible to divide four macroscopically distinct layers with very different formation processes. The composition and granular microstructure of the uppermost layer found in the thin section indicates that it was created only as a result of the destruction of the feature. It also contains fragments of the original active layer deposited below it (Fig. 137a). The trampled layer itself is only 2 cm thick and is made up of horizontally placed charcoal, remains of plant fragments, eggshells (Fig. 137b yellow arrows), fragments of burnt bones (Fig. 137b blue arrows) and fragments of fish bones (Fig. 137b red arrows). This material can be interpreted as common kitchen waste. Phytoliths are often articulated and laid in a horizontal position and indicate the fact that straw or hay was deposited on the surface on which people moved. The content of charcoal in the trampled layer is variable: in some parts it is up to 50% (Fig. 137b), in other parts it is up to 3% (Fig. 137c). The active trampled layer with a sharp boundary sits on the passive floor layer. This is formed by unsorted clay-like dusty sediment with an admixture of coarse-grained sand (Fig. 137d). Within this sediment, a number of ferric and manganese-rich impregnations and nodules were formed (Fig. 137d, red arrows). This fact indicates changing oxidation-reduction conditions, in this case repeated wetting and drying. At the same time, there are visible horizontal pores (Fig. 137d), which testify to the intensive aggradation of the given space. Given that these pores are not filled with an iron coating or infilling, it can be said that the material in which the previously described nodules formed was already deposited in the feature in this state. The presence of redoximorphic signs in the passive layer of the floor set does not indicate changing humidity conditions directly in the building, but is a sign transferred from another environment. The basal part of the floor horizon, originally interpreted by archaeologists as burnt geological substrate, is a remnant of the burnt destruction of some feature. In the thin section, it was found at a thickness of 10 cm (Fig. 137) and has a reddish colour. The colour of the sediment, which is due to fine-grained hematite, was created as a result of burning (Fig. 137e, f). Burnt fragments of the original floor are easily detectable within the basal red layer (Fig. 137e). Their original layering is highlighted by clay infillings of pores (Fig. 137e, green arrows), which are a reflection of the original orientation. The basal red layer contains a number of iron-rich pedogenic features (Fig. 137f, green arrows).

4. Interpretation of wood-and-clay buildings based on micromorphological analysis

Fragmentary finds of wood-and-clay buildings from around the middle of the 13th century in the area of today's passageway of the house at 16 Masarykovo Square did not answer the question of whether these buildings were contemporary with the masonry chamber ('kamenate') built after 1235, but they are clear evidence of the existence of older wood-and-clay buildings on the plot.

From the perspective of the preserved sedimentary archive in the form of floor sandwiches, it is at least possible to answer how the given contexts differ from each other in the method of preparation and subsequent use of the surface. All studied floor sets contain passive construction layers. This means that before the surface of the basement was used, the area on which people moved was intentionally built. If necessary, a 'new passive construction layer' was applied repeatedly. We know from ethnographic sources that, depending on the source material, local dusty or dusty clay material was used for 'floor repairs', usually mixed with horse excrement (Lisá et al. 2020a). However, in the case of the part of the basement where the first upturn was removed, organic temper was not added to the plaster. A silty

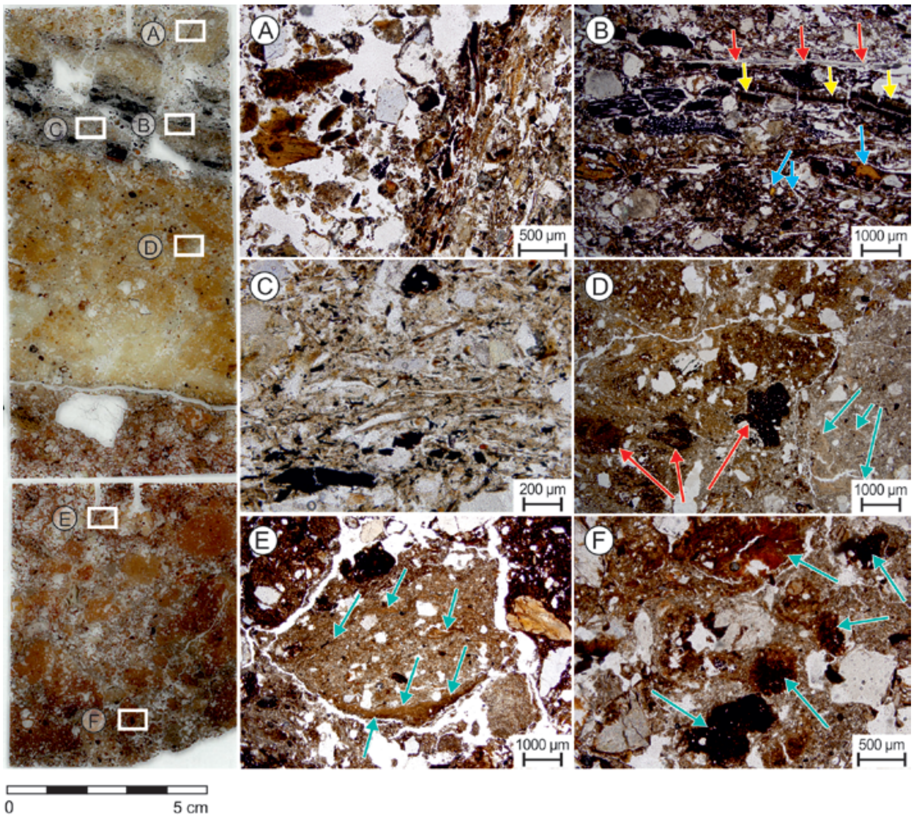


Fig. 137. Jihlava, 16 Masarykovo Square. Context s. u. g. 3. A – Granular microstructure composed of single mineral grains or charcoal and of aggregates related to the disturbed former floor. Note the clast orientation within the fragment; B – part of the active layer rich in charcoal fragments and kitchen waste; fish bone is marked by red arrows, eggshell fragments are marked by yellow arrows, burned bones are marked by blue arrows; C – part of the active layer typical of the accumulation of organic matter with the minimum of charred material; D – passive layer typical of horizontal cracks, Fe/Mn nodules (red arrows) and clay fragments (green arrows); E – aggregate of the former floor detected in reddish layer at the bottom of the floor. Note the accumulation of clay (green arrows), showing the original orientation of the layer; F – reddish layer at the bottom is typical of different types of Fe/Mn features (green arrows); all pictures were taken in PPL. Author L. Lisá.

clay-like sediment was used for the construction of passive layers, which bear signs of repeated water-logging, so it is possible that more clay-like (more plastic) sediment was purposefully selected from places where the groundwater level was higher. The sample described from Test pit s. u. g. 3 also has only one active layer, which is formed by a trampled layer containing a great deal of kitchen waste, such as charcoal, bones, organic matter and shells.

The second floor set (s. u. g. 2) has a complicated structure. As in the case of the first one (s. u. g. 3), the base is a passive construction layer. This already contains decomposed remains of organic matter, so it is clear that organic matter was purposefully added as a temper to the plaster used for the structural part of the floor set. The active layer of the floor set is relatively thick because it includes repeated adjustments of renovated plaster (Macphail, Goldberg 2018). Kitchen waste is no longer present on the active surface, and only organic matter in the form of hay or straw was normally deposited on it. The active layer in the lowest part of the floor set is heavily bioturbated and can be assumed to have been rich in nitrogen, which attracted microfauna.

While in the case of the third Sample s. u. g. 3 it was possible to identify one sharply demarcated active trampled layer with kitchen waste, in the second Sample s. u. g. 2 a relatively thick, repeatedly repaired trampled layer with a lot of hay and straw on the surface (in the case of the first sample), it is probably the most complicated in terms of assessing the possible length of its use. The given set contains at least three passive and two active trampled layers. Since the uppermost passive layer contains a number of horizontal pores created by repeated aggradation, it can be assumed that there was at least one active layer that was not included in the sample taken from the archaeological context. Active trampled layers are made up mainly of decomposed organic matter with a minimum of charcoal. The lowest active layer is again intensively bioturbated and contains a lot of microfauna excrement, which coincides with finding at the base of Sample s. u. g. 2. The assessed floor sandwich samples differ fundamentally from the type of floor horizons detected for example in the mining settlement of Jihlava – Staré Hory (see Chapter 18) or from the market settlements of Počátky (see Chapter 17) and, with its specific structure, are most similar to the floor sets found in burgher houses in the territory of medieval Brno (Lisá et al. 2021; see Chapter 6).

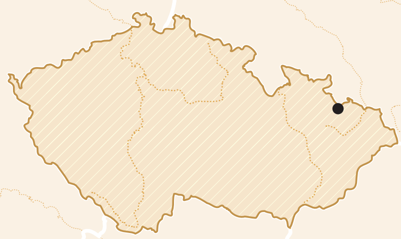
5. Conclusion

Overall, it can be said that in all three studied samples, or more precisely contexts, the surface on which life in the house took place was purposefully prepared, or subsequently treated with additional structural or, let us say, sanitary layers. The 'active layers' and their number indicate more information about the way of use. Sample s. u. g. 3 has only one active tread containing a quantity of kitchen waste. It is therefore a question whether this area served as a secondary waste area. Samples or Sampling points s. u. g. 2 and s. u. g. 3 are typical of the amount of horizontally placed organic matter interspersed with sanitary construction layers. In both cases, it was a space that was normally used; there was hay or straw on the ground, and from time to time the space was covered with a mixture of clay and organic matter. Kitchen waste no longer appears in these places. While it is clear in Sample s. u. g. 2 that the space was modified more or less continuously, in the case of Sample s. u. g. 3 the 'sanitary layers' were applied only twice, always after a long period of use. All three studied spaces were actively used, which was reflected in the very well-developed horizontal porosity of the floor layers. It can be stated that in the case of Samples s. u. g. 1 and s. u. g. 2, the archaeological interpretations assuming partially recessed, probably residential wood-and-clay structures were confirmed. In the case of s. u. g. 3, the interpretation is more difficult and without a further excavation it is not possible to say with certainty whether it is a recessed wood-and-lay structure or walking levels in the area of the former passageway.

Chapter 13

Wood-and-clay buildings in medieval Opava

Barbara Marethová – Michal Zezula



1. Introduction

Opava is one of the earliest institutional towns in the Czech lands that came into existence in the Moravian-Silesian borderland between 1213 and 1220. The Margrave of Moravia, Vladislaus Henry, is considered to be the founder of the town. The earliest direct document of its existence is a privilege by the King of Bohemia, Ottokar I, issued to the burghers of Opava in 1224 (CDB II, No. 265; 256–257; Bakala 1974a, 22–24). Opava became the economic centre of the Opava Province, which underwent an extensive transformation of its existing settlement structure along with the settlement of high-altitude submontane positions. The town came into existence in the location of an earlier pre-urban settlement situated at the crossroads of long-distance routes near a ford across the River Opava. This was also reflected in its urbanistic layout, which was forced to accept the earlier situation. The town's population was concentrated in the close vicinity of present-day Horní Square, Dolní Square and Mezi Trhy Street, which connects them. It was in this area that Jaroslav Bakala (Bakala 1974b) situated 65 of the earliest houses with brewing and propination rights based on an analysis of the written sources. The town's urbanisation network stabilised during the second half of the 13th century when the whole area of the town was built up. It was equipped with masonry fortifications as early as around the mid-13th century (Kolář ed. 2013; Kolář, Zezula 2014).

Despite the long tradition of archaeological research in the centre of Opava, of which the early intensity was primarily connected with post-war redevelopment and subsequently new construction (Kouřil 2000; Zezula 2014), a single structure that might be interpreted as a basement of a wood-and-clay house was detected in the second half of the 20th century. This was a preserved corner with an entrance neck documented during an excavation in the northern part of Hradecká Street. Even though these features were first called 'residential cottages' (e.g. Richter 1963, 206) and later 'pithouses' in that period, Jaroslav Král interpreted the feature from Hradecká Street as a small cellar (Král 1974; Král, Pavelčík 1975). It took several decades before the interpretation, deep-rooted in Czech archaeology, changed, and the term 'basement' started to be used for subsurface rectangular features, often with a preserved internal structure and an entrance neck (for an overview of the development of their interpretation, see e.g. Vařeka 2002; Holub et al. 2003).

As the construction boom in the 1990s and early 2000s increased, the volume of rescue excavations in the medieval core of Opava along with the number of identified basements also started to rise. Marek Kiecoň and Michal Zezula counted seven in their summary (Kiecoň, Zezula 2005). More were gradually discovered, one each in Popská (Kiecoň, Skalická 2013), Lazebnická and Mezi Trhy streets (Kolář et al. 2011). A basement with four development phases was excavated in Holubí Street (Kolář 2007; Kolář, Zezula 2014) and many other basements were examined in 2010 and 2011 along the former Radniční Street (Skalická, Marethová 2013; Fig. 138). Besides the absence of large-area excavations in the territory of the original medieval plots, the relatively smaller number of registered basements in contrast to, for instance, Brno (Holub et al. 2005a) can also be explained by the

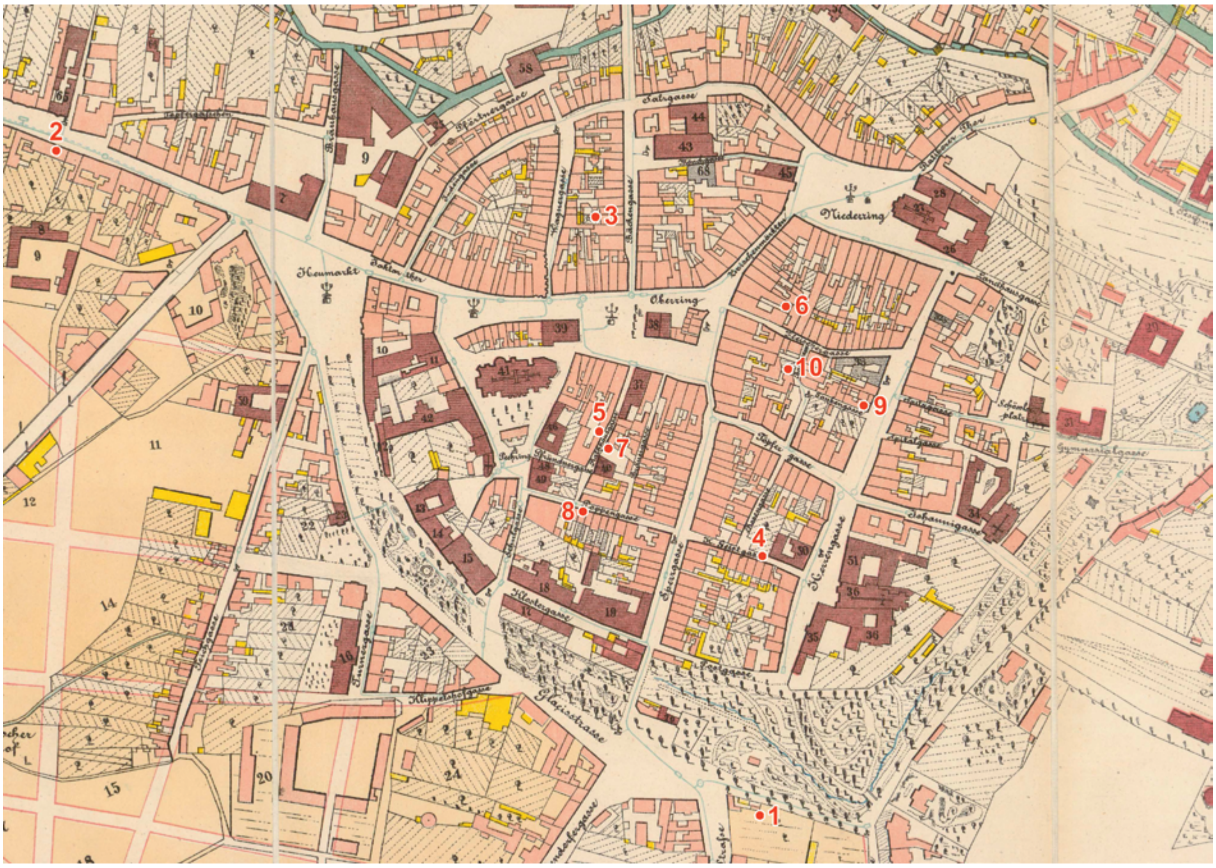


Fig. 138. Opava. Town plan and the localisation of the excavated basements. 1 – Hradecká Street; 2 – Krnovská Street; 3 – Pekařská Street; 4 – U Pošty Street; 5 – Horní Square; 6 – Mezi Trhy Street; 7 – former Radniční Street; 8 – Popská Street; 9 – Holubí Street; 10 – Lazebnická Street. After Labitzky 1876 (State Regional Archives in Opava, Inv. No. 1926).

fact that during the modern development of the town, many medieval buildings were replaced by masonry houses whose parts with cellars destroyed the earlier remnants of the wood-and-clay construction phases.

2. Dating

The temporal classification of the examined features is generally based on their stratigraphic position within the archaeological layers; dendrochronological dating could also be used in some cases. Dating based on an analysis of finds gathered from destruction fills may be somewhat problematic, as they often contain artefacts that were redeposited several times. If the interval of the basement's function is ascertained, as was, for example, the case of a feature from Pekařská Street (Kiecoň, Zezula 2005, 30) or the later phase of the basements along former Radniční Street (Skalická, Marethová 2013), it is evident that their term of use was usually a few decades. The dating of the most recently mentioned basements is based on dendrochronology data from preserved wooden structures, which showed that fir wood felled in 1277/1278 was used in their construction (Skalická, Marethová 2013; Fig. 139). The features did not cease to exist violently but were abandoned in the first decades of the 14th century, probably due to a change in the use of the area. Their fill was followed by a regression in the settlement, as the place temporarily became an inner periphery within the town.

The earliest basements from Opava examined to date that were excavated within the framework of the land plots came into existence around the mid-13th century. However, they are not only found in areas that are considered to be the original core of the newly founded town, in the vicinity of Horní Square (Kolář, Zezula 2014), but also in the peripheral parts of the town, which were presumed to be settled later (Holubí Street), or even outside the town itself (a basement in the Hradecká Street). Most of the features ceased to exist in various ways during the 14th century; some were filled intentionally due

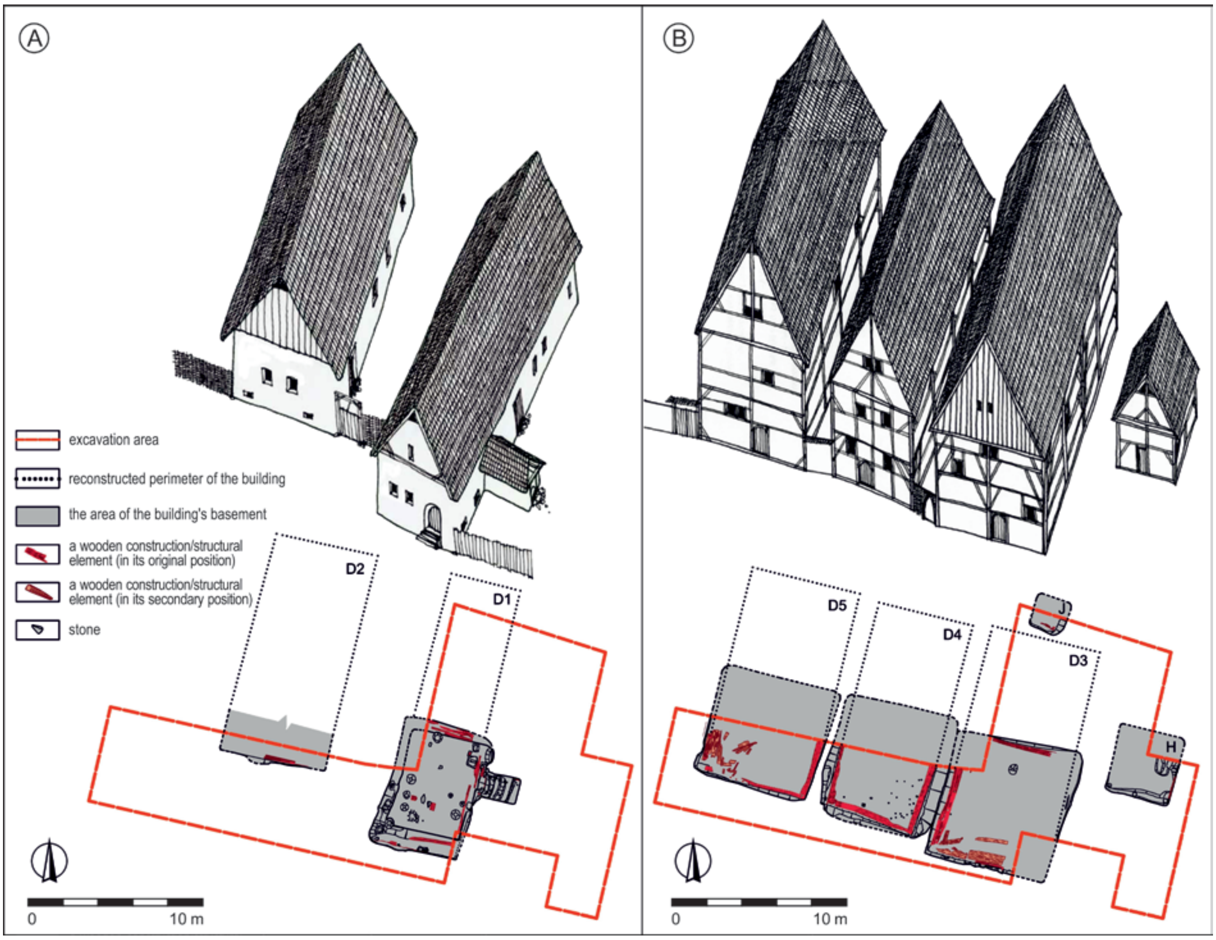


Fig. 139. Opava, former Radniční Street. A reconstruction of the wood-and-clay buildings associated with: A – earlier phase of the basements (the second third of the 13th century – 1270s/1280s); B – later phase of the basements (1270s/1280s – the first half of the 14th century). After Merta 2012, 17.

to a regression of built-up areas (former Radniční Street), while others were destroyed by fire or replaced by another type of underground space. This transition has been followed in U Mouřenína House (Mezi Trhy Street), where a masonry structure was first inserted into the basement of a wood-and-clay house in the 14th century, and the whole building was rebuilt in stone in the following century (Lukas, Kolář 2010; Kolář et al. 2011). In the suburb, the latest features are still registered in the late 16th and early 17th centuries (Krnovská Street).

3. Structure

The appearance of buildings in pre-urban and urban Opava has not yet been reliably clarified. It appears that it might include post-built structures, as suggested by a part of a structure uncovered under the floor of the chapter hall of the cloister of the Friars Minor (Prix, Zezula 2002) or the layouts of features on the surface of a soil horizon in Pekařská Street (Kiecoň, Zezula 2004). However, even in this period, we must presume the existence of recessed storage spaces, as indicated by a rectangular small cellar with a stepwise adapted entrance neck protruding inside and documented in the area of Dolní Square (Zezula et al. 2007, 123–128; Fig. 140).

A frame design of basements completely predominates the local milieu; a post-built structure has only been identified in Feature 1523 near the former Radniční Street (Fig. 141). This was a rectangular sunken space with remnants of post holes preserved along the sides and in the centre. The vertical structural elements supported wooden walls that delimited the internal space and probably also served as a load-bearing structure for the above-ground parts of the building. Stones strengthening the setting of the posts in the unstable sandy gravel subsoil were preserved around the holes. Although the duration of the structure is only estimated at two or three decades, traces of repairs have been detected. The most distinctive of these concerned the central

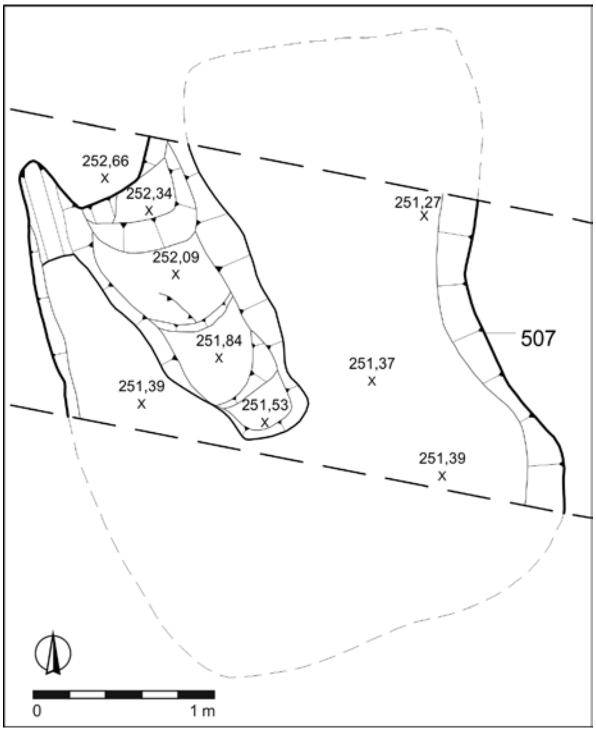


Fig. 140. Opava, Dolní Square. Trench S1 – a small cellar with the entrance neck leading into it. After Kolář, Zezula 2014, 548.

stake, whose lower part apparently rotted away and had to be supported with another baulk. The regular renewal of the floor, which gradually increased the level of the bottom by 0.3–0.5 m, might have also contributed to the stabilisation of the whole system (Skalická, Marethová 2013).

With caution, the situation in a feature in U Pošty Street, where a shallow circular hole was detected, immediately followed by a rectangular hole, can also be interpreted as a remnant of one of the variants of a post-built structure. The authors consider that the planks vertically embedded in the ground were used as vertical elements bearing wooden boarding (Kiecoň, Zezula 2005, 30).

In most of Opava's basements, the builders used self-supporting skeleton structures. Favourable natural conditions, which enable the excellent preservation of wood in Opava, have made it possible to document not only the basic beam rings (Fig. 142) along the circumference of the features but also the vertical structural elements and parts of the walls. Perhaps the widest range of evidence of the diverse variants of the building techniques comes from the basements of the later phase near the former Radniční Street. The building variability at that time is documented by the wall structure in Feature 555. The western edge of the pit was cut into a loess subsoil so compact that the wall of the structure could have been formed by wattle alone; the north side was embedded in the fill of an earlier structure. The unstable terrain made it necessary to strengthen the wall of the basement so that it withstood the pressure of the neighbouring layers. Therefore, baulks were embedded in the beam ring, to which vertical boards fitted together with a system of mortises and edges were attached. The structure was so strong that it did not fall apart even during the destruction of the building; the whole wall merely collapsed in one piece into the destruction fill (Skalická, Marethová 2013, 265; Fig. 143). No remnants of the inner structure at all were documented in some of the features; a skeleton design was presumably also originally used in these situations as there are no traces of negative imprints of posts or other vertical structural elements.

A transitional stage between the wood-and-clay and masonry phases of building development is represented by 'Steinwerk' (stonework, stone chamber), which was documented in Opava during an archaeological excavation and building-historical survey in U Mouřenína House in Mezi Trhy Street. There, the earliest phase of a wood-and-clay house ceased to exist, probably due to a fire, as early as the 13th century, but it was soon renovated. A walled basement with an entrance from the court in the 14th century was added to the existing wood-and-clay structure.

Fig. 141. Opava, former Radniční Street. A row of post holes along the inner edge of the basement of Feature 1523 into which the load-bearing construction reinforced by stones was recessed. Photo by P. Skalická.

Fig. 142. Opava, former Radniční Street. A detail of the beam ring at the bottom of Feature 585 with the preserved square mortises. Photo by P. Skalická.

Fig. 143. Opava, former Radniční Street. Collapsed wooden structure in Feature 555. Its wall was far thicker here because of the less stable edge formed by the fill of the earlier feature. Photo by B. Marethová.

This was gradually followed by other masonry structures and a stone house is already presumed at the plot during the 15th century (Kolář et al. 2011; Zezula 2019, 54–55). A similar development was indicated by the tentative results of a building-historical assessment of U Bílého koníčka House in Dolní Square (Zezula et al. 2007, 135) and the excavated contexts of the built-up area in Pekařská Street (Kiecoň, Zezula 2004; 2005, 27–30).

The internal structuring of the basements is closely linked to their structural design. Cases with a division of the space by partitions were registered in Brno (Lisá et al. 2021, 131) although this phenomenon has not been observed in Opava. Several dozen small stake holes detected on the bottom of Feature 581 near the former Radniční Street can rather be linked to a type of light structure inside the space or, more likely, they are negative imprints of stakes used to fix a wooden floor (Skalická, Marethová 2013).

Various forms of flooring in the basements could be observed in multiple cases in Opava. These mostly had the form of thin packed layers of moved subsoil or sand although wooden boards on a sand subbase were also common (e.g. Feature 502 in Popská Street). The floors were regularly renovated and several layers were often detected, which led to a reduction in the clearance of the space, sometimes by as much as 0.3 m (Feature 555 near the former Radniční Street). Finds from them can be used as an important chronology element; lost coins found on the floor of the fourth phase of a basement in Holubí Street, for instance, made it possible to date the floor to the 14th/15th – first half of the 15th centuries (Kolář, Zezula 2014; Fig. 144).

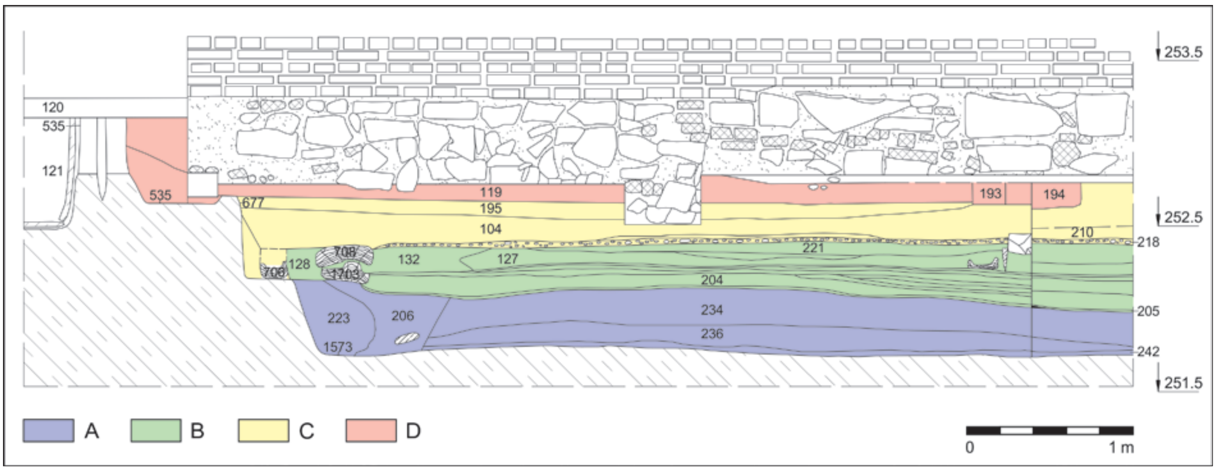


Fig. 144. Opava, Holubí Street. A section featuring the individual phases of the basement. A – First building phase (13th century); B – second building phase (first half of the 14th century); C – third building phase (second half of the 14th century); D – fourth building phase (14th/15th – first half of the 15th century). After Kolář, Zezula 2014, 556.

Fig. 145. Opava, Krnovská Street. Superposition of the entrance necks of Feature 502 (15th century) and Feature 532 (16th–17th century). The street front is located to the right of the features. After Kiecoň, Zezula 2005, 36.

The layout of the entrance was discernible for basements in Krnovská and Hradecká streets and near the former Radniční Street (Feature 1523). This always took the form of staircase steps hewn into the loess subsoil. Small stake holes along the sides of the individual steps of the stair detected near Feature 502 in Krnovská Street (Fig. 145) and Feature 1523 in the former Radniční Street are interpreted as traces of wooden reinforcement. The entrance necks were usually situated in the corner area, except for Feature 1523 near the former Radniční Street, where the neck opens into the middle of the longer wall. The position of the entrance with respect to the street line is also variable and is usually situated either perpendicular or parallel to it, depending on the house's position within the plot. As an example, we can name three basements of the later phase of buildings in the former Radniční Street, adjacent to each other and to the street line, where it was impossible due to spatial reasons to design the entrance from anywhere but the rear part of the plot. If a part of the house without a cellar continued above the basement in the direction of the depth of the plot, the entrance neck would be situated in its interior.

4. Position within the plot

The position of the basements in relation to the street line is important evidence of the organisation of urban buildings on a medieval plot. In Opava, the majority of them are situated in the front part of the plot, either on or very close to its edge. The only exceptions are features from Pekařská and Lazebnická streets, which were situated in the rear parts. In the overwhelming majority of cases where no traces of above-ground parts of the houses were preserved, the context of the basement with respect to the street line may at least indicate the built-up area and its basic orientation. It appears that the orientation perpendicular to the street line predominated in Opava; parallel orientation was only recognised in the latest phase of a house in Holubí Street.

4.1 Excursus – A pithouse from Kateřinky

A feature different from other local basements has been examined outside medieval Opava, in the present-day Kateřinky suburb on the left bank of the river. This was a 4 × 4 m square feature sunk 0.35–0.4 m into the loess subsoil, with an estimated overall depth of 0.8 m. Traces of stake holes were detected along the circumference of the perpendicular walls. No entrance was detected although one edge of the feature was not examined. This was dated to the late 13th or early 14th centuries. The author of the research describes it as a pithouse (Kouřil 1988). It differs considerably from the other basements in Opava in two aspects – its low depth and its distance from the medieval town. Although there is also evidence of basements in the Opava suburbs (one basement in Hradecká Street and two in Krnovská Street), this feature was situated in the sovereign's domain that primarily consisted of a rural population concentrated around an agricultural court. The presence of urban buildings that would include a basement is highly unlikely there. Therefore, we can agree with Pavel Kouřil and interpret the feature as a partially recessed building of an economic character. Craft activity has not been ruled out in it (glaze drops were found in the fill, possibly indicating pottery production). From this example, we can see that basements and pithouses may share many parameters while representing extraordinarily variable phenomena. Therefore, their functions must be assessed individually (Čapek, Netolický 2014).

5. Summary

The presented examples show that as in other towns of Central and Eastern Europe, wood-and-clay architecture predominated in the first phases of the existence of medieval Opava and was only replaced by stone houses to a greater extent from the Late Middle Ages. The context of the basements indicates a stabilised organisation of buildings in the individual plots, as they were renovated in an identical position (Holubí Street), or a developmentally more advanced masonry chamber was built in their place (U Mouřenína House in Mezi Trhy Street). On the contrary, a basement excavated in Popská Street documents only a gradual stabilisation of the street lines in this part of the town. More continuous excavations encompassing several of these features may also specify the knowledge of the urbanistic development of Opava in further respects, as shown by the archaeological context of wood-and-clay buildings along the former Radniční Street. Until their discovery, it was presumed that the alley passing through a block of houses from the centre of the southern frontage of Horní Square in the direction of Popská Street is part of the modern development of the town, as it only appears for the first time in Lundwall's plan from before 1758. An excavation from 2010 and 2011 proved that the origin of the alley dates back to the very beginnings of the foundation of the town. Both basements from the earlier phase, as well as an opposite feature detected during the 2004 excavation (Kiecoň, Zezula 2005, 30), were situated a slight distance from its presumed course, while the basements of the later phase were already moved closer to the street line. The houses to which these features belonged were abandoned in the first half of the 14th century; the alley probably ceased to exist and was not renewed until the 18th century. This was only temporary again as it vanished once more due to a fire in the city in April 1945 and the subsequent redevelopment.

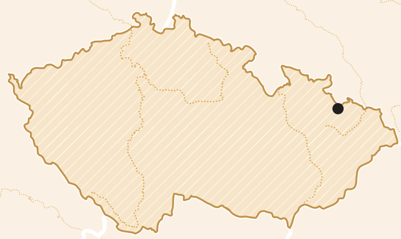
Acknowledgement

The chapter came into existence within the framework of partial objective I.1 *Zpracování a vyhodnocení záchranných archeologických výzkumů NPÚ na vybraných nemovitých kulturních památkách, městských rezervacích, zónách a územích České republiky s dosud nechráněným archeologickým potenciálem* (Processing and assessment of rescue excavations conducted by the National Heritage Institute in selected immovable cultural monuments and conservation areas in the Czech Republic with so-far unprotected archaeological potential) of research area I. *Archeologie* (Archaeology) financed by the Ministry of Culture's institutional support for long-term conceptual development (IP DKRVO).

Chapter 14

Micromorphological characteristics of floors and open site areas in the context of medieval households in Opava city centre (former Radniční Street)

Lenka Lisá – Barbara Marethová – Pavla Skalická



1. Introduction

The city of Opava stands out for its wonderful preservation of the organic remains of medieval buildings. This is strongly influenced by the geological situation through which the organic fillings of recessed buildings can be assessed and thus another part is added to the mosaic of knowledge/issues of medieval buildings. One of the most researched parts of the city of Opava is the former Radniční Street, where rescue excavation took place in 2010–2011 (Skalická, Marethová 2012). During the excavation, it was possible to explore several phases of medieval buildings that were manifested as a sequence of sunken basements of wooden-clay houses and the related open sites. The site provided sufficient material for micromorphological analysis of their floor horizons. Macroscopically detectable microstratification is often interpreted as a floor horizon (Lisá, Lisý 2019, Lisá et al. 2020a; 2020b; 2021; Macphail, Goldberg 2018), but its formation can also be conditioned by other formation processes (Lisá et al. 2017). The micromorphological research aimed to clarify if it was possible to recognise distinct differences between the floors of sunken houses and the active layers of the related open sites. The formation processes of the individual floor sets and their composition could be described in detail, which is exceptional due to the long-prevailing reduction environment at the site.

2. Context of the site

Samples for micromorphological analysis were taken from Square 17, the southern half of which was represented by the basement (Context 1523, see Fig. 146) and is the oldest recorded phase of residential development at the site. The building was probably built during the mid-13th century. The basement was sunken into the extinct terrace of the River Hvozdnice (Gravel sands 179, 180), and its construction was solved using recessed columns in pits lined with stones due to the instability of the terrace (Post holes 1614–1620). The extinction fillings (159–167) mainly contained ceramic material and did not show any traces of fire. Throughout the use of the basement, several phases of floor levels were aggraded, through which the terrain was gradually increased up to 0.3 m. The most recent documented floor was detected in Archaeological context 165. The sequence of extinction fillings is completed by a later and larger basement dendrochronologically dated by the absolute date of tree felling used for Foundation wreath 1278/9.

The construction of the later basement, No. 585 (Fig. 146), is a well-preserved wooden construction. Adjacent to it, at the northern edge of the square, another basement, No. 581, has been deepened. The archaeological context indicates that it is the same time horizon – the extinction filling that is partially common for both buildings is at the same depth, and the dating by ceramic and dendrochronology shows the same results, the floor level is in the same depth

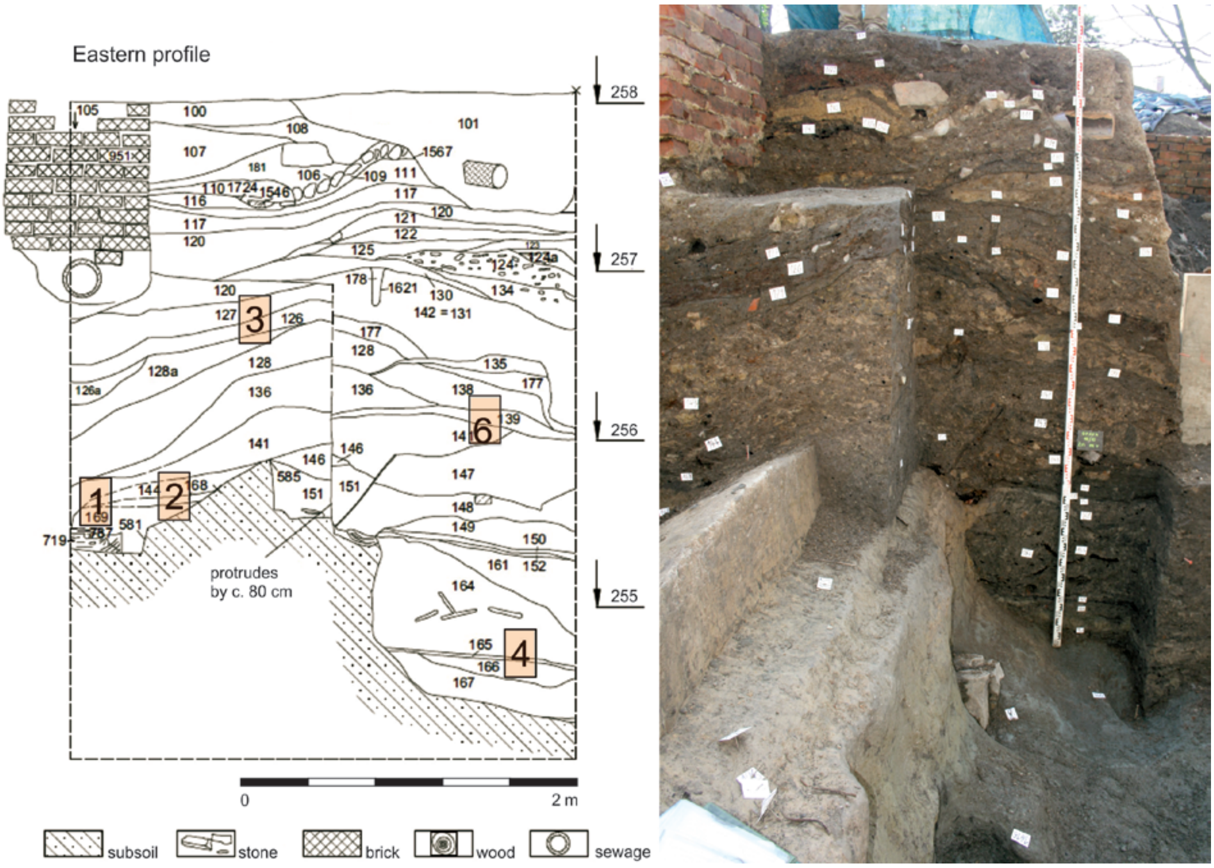


Fig. 146. Sedimentary section of the different stages of basement origin with the location of the samples. Authors L. Lisá, B. Marethová.

and the features follow each other. The features were placed relatively low above the lower levels of the depression while the least narrow strip of subsoil between them was not stable.

Both Basements 581 and 585 were abandoned during the first half of the 14th century when they were infilled. Free space was created in the position above them, which served as the economic facilities of the surrounding plots. The levelling layers (Archaeological context 128, 136, 138, 141), which sagged into the still descending fill of features, alternated in some places with layers of a manure character (e.g. 135 and 139) containing a large amount of organic material. At the turn of the 14th and 15th centuries, the surface was reinforced with cobble paving set in a sand bed. Later, within a shorter time interval, a lighter above-ground building of an economic nature was created for it, which was probably related to the later phase of the malting operation.

3. Sampling strategy

The unique research of the site in the former Radniční Street provided a set of organic layers, from which it was already macroscopically clear that they were passive and active floor horizons interspersed with destruction layers (Fig. 146) as well as active layers related to the household. One or two micromorphological samples (five samples in total) measuring 7 × 10 cm were taken from more or less each floor set identified at this site (see localisation in Fig. 146). The samples were cut intact from the profile and transported to the laboratory where they were gradually dried and impregnated with resin in a vacuum. Micromorphological 'mammoth' sections were then subsequently created from them (Murphy 1986) and studied using a binocular and polarising microscope. The description was according to Bullock et al. (1985), Stoops (2003) and Stoops et al. (2010).

Results

3.1 Sample 4 – the oldest floor at the site

Sample 4 represents the upper part of the oldest documented floor set at the site. Building 1523 is a basement from the older phase, the duration of which is expected from the mid-13th century to the 1970s. Throughout its existence, the floor levels gradually increased by several tens of centimetres. The later was Archaeological context 165, from which a sample was taken, and was a thin, dark brown layer, on the surface of which lay wooden structural elements from the time when the building was abandoned. It can be divided into two different subfacies representing passive and active layers (Fig. 146).

The microstructure of the passive layer is complex with the prevailing pores being planes and vughs. The matrix is relatively sorted with porphyric-related distribution. The grain size is silty to sandy loam with $C/F_{(50\ \mu m)}$ = 50 : 50. The coarse fraction is composed of subangular quartz, plagioclase, biotite and opaque minerals. The matrix is light grey with crystal birefringence and locally stipple-speckled birefringence. The organic matter is not commonly preserved, it is represented only as black dots. The pedofeatures preserved are the depletion and accumulation of a clay coating, which is often bioturbated into passage features (Fig. 147a).

The microstructure of the active layer is complex with vughs and planar pores. The matrix is moderately sorted with porphyric-related distribution. The grain size is silty to sandy loam with $C/F_{(50\ \mu m)}$ = 50 : 50. The coarse fraction is composed of subangular quartz, plagioclase, biotite and opaque minerals. The sandy coarse fraction is composed of rounded and subrounded quartz and plagioclase. The matrix is brown with lighter or darker shades according to the type of changing composition. The birefringence is crystal and locally stipple-speckled. The organic matter is commonly preserved usually as charcoal and microcharcoal. Unburnt organic matter is preserved in the form of black dotting, brown decomposed, partially decomposed (Fig. 147b) and even non-decomposed organic matter, plant and wood fragments (Fig. 147c). There were documented phytoliths and locally articulated phytoliths, bones, digested bones and burnt bones. The pedofeatures preserved are depletion, redeposition of clay, a clay coating and neoformation of vivianite (Fig. 147d).

Interpretation: the passive layer is formed by fine-grained sediment (loess clay, fine-grained floodplain) and forms the non-structural *in situ* passive layer of the floor set. It contains planar pores and a number of clayey deposits redeposited from the active floor layer in the overburden. The pores are caused by intensive loads from the overburden and typically occur in basements. The active layer is characterised by a set of microlamines with horizontal orientation. The mineral composition of the active layer has the same provenance as the underlying and overlying passive layer, although it contains a number of anthropogenic inclusions, especially microcarbons, kitchen waste carbons and related newly formed minerals formed in the reducing environment (vivianite). Intense straightening shows signs of sweeping. An almost identical set of microlamines was published in the work of Lisá, Kolařík (2020) from the recessed cellar in Brno-Královo Pole dated to the 14th century and situated in a rural environment.

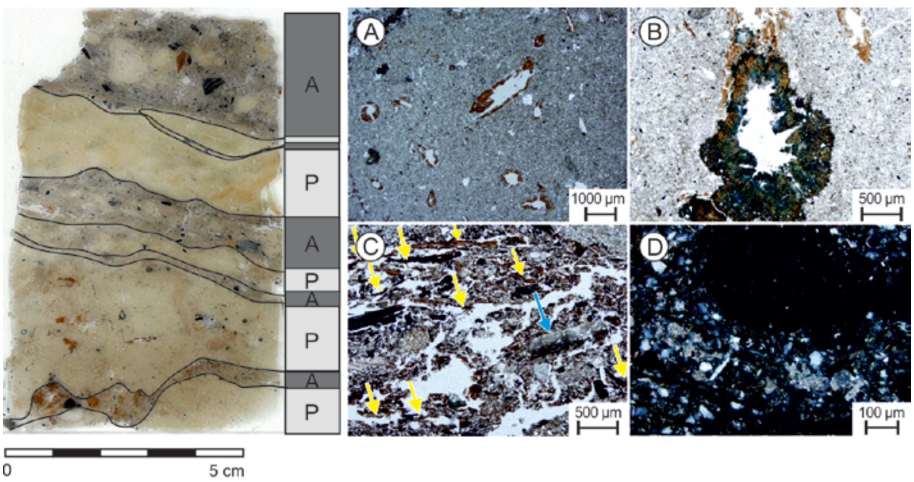


Fig. 147. Micromorphological documentation of Sample 1: A – clay coating inside the pores (PPL – photo taken in plane-polarized light); B – neoformed vivianite (PPL); C – active layer – yellow arrows point to the fragments of partly decomposed organic matter, blue arrow points to the fragment of eggshell (PPL); D – ash crystals (XPL – photo taken in cross-polarized light). Author L. Lisá.

3.2 Samples 1 and 2

Samples were taken from the floor levels at the base of Basement 581, which belongs to the later phase of residential development at the site. It originates from the late 1370s and the dating is based on dendrochronological data obtained from wooden structures. Extinction is expected in the first half of the 14th century based on ceramic finds and stratigraphic observations. These two samples were taken from one context, which changed horizontally into slightly different-looking seven layers. Thus, the transition of use of one walkable layer in the order of several tens of centimetres is captured.

Sample 1 can be divided into five passive and up to five active layers (Fig. 147). Sample 2 can be divided into at least seven passive and seven active layers (Fig. 148). The transitions between the microlamines in Sample 2 are in some cases difficult to read and it is likely that both the active and passive layers could be increased. For simplicity, a common characteristic within passive and active layers is always described in the text, because these layers can be facially merged.

Characteristics of passive layers: a total of four passive layers were captured in the sample (Fig. 147). The number of observed passive layers in Sample 2 was even higher (Fig. 148). Their thickness ranges from 0.5 to 3 cm (Fig. 148a). Passive layers have a complex microstructure. The prevailing types of pores are vughs, planes, cracks and vesicles. The material of passive layers is usually well sorted with occasional inclusions of newly formed *in situ* minerals or clay illuviations. The grain size distribution corresponds to silty loam with porphyric-related distribution with $C/F_{(50\ \mu m)}$ = 30 : 70. The coarse fraction is composed of subangular quartz, plagioclase, mica and opaque minerals. The new forming minerals are vivianite crystals (Fig. 147b, 148d) in a coarse sandy fraction and recrystallization of ash (Fig. 148b). The matrix has a light brown colour with crystal and locally stipple-speckled birefringence. The organic matter is relatively rare and presented as black dotting and brown decomposed organic matter. The charcoal is rare and presented only as inclusions due to the bioturbation. Organomineral particles are preserved in form of bones and burned bones and eggshells (Fig. 148c). The pedofeatures are depletion, bioturbation, silty clay coatings and clay impregnations (Fig. 147a). Newly formed vivianites (Fig. 147b, 148d) were observed.

Characteristics of the active layers: at least four active layers were detected in the sample with thicknesses varying from 0.1 cm to 3 cm. The microstructure of the active layers is complex. The prevailing pores are compound packing voids and planes. Occasionally, vughs and cracks also occur. The material is moderately sorted to unsorted with porphyric-related distribution. The grain size distribution corresponds to sandy loam with $C/F_{(50\ \mu m)}$ = 50 : 50. The coarse fraction is composed of rounded and subrounded sandy grains of quartz and plagioclase and silty angular to subangular grains of quartz, plagioclase, mica and opaque minerals. Newly formed vivianite crystals in a sandy fraction are quite common. Sparitic birefringence carbonate was observed. The colour of the matrix is dark brown to brown, with crystalline birefringence. The organic matter is preserved as black dots, decomposed brown organic matter but quite commonly also as partly decomposed horizontally oriented

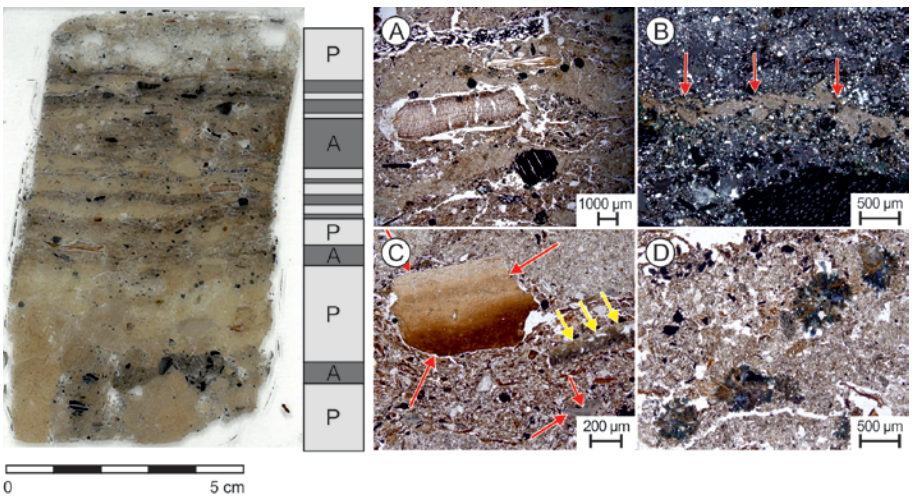


Fig. 148. Micromorphological documentation of Sample 2: A – set of passive and active microlayers. The thickness of these layers is only a few mm (PPL); B – laminae of recrystallised ash (red arrows), (XPL); C – bones burned in different temperatures (red arrows), eggshell (yellow arrow) (PPL); D – rounded crystals of vivianite developed *in situ* (PPL). Author L. Lisá.

brown organic matter, microcharcoal and charcoal. Articulated and non-articulated phytoliths were observed. Also quite common are digested bones and especially eggshell fragments (Fig. 147c). Pedofeatures observed in the sample are local depletion, a clay coating, calcium carbonate accumulation after illuviated ashy solutions (Fig. 147d), bioturbation (excremental features after microfauna, passage features) and new crystal growings (vivianite).

Interpretation: in the case of passive layers, the planar pores are developed relatively poorly, which indicates the degree of surface loading. The number of passive layers probably reflects the repeated application of the so-called sanitary layers, which have the task of strengthening and cleaning the surface in a particular way. The passive layers cannot be considered as a tread because they are relatively homogeneous and contain a minimum of anthropogenic inclusions. Therefore, their application had to be targeted. In contrast, the active layers are not composed only by organic material stored there but are occasionally dumped or applicated as a part of the floor maintenance. The active layers are a typical deposition of horizontally stored organic matter and kitchen waste, which represents both bone fragments, numerous eggshells and waste from the heating system, including carbon and recrystallised ash. Due to chemical reactions, clay minerals are released and shifted, which accumulate as deposits in both the active and passive layers. The direction of the mineral fraction in the active layers is not significant; therefore, it is not expected that there will be sweeping. It is clear that the cleanliness of the surface was achieved by the deposition of a sanitary layer, in this case, loess. This method of treatment is all the more striking in Sample 2, where the relatively thin millimetres of the active layer alternate again with the relatively thin layers of the passive sanitary layers.

3.3 Sample 3

Sample 3 was taken from Contexts 126 and 127, which are characterised as manure with a larger amount of organic material, especially small wood fragments. They were stored during the second half of the 14th century when they were part of the open space. This probably served as the facilities for the surrounding buildings and is determined by the manure layers with levellings containing waste from craft workshops. This sample can be divided into two active and one passive floor layers (Fig. 149). The parameters of the active layers are not comparable. Therefore, they are described separately in the text as the lower active layer and the upper active layer.

The lower active layer has a complex microstructure and is composed of a number of aggregates (Fig. 149a) of different provenance. The typical pores are compound packing voids, cracks and vughs. The material of this layer is unsorted with porphyric and double-spaced porphyric-related distribution. To set the grain size is difficult due to the variability of the layer, although it may be interpreted as unsorted sandy loam with $C/F_{(50\ \mu m)} = 30:70 - 70:30$. The coarse fraction is composed of a sandy fraction, which is composed of subangular quartz, plagioclase, daub and ceramic sherds. The fine sand coarse fraction is composed of angular to subangular quartz, plagioclase, mica and opaque minerals. The colour of the matrix is variable due to the inhomogeneities but generally brown with crystal birefringence. The

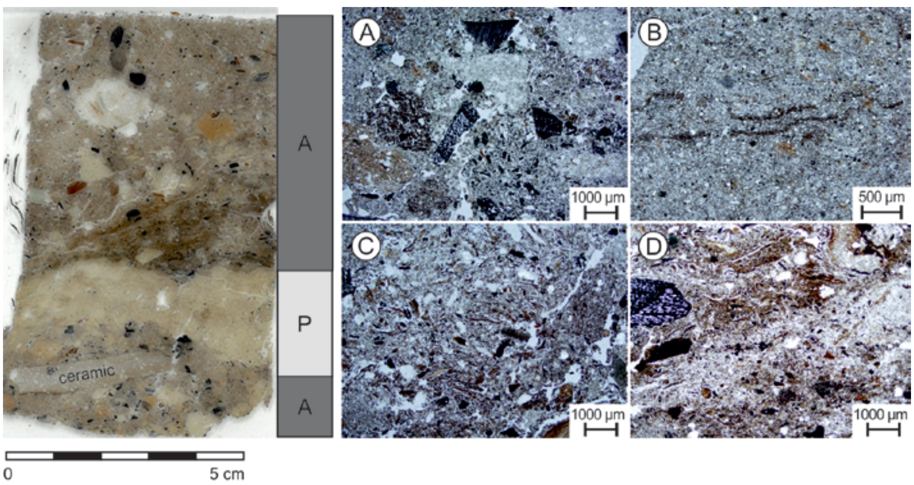


Fig. 149. Micromorphological documentation of Sample 3: A – aggregates of different matrix (PPL); B – illuviation laminae composed of Fe/Mn hydroxides (PPL); C – bioturbated matrix rich of organic and organomineral fragments including eggshell (in the centre) (PPL); D – layers with different preservation of organic residues (PPL). Author L. Lisá.

organic matter is preserved as black dotting, but mainly as a brown and dark brown accumulation of decomposed organic matter, fragments of partly decomposed and non-decomposed organic matter (Fig. 149c), which are not necessarily horizontally oriented, and microcharcoal and charcoal. Phytoliths are present. The pedofeatures observed are mainly bioturbation, depletion (Fig. 149d), vivianite crystal growing and rare clay coating.

The passive layers have a complex microstructure. The prevailing types of pores are vughs, planes, cracks and vesicles. The material of the passive layers is usually well sorted with occasional inclusions of newly formed *in situ* minerals or clay illuviations. The grain size distribution corresponds to silty loam with porphyric-related distribution with $C/F_{(50\,\mu m)}$ = 30 : 70. The coarse fraction is composed of subangular quartz, plagioclase, mica and opaque minerals. The new forming minerals are vivianite crystals in a coarse sandy fraction. The matrix has a light brown colour with crystal and locally stipple-speckled birefringence. The organic matter is relatively rare and presented as black dotting and brown decomposed organic matter. Charcoal is rarely represented, only as inclusions due to the bioturbation. The pedofeatures are depletion, bioturbation and silty clay illuviation (Fig. 149b).

The upper active layer has a complex microstructure. The prevailing pores are compound packing voids, planes, cracks, vughs and vesicles. The material is unsorted sandy loam with porphyric-related distribution with $C/F_{(50\,\mu m)}$ = 50 : 50. The coarse fraction is composed of subangular quartz, plagioclase, mica and opaque minerals and the coarse sandy fraction of subrounded quartz, plagioclase and daub. The matrix is light to dark brown with crystal birefringence. The organic matter is commonly represented as partly decomposed brown organic matter (Fig. 149c), usually horizontally oriented. Black dotting and decomposed organic matter are a common part of the organic fraction. The charcoal and microcharcoal are present but not in a high amount. The phytoliths are both commonly articulated and non-articulated. Bones and eggshells are not very common. The pedofeatures are depletion and bioturbation (Fig. 149d).

Interpretation: the lower active layer is a mix of soil fragments trampled together with organic matter, without a significant horizontal orientation. This tends to be seen in the internal structure of the individual aggregates with a passive layer consisting of pure loess applied. After decomposition, it was affected by post-sedimentary processes, which are manifested mainly in the presence of illuvial infusions from the overburden. The upper active layer is relatively thick and was formed by repeated and probably relatively fast tread (there is an absence of well-developed horizontal pores in the passive layer below it). It consists of various organic waste and rather than kitchen waste is dominated by organic matter (remnants of hay, grass, possibly food). Carbons and occasionally eggshells and digested bones appear, but only to such an extent that they were probably brought on shoes, not applied in a targeted manner. This is probably a utility, partial storage space without any modification to the floor surface.

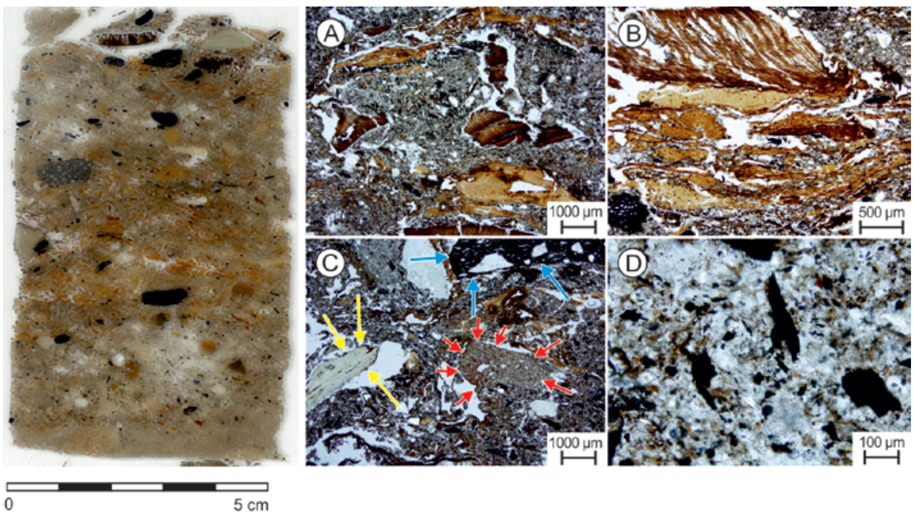


Fig. 150. Micromorphological documentation of Sample 6: A, B – wood fragments in a different state of preservation (PPL); C – bone (yellow), ceramic fragments (red and blue arrows) (PPL); D – microcharcoal fragments (PPL). Author L. Lisá.

3.4 Sample 6

Context 139, which makes up the majority of Sample 6, was strongly organically smelling. As with Sample 3, it is a layer with manure character, which was deposited over the descending filling of Basement 585 during the second half of the 14th century. At that time, the space served as an open space in the courtyard. Sample 6 is composed of a thick active layer with a fragment of a passive layer below. The parameters of the passive layer are comparable with the passive layer observed in Samples 4 and 5 with the absence of planar voids. The active layer shows signs of internal lamination although no special subfacies were divided there. The microstructure of the sample is complex, and the main type of prevailing pores are compound packing voids, planes and vughs. Cracks and vesicles were observed. The material is unsorted with porphyric-related distribution. The grain size distribution corresponds to sandy loam. The $C/F_{(50\,\mu m)} = 50 : 50$. The coarse sandy fraction is composed of subrounded quartz and plagioclase, daub (Fig. 150c, red arrows) and ceramic sherd (Fig. 150c, blue arrows). The fine sand coarse fraction is composed of subangular quartz, plagioclase, mica and opaque minerals. The colour of the matrix varies between light and dark brown. The birefringence is crystal. The organic matter is commonly presented as large flanks of partly decomposed brown organic matter (Fig. 150a) (probably leaves – Fig. 150b), but also as brown decomposed organic matter (Fig. 150c), black dotting and common microcharcoal (Fig. 150d). Bone fragments are present (Fig. 150c, yellow arrows) as well as articulated and non-articulated phytoliths. The pedofeatures presented are partial depletion, bioturbation (passage features preserved), Fe/Mn hypo-coating and occasional Fe/Mn nodule growing.

Interpretation: the sample from the active floor layer reflects the repeated deposition of organic matter in the form of leaves. Unfortunately, any further determination is not possible. However, the active layer is also formed by the amount of mineral matter in the form of soil aggregates, ceramics or a fine-grained matrix. Parts of the layer are affected by flowing water while at the same time there are visible signs of the formation of iron concretions in the sample, which indicates increased humidity. On the other hand, there are no signs of the formation of vivianite, which would be formed in a reducing environment with the supply of phosphates and carbonates. The pH will probably be more acidic, which in the case of this basement may be related to the absence of ash distribution.

4. Discussion

Although the individual floor horizons are macroscopic as individual layers indicating relatively rapid degradation, they in fact represent a complicated floor set of several time phases (Lisá et al. 2017; 2020a; 2020b). The formation processes leading to the formation of those layers always tend to differ, which is related to how the space and the associated surface treatment are used (Rentzel et al. 2017). Floors in the form of thin webs are detectable both in historical and prehistoric contexts, and their formation processes always correspond to specific conditions, often controlled by underlying geology, type of construction and type of use (Novák et al. 2012; Kuna et al. 2013).

In general, the active layer always lies on a passive layer formed by loess or fine-grained alluvium. The oldest phase recorded in the stratigraphy of the house has the parameters of a classic swept floor where the surface has been beaten for a long time and the active layer is formed by a tread that includes both mineral fraction and kitchen waste. The same situation was documented, for example, in the floor of a medieval cellar in Královo Pole (Lisá, Kolařík 2020).

The active layer above this is already related to completely different practices. Although not always homogeneous in the horizontal direction, the same parallels of maintenance can be found there. Mainly due to the specific maintenance, the floor macroscopically and micromorphologically does not have exactly the same parameters, although it is evidently the same horizon. This floor consists of a set of active and passive microlayers because passive microlayers have been used as a form of cleaning. These are sanitary layers; similar practices have been described in the Hallstatt Earthworks in Brno-Modřice and some basements from the context of medieval Brno (Lisá et al. 2021) or geo-ethnoarchaeological parallels of subrecent floors from Romania. The differences between the sampling positions are given by the degree of preservation of the passive or active layers. The passive layers were obviously applied where it was needed. However, these sanitary layers were not applied to any storage place to clean it. In addition to organic matter, the active layers are formed by ash and carbons. Therefore, their use is much more complex. The active layer was not swept in any way, it was only covered with a sanitary layer. If the space was used for storage, the remediation would still have to be associated with the application of ash. This, on the other hand, is not ruled out and has already been documented in Tišnov (Lisá et al. 2009) and in the horse stables in Veselí na Moravě (Dejmal et al. 2014).

The open site floor sequences sometimes also contain a passive layer although the internal stratigraphy and the composition are totally different from the stratigraphy of sunken floors. In the case of Sample 3, it appears to have only been an uncoordinated accumulation of soil matrix, together with ordinary carbonaceous waste and partly kitchen waste. However, a remediation layer was applied to this layer, as was the case with Samples 1 and 2. The active layer, which subsequently forms this remediation layer, was formed by repeated and about one relatively fast tread (Lisá et al. 2021; 2020b). It consists of various organic waste and rather than kitchen waste is dominated by organic matter (remnants of hay, grass, possibly food). Charcoal and occasionally eggshells and digested bones also appear, but only to such an extent that they were probably brought on shoes, not purposefully applied. The reason is that the floor is not related to the sunken part of the house but rather to the roofed open site. The floor of Sample 6 provided information on the passive and powerful active layer. The passive layer is comparable to that described above and similarly, it does not show the presence of planar pores indicating repeated loading. The insufficient pressure on the subsoil may be caused by the relatively rapid degradation of the active layer. This consists of a number of organic fragments interpreted as the leaves of dicotyledonous plants. However, the layer also contains a common tread, whether in the form of carbons, bone fragments, fine-grained matrix or soil aggregates. Partial depletion and the onset of iron nodules indicate a humid environment, i.e. the site was located outside and probably not even roofed. It is evident that, unlike in previous cases, no ash was deposited there. The absence of carbonates thus caused unsuitable conditions for the formation of vivianite.

5. Conclusion

The micromorphological study of the floor horizons of medieval basements and horizons representing the living space outside the houses in the Opava city centre site points to the fact that the macroscopic identification of the so-called floor sets has much greater potential. Within the studied samples, it was possible to recognise the distinct differences between underground floors and open site floors. One of the open site floors was evidently roofed. Both the underground floors as well as the open site floors revealed the presence of passive and active or reactive floor layers. Passive horizons are probably part of the natural habitat; in other cases, they are a design issue. If they are dominated by developed horizontal pores then repeated long-term pressure from the overlying active layer (the oldest basement) can be assumed. However, these passive layers can also serve as remediation, which is related to surface treatment. While the oldest basement was evidently swept, the later basement was modified only by the application of renovation layers. There are no modifications to the surfaces documented from the open site floors, namely from Samples 3 and 6. In these samples, frequent applications of sanitary layers are not obvious, although some methods of surface treatment are not visible either. A basement with a number of sanitary layers could probably be used to store organic products, and the cleaning methods are likely to be related to the application of ash and thus the removal of moisture.

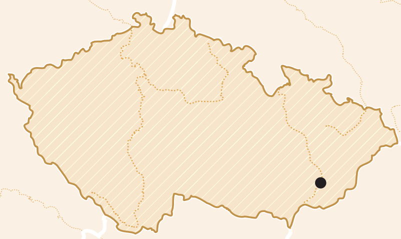
Acknowledgement

The chapter came into existence within the framework of partial objective I.1 *Zpracování a vyhodnocení záchranných archeologických výzkumů NPÚ na vybraných nemovitých kulturních památkách, městských rezervacích, zónách a územích České republiky s dosud nechráněným archeologickým potenciálem* (Processing and assessment of rescue excavations conducted by the National Heritage Institute in selected immovable cultural monuments and conservation areas in the Czech Republic with so-far unprotected archaeological potential) of research area I. *Archeologie* (Archaeology) financed by the Ministry of Culture's institutional support for long-term conceptual development (IP DKRVO).

Chapter 15

Buildings in Uherské Hradiště in the town's first century

Rudolf Procházka



1. Introduction

The study attempts to summarise issues related to the oldest buildings in the royal town of Uherské Hradiště based on archaeological records and to set them in the Central European context. It is based on preliminary and partial publications, archaeological reports and especially fieldwork documentation. In some cases, it offers a revision of available sources leading to changes in previous interpretations. We need to emphasise that the excavations were conducted many decades ago and that the available sources are of a very diverse character, mostly not meeting present-day requirements.

2. Founding of the town and its development until the beginning of the 15th century

The royal town of Uherské Hradiště was founded by King Ottokar II probably in 1257, the year in which the first of two deeds relating to founding activities was written (CDB V/1, No. 136, 218–220; CDB V/2, No. 156, 245–248). Within the framework of his town founding policy, the king reacted to the Cuman raid of 1253, when the attackers got as far as Olomouc. The term *munitio* used in the document from 1257 therefore also emphasised the fortress character of the newly founded town. This is why an island in the River Morava, allegedly with a chapel, was chosen for the new town. The territory was owned by the recently founded Cistercian monastery in Veligrad (now Velehrad), which itself had founded a market village of the same name in the first quarter of the 13th century occupying a part of a Great Moravian stronghold that had vanished long before that; the village was called Staré Město from the 14th century (CDB II, No. 195, 179–181, No. 321, 319–321; Verbík 1981a, 88–96). The village of Kunovice, also with a market, had been founded – probably also in the 13th century – in the sovereign's territory south of the island. The king used the inhabitants of the two market villages to populate the new town.

A royal town represented a qualitative shift towards a production-market centre of the first order on a contemporary scale. The urban community, equipped with a high level of personal freedom and gradually also with a system of mostly economic privileges, had qualitatively much better preconditions for playing the part of a regional economic centre than previous market villages, which moreover only had a weekly market according to a mention in a deed from 1257. Unlike other similar cases, the king did not buy the land on which the town was founded from the owner, the Veligrad monastery. The local Cistercian convent founded by Margrave Vladislaus Henry and Olomouc Bishop Robert, was the largest landowner in the region. Ottokar II therefore granted it extended rights in the newly founded town, including above all the right to appoint the mayor ('Richter') and the fee from land plots and from the weekly market that took place in the Veligrad part, as well as judicial penalties collected by the mayor. The town had Brno rights, the one-mile privilege concerning taverns, three villages, a forest near the River Morava, weekly markets transferred from Kunovice and Veligrad, an annual fair and the (never used) possibility to mint royal coins. It was also granted the use of Kunovice's pastures and forest. Moreover, a trade route from Hungary was supposed to lead through the town. The Church of St Michael in the former market village of Veligrad remained the parish church (Verbík 1981b; Kejř 1998; Procházka 2008, 219–223; Mitáček 2009; Mitáček, Procházka 2007; Tomas 2014, 449–450).

The settlement's higher economic and legal position was accompanied by a transformation of the structure of its built-up area, differing altogether from the settlement units that had dominated the landscape until the 12th or early 13th century.

The municipality was apparently founded at one time in the highest part of a river island that had no permanent population at the time; its outline respected a roughly triangular shape with an area of 16 ha. The exact extent of the island is unknown, but it is evident that the high medieval founding roughly overlapped with the area of early medieval occupation, which exceeds the perimeter of the town wall only in some places (Procházka, Havlíček 1996). The grid street network typical of towns founded during the reign of Ottokar II was adjusted to the irregular shape of the settled terrain. A remarkable feature of the town plan was its division into the Veligrad and Kunovice parts, divided by the Canal Rechla, which had probably originated from the adaptation of a river arm into a millrace. A roughly rectangular square was laid out in each part. According to a record in a pair of registers of the payers of the town levy and the area rent from 1371, there was a certain urban book (*liber locationum*); although its content is unknown, we may assume that it contained a list of the surveyed plots and their first owners within 11 plot blocks (*contextus arearum*), each consisting of four plots. The ideal structure has indeed survived in several places, such as on the southeast side of Horní (present-day Mariánské) Square. Most probably, however, it was not observed strictly even at the beginning; instead, it likely served above all for the determination of the overall amount paid. The real structure usually varied, and more plots were surveyed in each block (Procházka, Sulitková 1984, 8–9, 53–59; Čoupková ed. 2001, 99–114). The mentioned registers contain about 188 house plots. The town was apparently fortified only by a wooden palisade; it was undoubtedly still so in 1315, when it was unsuccessfully attacked by Hungarian oligarch Máté Csák of Hungary. Judging from the exemption from tallage and judicial penalties by John of Bohemia in 1323 and 1327 in support of the construction of the fortification, town wall construction probably began in the 1320s. Another exemption from duties by Margrave Charles shows that the work had not been completed two decades later. The town could be entered through two gates (Staroměstská and Kunovická) and through a simple postern gate on the southwest side. The walls were not rich in towers; only one is preserved, a polygonal tower on the west side of the town wall. Several more towers of various layouts are known from plans and vedute starting with 1658, as are two open towers of the southeast Staroměstská Gate. They were probably only built in the 15th century, possibly partially after the siege of the town by Matthias Corvinus (Verbík 1981b, 101, 107–108; Kuča 2008, 819; Procházka, Sulitková 1984, 49–53; Razím 2019, 362–372). The time of origin of the houses in Rybářská Street on the opposite bank of the River Morava is unknown. They were not yet explicitly mentioned in 1371, but at that time, malthouses already stood in front of the walls; they were burnt during the internal war between Margraves Jobst and Prokop in 1394 (Procházka, Sulitková 1984, 12, 26, 65). The role of a suburb in the economic sense of the word was played above all by the nearby settlement of Staré Město, which remained in the hands of the Cistercians. Although legally a mere village, pottery developed there, as evidenced by archaeological finds of 13th- and 14th-century kilns and of a unique pottery hoard (Snášil 1982a; 1982b; 1983; Galuška 2003; Procházka 2015, 218–222). Uherské Hradiště administered two bridges across the River Morava, with numerous villages listed in the bridge toll register from 1362 contributing to their maintenance (Procházka 1983; Čoupková 1995).

In the 14th century, Uherské Hradiště was a town of a craft character to a considerable extent; agriculture is also documented, including viticulture. The list of 67 villages paying the bridge toll documents an agricultural hinterland reaching as far as 28 km from the town. The sovereign endowed the town with numerous privileges, especially annual fairs, the right of escheat and a one-mile privilege for the performance of crafts. He also supported the construction of town walls (Verbík 1981a; 1981b, 66, 100–124; Procházka 1983; Procházka, Sulitková 1984, 10–25, 51; Čoupková ed. 2001; Kuča 2008, 819).

Despite its importance for the defence of the Czech lands and numerous privileges, Uherské Hradiště remained a smaller town with a population of about 1,500, which represents a medium size in this country's context. This is also why it long lacked a mendicant friary, which was not founded until the late 15th century. However, it did have a hospital near the Staroměstská Gate. The patronage of the filial Church of St George was held by the Veligrad monastery throughout the Middle Ages (Verbík 1981a, 136–137; 1981b, 112–113; Hosák, Zemek 1981, 145–146; Procházka, Sulitková 1984, 26).

The archaeological contexts are strongly influenced by hydrogeological conditions. After the temporary abandonment of the island during the 10th century, the early medieval strata were exposed to the influence of weather and vegetation, which unfavourably affected the preservation of organic substances; of wooden building structures, we usually only find lower parts of stakes thrust into the clay subsoil, which already come into contact with groundwater. The height level of the terrain did not rise, however, at least not in the central part of the island between the 11th and the mid-13th century. The situation changed in this respect after the arrival of settlers. A varied stratigraphy was created above all in the first century of the town's existence; it was comprised of remnants of buildings, excavated material, settlement and construction waste, fascines and other elements used to repeatedly strengthen the surfaces and also of alluvial deposits due to rising floods. This contributed to the preservation of the remnants of wooden buildings and other objects, above all those made of wood and leather, in the lower, moist and poorly aerated layers. The fact that there are very few such sites in the Czech lands also increases the value of the historical core of Uherské Hradiště for monuments concealed under the pavement. Interest in them dates back to the late 1970s, when archaeologists from the local Slovácké museum (Museum of Moravian Slovakia in Uherské Hradiště) under the guidance of Robert Snášil began a rescue excavation at the vacant site after demolished houses in Otakarova Street. Several more area excavations and numerous minor rescue projects followed by the beginning of the second half of the 1990s with the significant involvement of the Institute for Archaeological Heritage Brno. Occasional rescue projects take place in Uherské Hradiště to this day, conducted above all by archaeologists from the Museum of Moravian Slovakia in Uherské Hradiště, but well-preserved archaeological remains to a comparable extent with the first stage of the excavations are rarely investigated.

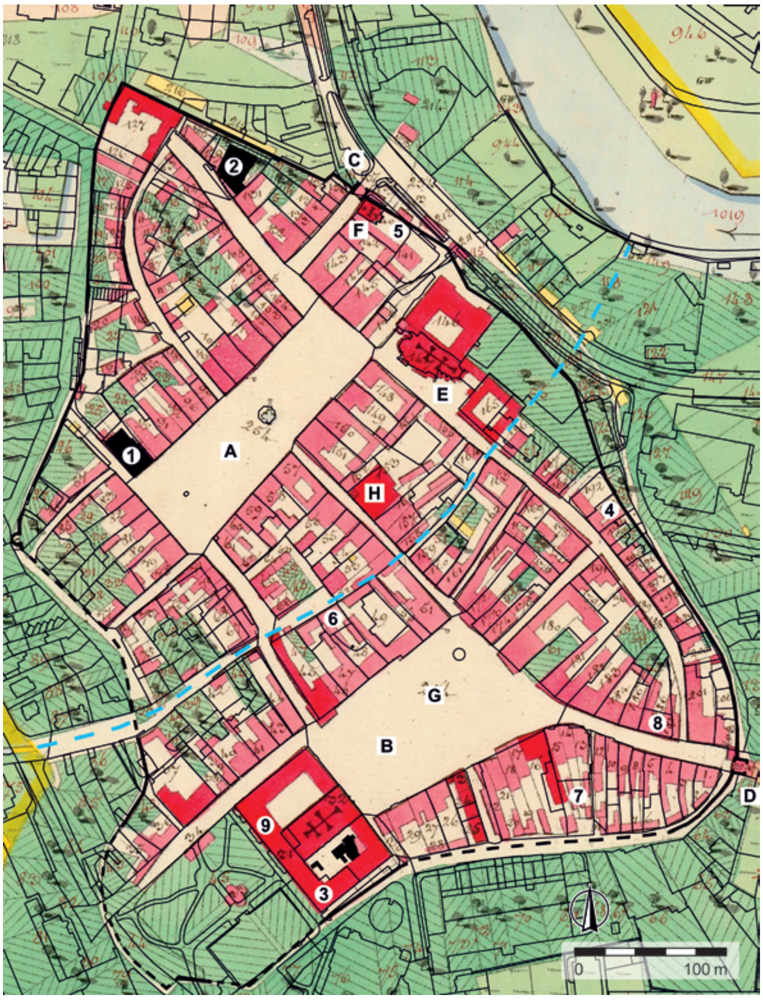


Fig. 151. Uherské Hradiště. Town plan from 1827, with marked excavations mentioned in text. A – Mariánské Square; B – Masarykovo Square; C – Staroměstská Gate; D – Kunovická Gate; E – Observant Franciscan friary; F – former town hospital with St Elisabeth Chapel; G – site of defunct Church of St George; H – Town Hall. 1 – 1247 Mariánské Square, plot No. 89/2; 2 – Otakarova Street, plot No. 65/54; 3 – 256 Masarykovo Square, plot No. 31/2; 4 – 1306 Františkánská Street, plot No. 193/1; 5 – 13 Vodní Street, plot No. 141/1; 6 – 1245 Zelný trh Square, plot No. 48/3; 7 – 1232 Hradební Street, plot No. 15/1; 8 – 1239 Havlíčkova Street, plot No. 186/1; 9 – 21 Masarykovo Square, plot No. 31/1. Town wall perimeter is defined by a solid and dashed line. © CUZK Uherské Hradiště, completed by R. Procházka, V. Kolařík.

3. Character of buildings in the second half of the 13th and the early 14th centuries

The excavations in Mariánské Square (1980–1983), Otakarova Street (1979–1984), 256 Masarykovo Square (1997) and, to a smaller extent, Františkánská Street are of particular importance from the perspective of the study of the character of residential buildings. Numerous other excavations, especially in 21 Masarykovo Square, 1238 Hradební Street, 1306 Františkánská Street, 1245 Zelný trh Square, 1239 Havlíčkova Street and 13 Vodní Street, only concerned the courtyard areas and rear parts of urban plots with evidence of economic activities (Fig. 151).

3.1 1247 (formerly 69) Mariánské Square, plot No. 89/2

A large corner plot in the area where Sojákova Street enters Mariánské Square (Rudé armády Square before 1989) had an original area of 946 m^2, a width of ca 16.6 m on the side adjacent to the square and a depth of 50 m, which made it a rather prestigious place in the 'Old Town' part of the town. Of that, a 424 m^2 area between the boundary of the square and a depth of 25 m was excavated in 1980–1984) (Fig. 151: 1).

The high medieval strata of the 13th and the first half of the 14th centuries with a thickness of ca 1 m were formed on the surface of 10th-century terrain. The central part of the area was disturbed by a part of a stone house with a cellar (ca 104.6 m^2).

The interpretation of the temporal and spatial development in preliminary publications has been revised based on the study of the plan and photographic documentation deposited in the Museum of Moravian Slovakia in Uherské Hradiště (Procházka, Snášil 1983, 63; 1984, 44–47; Snášil, Novotný 1985, 71–72; Snášil, Procházka 1982, 53–54; 1984, 63–64; Procházka 1996, 128, 130).

The **first phase** is represented by two relicts (Fig. 151, 153). Remnants of a single-room surface post-built structure (s. u. g. 2) were found in the south corner, near the street line in the place where Sojákova Street enters the square; according to the preserved remnants, sill beams were situated between the posts (Fig. 153: 1). A small sunken oven with a layout resembling the digit eight was detected on the lower level near the centre, accompanied by small burnt areas close to the northwest wall. Burnt clay areas were also discovered on two higher levels, close to the southeast wall. The floor was repeatedly renovated. A denarius of Ottokar II (1253–1278) on one of the floors helps date this phase. The location of the entrance is unclear. A row of post holes from the later phase of the building, possibly a remnant of the wall of a vestibule, was documented at a distance of 1.5–1.9 cm from the northeast wall (Fig. 154). The disturbance by Stone house s. u. g. 1 makes it impossible to determine the dimensions of the smaller house precisely; if it reached all the way to the present-day street line, they would be ca 5 × 7.5 m.

Behind the house near Sojákova Street, 4.8 m from the smaller surface house, was a subsurface feature described as a storage room ('komora') by Snášil (s. u. g. 3); most of its southeast and northeast walls were uncovered (Fig. 152). The minimum clearance was 3.5 × 3.3 m; the depth was ca 85 cm. The walls were a post-built structure bearing twig wattle. The entrance with a wooden threshold delimited by small posts was situated in the southeast wall (Fig. 153: 2). Several pits, one with tannery waste, belonged to this first phase; parts of surface non-domestic structures with wattle (and daub?) walls are documented as well.

According to Snášil, the **second phase** was represented by wooden House s. u. g. 9. It was situated ca 19 m from the street line, adjoining the southwest edge of the plot (Fig. 154, 155). It was built on the surface of the early medieval (9th century) layer, but at least partially on a thin high-medieval biogenic layer. It is probably somewhat later than the features of the first phase.

The two-section building was almost completely uncovered; it occupied an area of ca 105 m^2. The first section consisted of large Room C in the southeast (53.31 m^2) and narrower elongated Room A in the northwest (20.24 m^2).[1] A three-room section (B, D, E) followed transversely in the northeast and northwest, with narrow rectangular Vestibule F (2.7 m^2) singled out from outer Room E (8.3 m^2). Room B is somewhat larger (9.21 m^2); central Room D is third in terms of area (14.5 m^2).

Wooden structural elements were preserved in extraordinarily good condition. The wall structures of large Rooms A and C were based on a carpentry jointed frame (in an unknown way) of robust beams with vertical posts erected in its corners (Fig. 155: 4, 5). In the smaller Rooms D, E, F, earthfast posts were joined by sill beams. These posts were situated also in the middle of the walls as well as eccentrically (Fig. 155: 2, 3). The walls themselves consisted of vertical planks set into partly

1 Areas under assumption that the building reached as far as the street line.

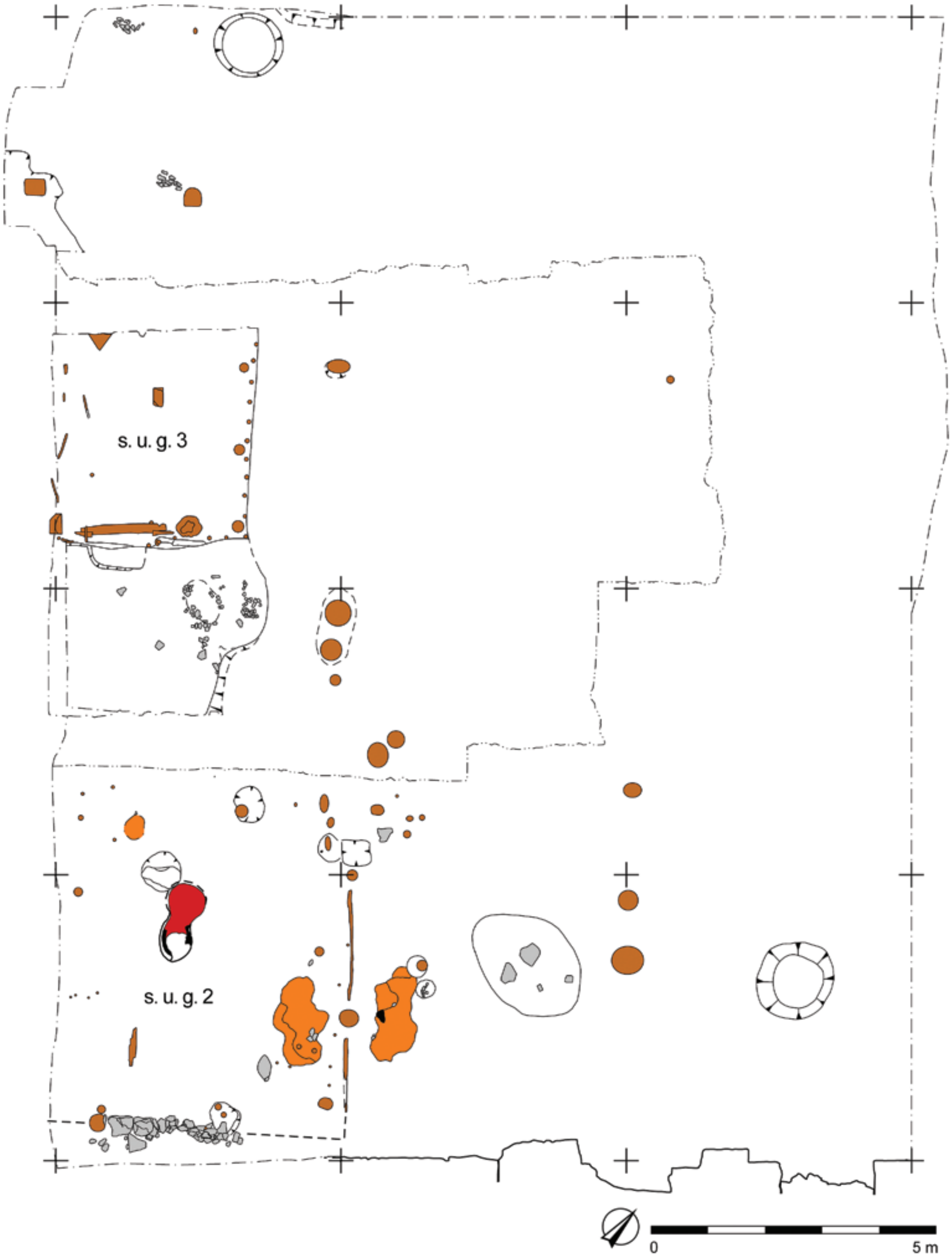


Fig. 152. Uherské Hradiště, 1247 Mariánské Square, plot No. 89/2. First phase with House s. u. g. 2 and recessed Storage room s. u. g. 3. Graphics by B. Veselá, V. Kolařík.

preserved grooves in the sill beams or horizontal beams set into upright grooves in the earthfast posts (Fig. 155: 3). Several special features unknown from other wooden structures in Uherské Hradiště were recorded. The east wall of Room C was doubled in the middle at least on the foundation level from the inside, as was the wall between Rooms B and D (Fig. 155: 1, 4). While the walls of Room C and D were made of posts, the parallel wall of Room B was unusually constructed using the wattle technique (Fig. 155: 4). The vertical end stake of the wall was embedded in the exceeding sill-beam head separating Rooms A and C. The northwest and northeast walls of Room B were not preserved.

The mortises for vertical planks were interrupted in the northeastern perimeter beam of Room C, creating a 68-cm-wide sill (?). It is possibly a trace of a doorway between rooms that was delimited on the south side by a partially embedded small post (a remnant of the jamb?); a more robust post was documented on the other side. A suggestion of a 65-cm-wide passage was also recorded in the sill beam between Rooms A and B between three upright stakes and the south corner.

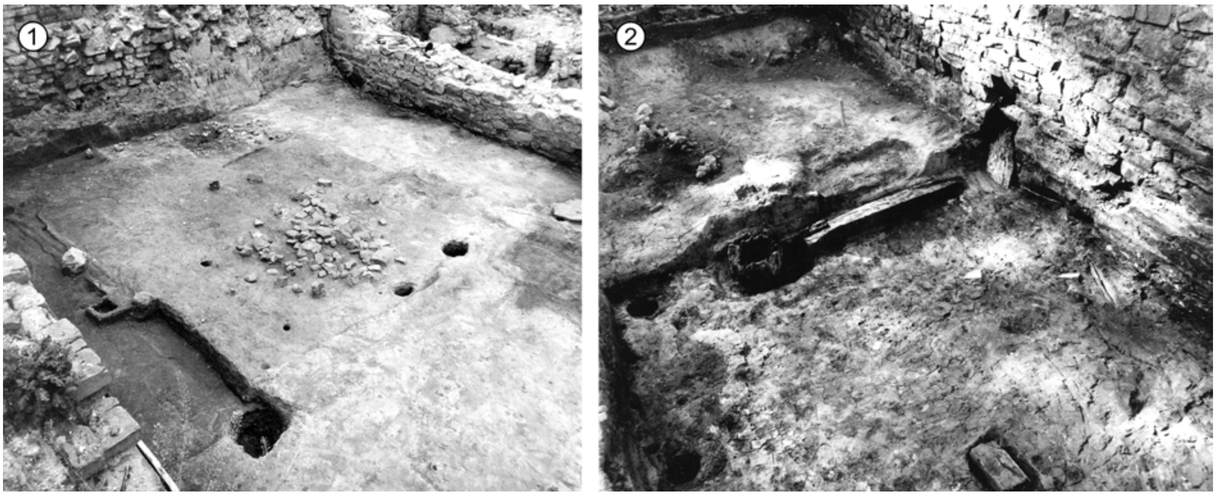


Fig. 153. Uherské Hradiště, Mariánské Square. 1 – Second phase, House s. u. g. 2, remains of foundation beams and posts of walls, photo from east; 2 – first phase, Storage room s. u. g. 3, visible remains of entrance construction, photo from north. Photo by L. Chvalkovský.

A plank floor on small flooring beams was preserved in Vestibule F (Fig. 155: 2). It seems that the entrance was on the northeast side of this room. The location of the entrance from Room E (or E1) to Hall D is not clear from the documentation.

An analysis of the relationships between the individual structural parts implies that Rooms A and C were built first, followed by the adjacent rooms.

Numerous small stake holes were documented near the east corner of the house, along with several larger posts, scattered planks and other fragments of wood. Uncovered outside the northwest wall of the house was a large (probably bread) oven (s. u. g. 7), of a stone construction and a horseshoe layout (140 × ca 75 cm) delimited by a frame with small corner posts (Fig. 154). A wattle fence with a NNW–SSE orientation ran northeast of the oven frame at a distance of 1.5–1.8 m. Other fence sections were uncovered south and southeast of the house, though none in the whole length of the outer wall (Fig. 154).

No clear plot boundary was documented. In the first phase, this was probably one large urban plot. The plot of House s. u. g. 9 facing Sojákova Street might have been separated from it in the second phase, as supposed by Peter Donat (2000, 138–139). Whether Features s. u. g. 2 and 9 existed concurrently for some time can neither be ruled out nor confirmed due to their disruption by Stone house s. u. g. 1. After the construction of the third-phase house, the edge of House s. u. g. 9 was overlapped by a dunghill in the southeast. Other common courtyard equipment elements were situated more to the west, along with the latest wooden structure. This means that the possible existence of an independent urban plot did not last long. A hypothesis that this was a second house on the same plot and, therefore, that the urban plot was never divided also cannot be ruled out.

According to Snášil, the recessed storage room situated in the front part of the plot was replaced in the second construction phase by a surface post-built structure, of which five massive pillars were preserved (Procházka, Snášil 1984, 45). However, the plan documentation of the filled feature does not support this interpretation.

The **third phase** was to be represented by the six-room, in principle three-compartment surface House s. u. g. 4 of an L-shaped layout and by Stone house s. u. g. 1 (Fig. 156). Snášil did not rule out the possibility that Stone building s. u. g. 1 was earlier (Procházka, Snášil 1984, 46). The wooden structure stretched along the street line of Mariánské Square, the courtyard section adjacent to the border of the neighbouring plot (today with House No. 70); each of the two sections consisted of three rooms. The state of preservation of structural elements was much worse than in the case of the earlier structures. The house was destroyed in a fire, as is evidenced by the destruction strata with clusters of burnt clay and charcoal.

Corner Room A with a width of at least 7 m was partially delimited by charred (?) beams in the northwest and northeast; the northern fragment of the northeastern beam was deflected to the northeast. Judging from a line of stones, the southeast wall possibly rested on a stone base. No posts that might be linked to the walls of this phase of the house are

Fig. 154. Uherské Hradiště, Mariánské Square. Second phase. In front, possibly still standing House s. u. g. 2, in back, House s. u. g. 9 and Oven s. u. g. 7. Graphics by B. Veselá, V. Kolařík.

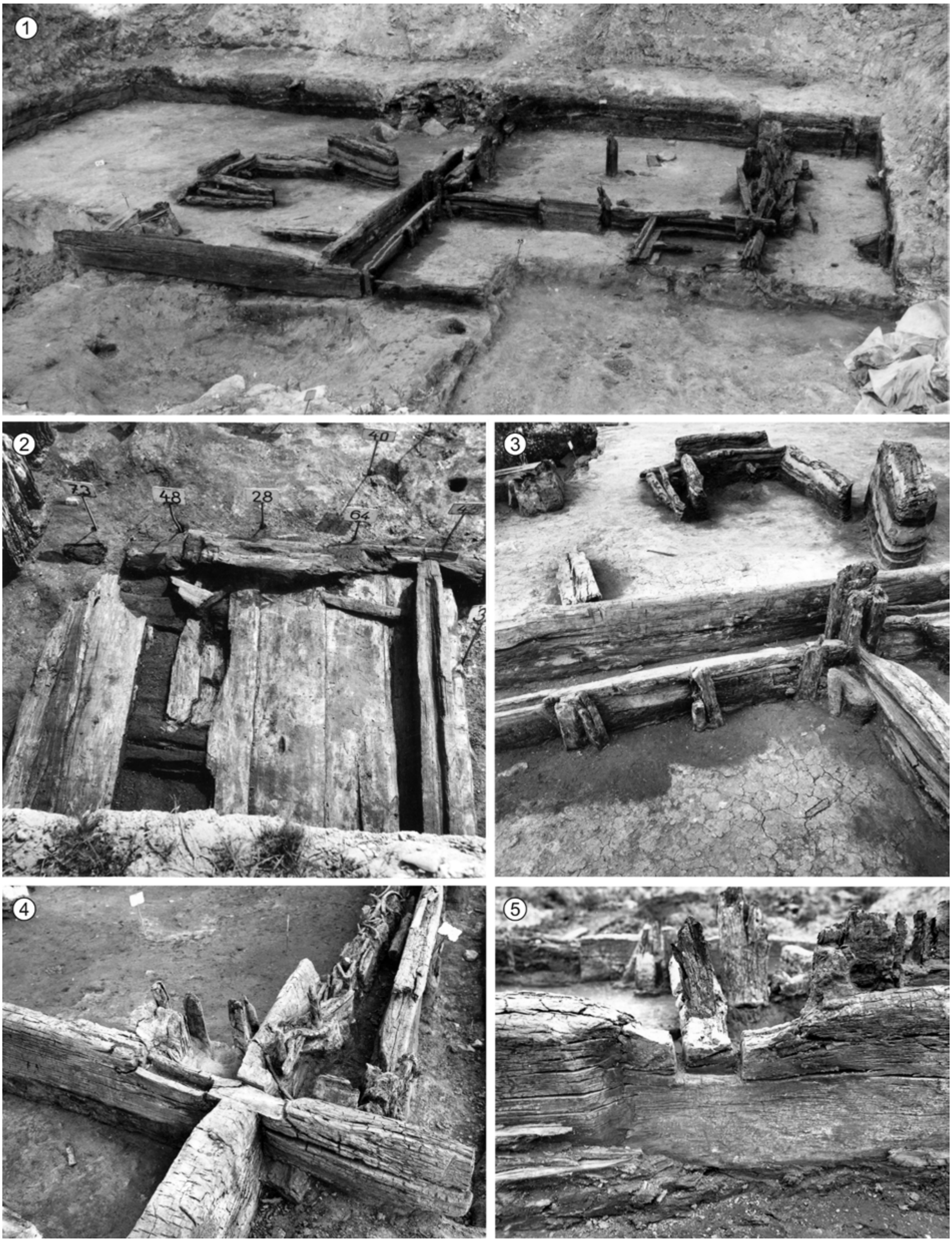


Fig. 155. Uherské Hradiště, Mariánské Square. Second phase, House s. u. g. 9. 1 – Partially revealed timber foundations with rooms C, D, E, F, view from southeast; 2 – Entrance room F with plank floor, view from northwest; 3–5 – details of wooden constructions; 3 – Room E, southwest wall, view from east; 4 – eastern corner of Room A and southeast wall of room B; 5 – northern corner of Room A from outside. Photo by L. Chvalkovský.

drawn on the plans. The southwest wall was drawn only hypothetically. In any case, this room spatially followed the first and second-phase building.

In the northeast, this room was adjacent to Room B, which was considered a workshop by Snášil. However, the plans do not clearly show that it was divided from Living room C in the east corner of the urban plot.

Located in the southwest part of Room B was a horseshoe-shaped **oven** with internal dimensions of 1.5/1.6 × at least 1.1 m with a burnt bottom and partially lined with stones and bricks. Small areas of burnt clay, perhaps the remnants of more ovens, were situated along the sides. The more westerly small oven was supposedly accessible from Room A. The construction of the northwest and northeast walls is unclear; two post holes detected might have been related to them.

The circumference of Room C (5.6 × 4 m) was only partially delimited by post holes. The construction of the walls is unclear.

Two burnt areas of an irregular shape (110 × 60 cm and 140 × 80 cm) were drawn in the northwest part, while a third one (140 × 70 cm) was situated in close proximity in the southeast direction. It is unclear

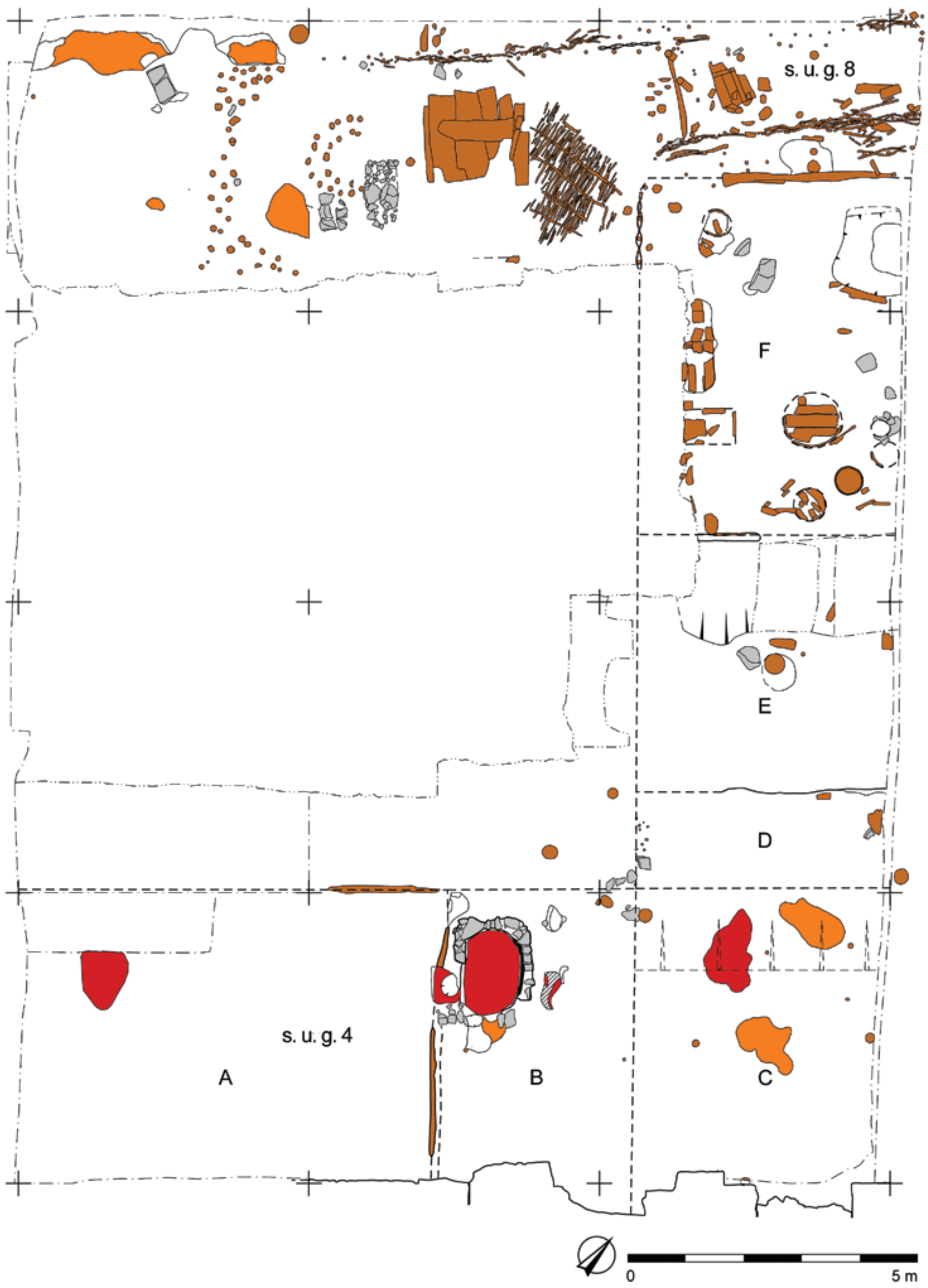


Fig. 156. Uherské Hradiště, Mariánské Square. Third phase, House s. u. g. 4. Graphics by B. Veselá, V. Kolařík.

Fig. 157. Uherské Hradiště, Mariánské Square. Store building F of House s. u. g. 4 of third phase with burned bottoms of barrels. Photo by L. Chvalkovský.

which of these areas was to be the heating facility of the living room, as this space was interpreted by Snášil. Instead, it seems likely that the living room was represented by Rooms B and C (7.4 × 5.5 m together). The large oven was either used for baking, or it was merely a lined cooking fireplace. One more small area of hard-burnt clay, possibly evidence of production activity, was situated northeast of it.

The next Room D of the courtyard section was considered a hall by Snášil (5 × 2 m). It was reportedly divided from adjacent Stable E by a small trench (possibly the bed of a sill beam). A height difference of ca 20 cm between the living room and Hall D was overcome by a short one-metre ramp.

Structural elements of the walls were preserved at least also in next Room E, which is considered a stable (5 × 4.6 m). A post hole was located in the southwest part of the room. The ground was covered with burnt pieces of wood, possibly from the floor. A shallow trench ran across the room in the southeastern half.

Subsequent Storage room F had dimensions of 4.6 × 3.6 m (the width is incomplete). Evidence of the wall construction is missing except for two fragments of beams that were part of the southeast and maybe also of the northwest wall, as well as the small rest of the wattle southwest wall. The height difference between the floor of Room F and the surface of Stable E (30 cm higher) was, once again, bridged by a ramp in the west corner of the stable (Room E). A 50-cm-deep depression with inclined walls and a roughly flat bottom was situated in the north corner.

The sand floor of Room F contained fragments of mortar or plaster. Carbonised pieces of wood, perhaps from the wall structure, were found especially along the edges. The bottoms of five charred barrels with bottom diameters of 44–96 cm were uncovered on the floor. Fragments of a large storage vessel were situated near the eastern edge (Fig. 156, 157). The entrances to the described rooms reportedly led from the courtyard, but clear evidence is missing in the plans.

After the construction of House s. u. g. 4 was finished, a roughly rectangular dunghill (s. u. g. 8) with at least two wattle walls (4.6 × 1.7–2.1 m) was established behind the courtyard section, above the eastern edge of House s. u. g. 9. This feature overlaid some of the structures described above. Its fill was of a strongly biogenic character (Fig. 156).

Uncovered closer to Sojákova Street was a system of stakes with a diameter of 7–16 cm in several irregular rows comprising an arch with a northwest-southeast orientation and a diameter of 3.5 m. This structure might have been related to a robust column in the north corner. At a distance of 1.3 m more to the east there was a semicircle of two rows of stakes with an internal diameter of ca 2 m; a 5 m long wattle fence was uncovered north of it. These features, clearly later than House s. u. g. 3, can perhaps be considered parts of various shelters or pens for domestic animals. Evidently, this part of the plot had the character of a farm court (Fig. 156). Regrettably, the contemporary situation in the northernmost part of the investigated area is unknown.

Stone House s. u. g. 1 without a cellar was built near the southwestern boundary of the plot, about 7 m northwest of the building line of the town square from the three-compartment house. However, it was adjacent to Sojákova Street (Fig. 158, 159). The oldest core had an almost square layout with internal dimensions of 6.9 × 6.4 m and a masonry thickness of ca 1 m; its foundations were slightly recessed into the Middle Hillfort strata. The masonry was built of Soláň sandstone. The northeastern outer wall was probably later demolished in the northwest section (about 2.5 m remained) and replaced by a mixed masonry wall set forward in front of the previous building line with its whole thickness (1 m). Until the demolition, the earliest masonry probably survived at least to the level of the first storey; regrettably, no buildinghistorical survey was carried out there. At the time of the excavation, only the wall adjacent to Sojákova Street retained this height. Lower parts of two small windows with oblique, inside widening jambs (max. width of 80 and 100 cm, minimum width of 45/50 and 60 cm) were preserved there (Fig. 159: 2). Inside, approximately along the northwest-southeast axis, were the foundation pedestals of two pillars (90 × 60 cm and 80 × 90 cm at a distance of 2.5 m). The fact that the more northerly of them is somewhat deflected from the axis perpendicular to the northwest wall in the direction of Sojákova Street calls into question the possibility that these might have been vault buttresses. A flat ceiling can be considered instead, in accordance with most early Gothic cellars in Brno (Holub et al. 2013, 465). The southeast wall disturbed small ovens (fireplaces?) of the first phase of the house in the south corner of the plot (Fig. 154).

The floor level of the earliest masonry structure is not clearly marked in the plans. An analysis of the profiles and height-surveyed plans implies that it was situated on a ca 30-cm-thick high medieval formation. Its upper part including fire destructions after the fire of House s. u. g. 4 was probably removed, the result being that the lower storey of the masonry house was situated several dozen centimetres below the neighbouring level.

Fig. 158. Uherské Hradiště, Mariánské Square. Fourth phase, Stone house s. u. g. 1; pink – oldest house core; green and blue – dividing wall and younger annex; yellow – latest build-in; empty shapes – fragments of other walls without any clear relationships. Graphics by B. Veselá, V. Kolařík.

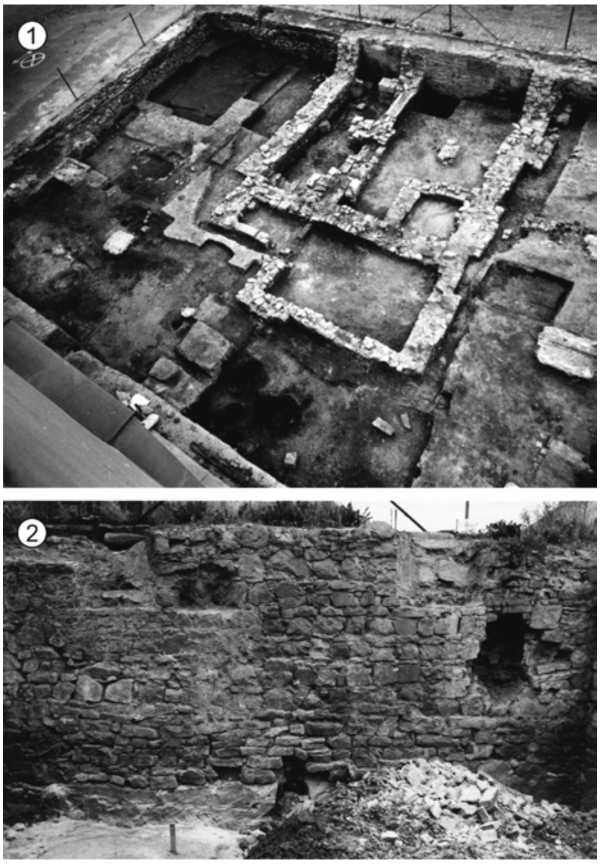


Fig. 159. Uherské Hradiště, Mariánské Square. Fourth phase, House s. u. g. 1. 1 – View of lower part of walls from north; 2 – southwest wall with visible window openings. Photo by L. Chvalkovský.

The stratigraphic position of House s. u. g. 1 is not quite evident from the preserved documentation. Regrettably, parts of the area between the stone house and the front part of the House s. u. g. 4 on the relevant level are lacking in the plan documentation; on the northeast side, earlier archaeological contexts are disturbed by later additions to the house. The context 10 m more to the northwest, where the level of the courtyard and the plot corresponding to the Wooden structure s. u. g. 4 in terms of height was disturbed by the masonry of House s. u. g. 1, also supports the opinion that the masonry house is later and therefore represents the **fourth phase**.

The find of a six-point star-shaped belt buckle just below the surface of the layer on which mortar poured from the boundary between the foundation and above-ground masonry were visible is not without importance for the dating of the stone building. A bracteate of Wenceslas II (1283–1305) comes from the same layer. Regrettably, the relevant profile is unavailable and the layer concerned is also not clear from the plans.

It is likely that the character of the layers on the plot started to change after the construction of the stone house. Afterwards, the terrain was probably raised by one-off thick backfills. An important question that probably can no longer be answered is what was situated in the front part of the plot, assuming that House s. u. g. 1 is later than House s. u. g. 4. Several groups of stakes without any hint of a regular arrangement were drawn on the highest level there, in addition to daub blocks related to the destruction of House s. u. g. 4 and a concentration of stones in the east corner of the plot. A certain indication comes from a fragment of stone foundation masonry with a pointed relieving arch in the front of the plot with modern masonry above it (Fig. 160). It is therefore possible that a part of the house without a cellar (?) was originally situated in the front, its masonry being later replaced by the modern-era building that remained in existence until recently.

In the following centuries, the core of the house was extended by annexes and divided by partitions and in-buildings from mixed and later brick masonry.

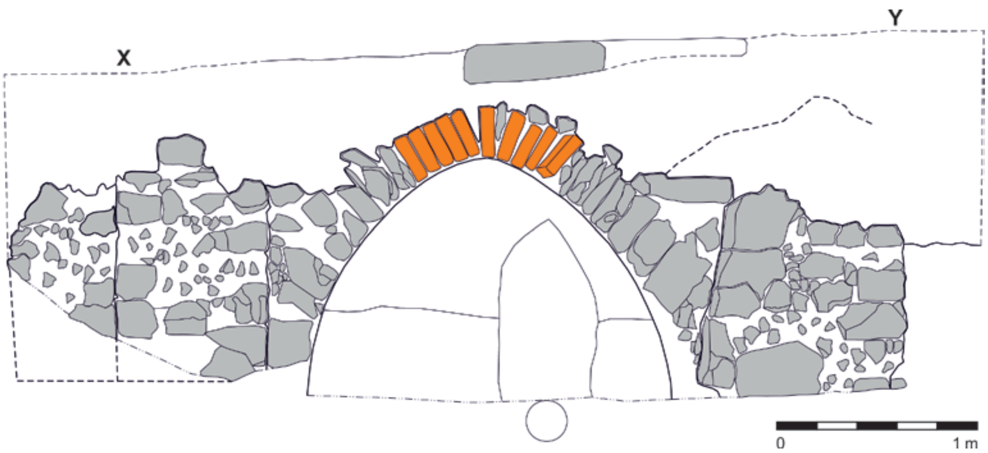


Fig. 160. Uherské Hradiště, Mariánské Square. Drawing of north face of X–Y foundation arch in front of plot, presumably related to House s. u. g. 1. Graphics by B. Veselá, V. Kolařík.

3.2 Otakarova Street, former plot No. 28–30, now 653/4

The site is situated on the northern periphery of the town, near the medieval town wall (Fig. 151: 2). In reality, the excavation concerned two modern plots where two differently surveyed medieval plots had been located (Procházka 1996, 130; Procházka, Snášil 1983, 62; 1984, 46–50; Snášil, Procházka 1981, 54; 1982, 52; 1984, 63). Three small one-storey houses were removed there in the late 1970s and early 1980s, and a rescue excavation took place in the southeast part of the vacated area in 1979–1986. At present, the whole area is unified into a single plot. Western Plot A was excavated to the greatest extent. It was also there that remnants of high medieval occupation rested on the surface of strata generally coming

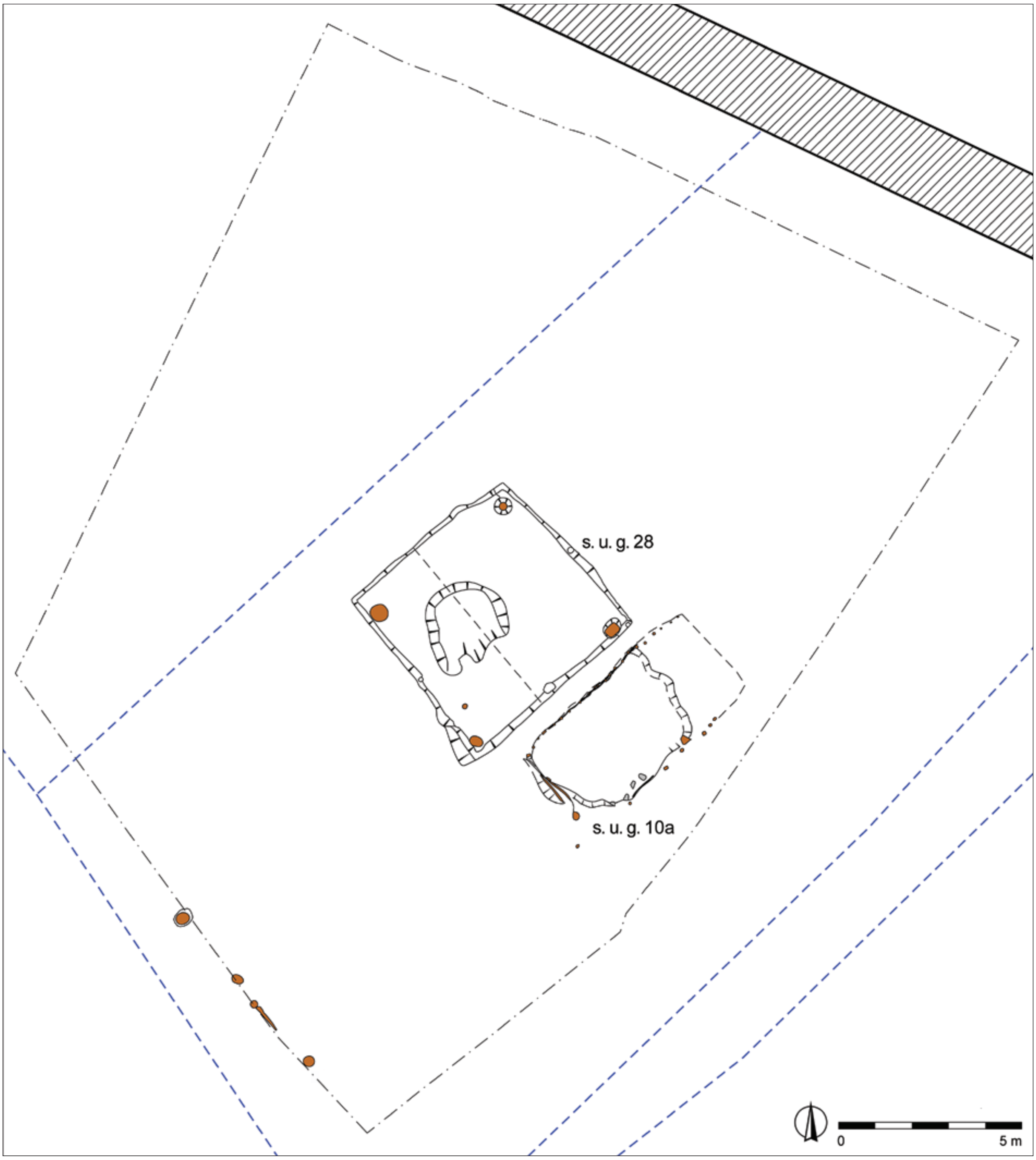


Fig. 161. Uherské Hradiště, Otakarova Street. Wooden semi-recessed Cellars s. u. g. 10a and 28 of first phase in primary Plots A, B. Graphics by B. Veselá, V. Kolařík.

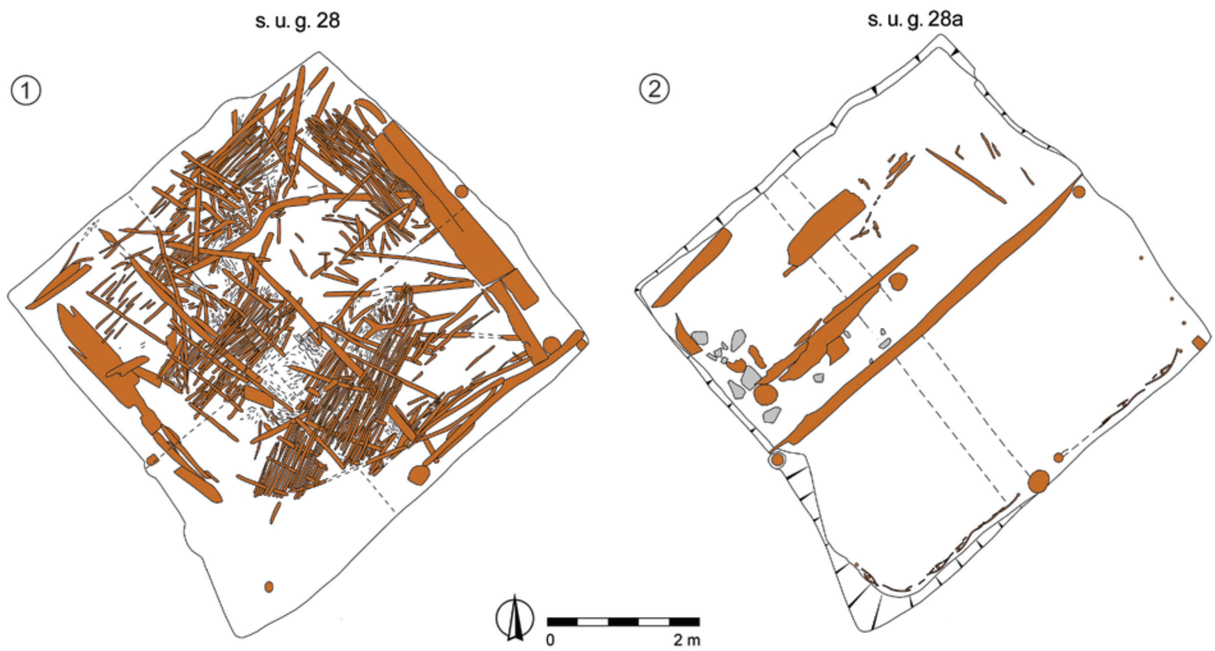


Fig. 162. Uherské Hradiště, Otakarova Street. 1 – Plan of semi-sunken Cellar s. u. g. 28 closely over floor covered by a collapsed wattle fence and other timber fragments; 2 – s. u. g. 28a. Graphics by B. Veselá, V. Kolařík.

from the time between the 8th and the first half of the 10th century (e.g. Procházka, Havlíček 1996; Frolíková-Kaliszová 2007).

The **first building phase** here is represented by Feature s. u. g. 28 situated in the centre of Plot A, ca 10 m from the street line (Fig. 161; 162: 1; 163: 2, 3). The building of an approximately square layout with sides of 5–5.6 m with very slightly oblique walls was recessed 0.6–0.9 m into the Middle Hillfort strata. The post-built structure had four robust 40–55-cm-deep pits approximately in the corners. In the southwest part was a shallow irregular depression in the floor. Collapsed wattle walls without daub were uncovered on the floor (Fig. 162: 1; 163: 2). Their orientation and relatively subtle character as well as the absence of stake holes in the floor do not clearly support the idea that these might be remnants of the outer walls of the building.

A house without a cellar of the same layout and orientation (s. u. g. 28a) came into existence on the (floor?) level of the filled Feature s. u. g. 28 in the same plan and therefore on the surface of the former Middle Hillfort layer in the **subsequent phase** (Fig. 162: 2; 163: 4). The house was divided into two not quite identical parts (width of the northwest part 2.8 m, of the southeast part 2.4 m) by a beam, originally apparently joined by a tongue and groove technique with posts in the ends (beam diameter of ca 20 cm). The southeastern room had wattle walls strengthened by posts in the middle. The other room lacked any traces of the wall construction along its perimeter. A vertical post, possibly related to the ceiling structure, stood approximately in the middle of the room, 30–35 cm from the dividing wall; another one was situated more to the south along the southwest wall. The connecting line between the two vertical elements was parallel with the partition. In light of the absence of post holes, the walls of the more northerly room might have been of timber frame or log construction; they were probably later disassembled. The presence of a heating and cooking facility poses a certain problem. In earlier publications, we stated that one of the rooms was equipped with a hearth (Procházka, Snášil 1984, 47). It was to have the form of the earliest fireplace level in the south corner of the living room of the later three-compartment House s. u. g. 11 situated close to the west corner of the more northerly of the two rooms. The relatively large burnt area of 1.75 × 1.35 m restricting the movement of people in the room raises much doubt in this respect. However, there is no certainty. Four 30–90-cm-deep post holes distributed irregularly approximately in one line with an overall length of 5.3 m were uncovered near the street line in the same stratigraphic position, on the level of the surface of the early medieval (the Middle Hillfort, ca 800–950) strata. They probably represent the boundary between the plot and the street.

A three-compartment house (s. u. g. 11) came into existence above the relicts of House s. u. g. 28a but still on the level of the Middle Hillfort surface in the **third phase** (Fig. 164). The living room (area: 22.8 m^2) moved to the northwest for a large part. A rectangular hall (21.4 m^2) was attached in the southeast, followed perpendicularly by a narrow rectangular storage room directed towards the street line (12.3 m^2). The house was predominantly a post-built structure with sill beams whose remains are mostly preserved; the posts were situated in the corners. The northeast wall of the living room could not be detected. Three posts were situated inside, two closer to the northwest wall and one in the east part, about 1.2 m from the east corner. The location of the entrance from the hall is unclear. This room was lined with large stones (Fig. 165: 1). The 1.3-metre-wide entrance from the courtyard to the hall situated in the corner was delimited by two posts; no sill was detected. The southern post of the entrance from the courtyard delimited the north corner of the storage room as well. There were two free-standing posts in the area of the hall, one close to the entrance and the other near the north corner. No post has been documented in the south corner of the storage room, where a small post embedded in the joined sill beams can be presumed.

The sill beams were partly recessed slightly into a dark layer of the Middle Hillfort origin and partly also into a later thin flood layer. The floor was raised above all in the area of the living room, which was also reflected in the layers of clay lining of the oven. A horseshoe-shaped stone-lined fireplace with 1.4- and 1.3-m axes in the south corner was used for heating and cooking (Fig. 165: 2). Four phases of clay lining of the hearth were documented; two of them (the first and third from the top) were underlaid with fragments of ordinary kitchen pottery, while the lower ones were strengthened by thick-walled fragments of large storage vessels. The third level overlaps an embedded pot, probably a building sacrifice.

The furnishings of the house probably included a bread oven in the courtyard adjacent to the street (s. u. g. 25; Fig. 164); an oval clay lining with axes of 1.5 and 1.0 m was preserved from it. The inhabitants of the house dug a well (s. u. g. 20) in the rear part of the plot, ca 5 m northeast of the living room (Fig. 164; 166: 3). The inner structure with a maximum diameter of 0.88 m was preserved up to a height of ca 3 m, consisting of a wooden barrel. The upper part of the well (ca 1 m above the barrel framework) was square-shaped with sides of 0.8 m. This structure was made only of lap jointed boards. The recorded depth of the well was about 4 m.

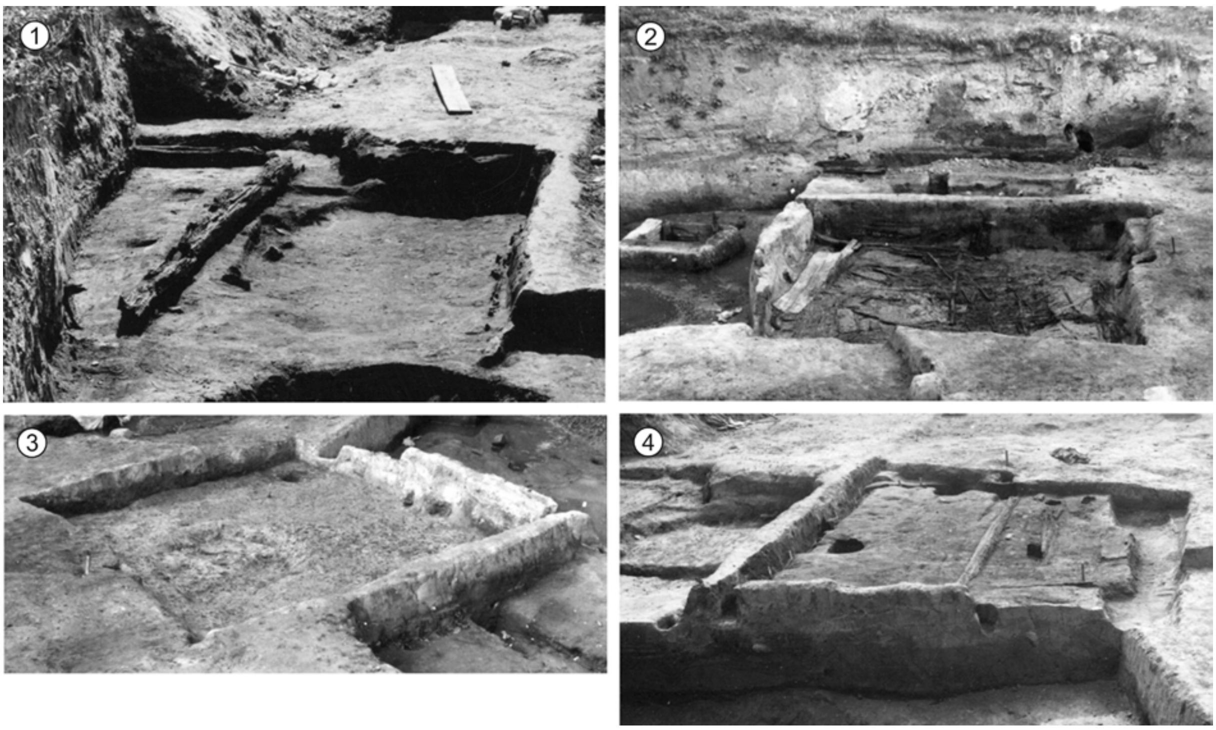


Fig. 163. Uherské Hradiště, Otakarova Street. Photos of remains of houses shown in Fig. 11 and 12 ; in the left – s. u. g. 17. 1 – S. u. g. 10a, from north; 2, 3 – s. u. g. 28, from northeast and south; 4 – s. u. g. 28a, from northeast. Photo by R. Procházka.

Scattered post holes were also located in the courtyard. A waste layer stratigraphy grew around the building during the second half of the 13th century.

North of the house, ca 2.85 m from the north corner of House s. u. g. 11, in close proximity to the town wall, was partially excavated House s. u. g. 12, once again with a partly preserved foundation structure consisting of ca 10-cm-thick charred beams (Fig. 164; 166: 1). The house was slightly recessed into the existing terrain and the sill beams were adjacent to the outer wall of a shallow trench. The building probably had a rectangular layout (5.2 × > 5.2 m) and besides remnants of the sill beams, it was also delimited by posts, some of which stood outside the beams themselves at a distance of up to 18 cm. It is possible that the walls were constructed with both

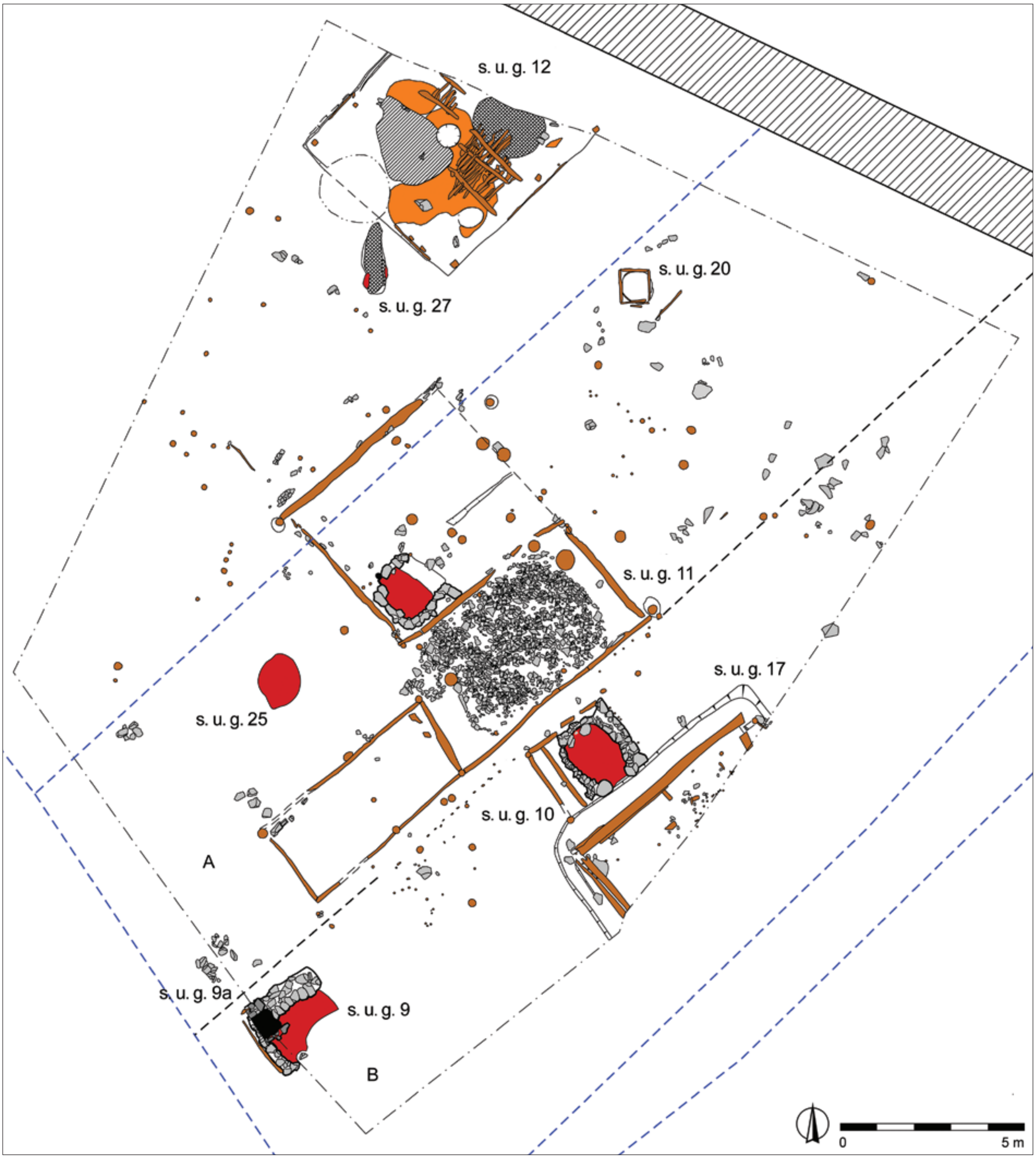


Fig. 164. Uherské Hradiště, Otakarova Street. Plan of houses of third phase in two primary Plots A, B; Houses s. u. g. 11, 12 and 17. Graphics by B. Veselá, V. Kolařík.

posts and framing, and the posts outside the wall beams are related to the ceiling and roof structure.

The building ceased to exist in a fire, as evidenced by the destruction of burnt daub surrounding the charred destruction of round ceiling timbers. Presumably, the ceiling was covered by a level of soil with chaff. A large burnt area of a rounded shape (axes of ca 3.5 × 2.5 m) occupied a large part of the floor in the excavated part below the daub and the ceiling beams. Given the large extent and the absence of boundaries, a connection with an uncontrolled fire can be considered.

Along the shorter wall was a pit with partially burnt walls disturbed by a later subsurface feature (s. u. g. 27; Fig. 164). In view of the finds of slag in the vicinity, this might have been part of a smithy, but it need not have been contemporary with the described house.

A row of small stake holes in a dense sequence about 10.3 m long was detected near the southeast wall of the three-compartment house. At least in the front part of the area, their line probably delimited the oldest plot's boundary with neighbouring Plot B. One of the earliest contexts here was

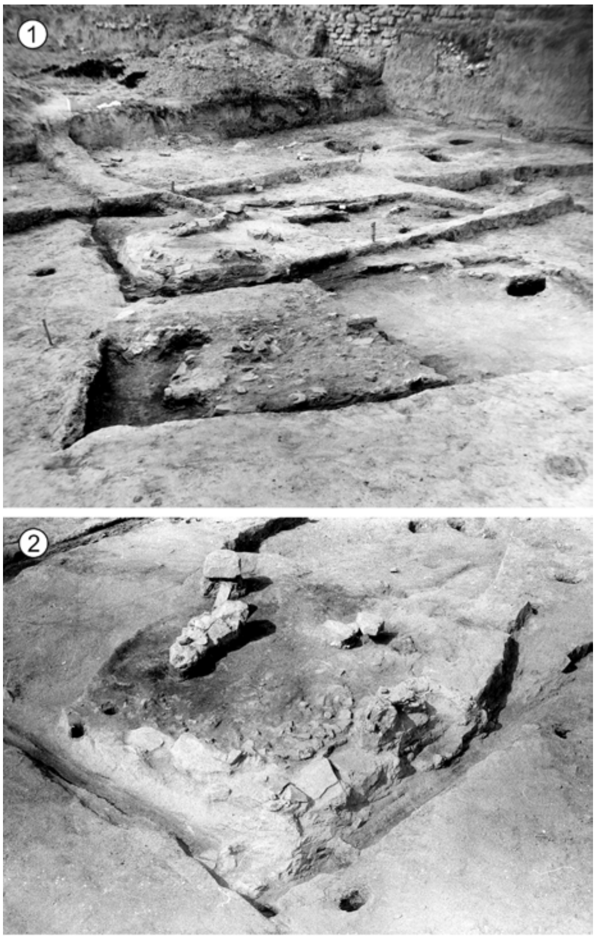


Fig. 165. Uherské Hradiště, Otakarova Street. House s. u. g. 11. 1 – Uncovered entrance room with stone pavement, living room in back, from southeast; 2 – hearth in dwelling, from south. Photo by R. Procházka.

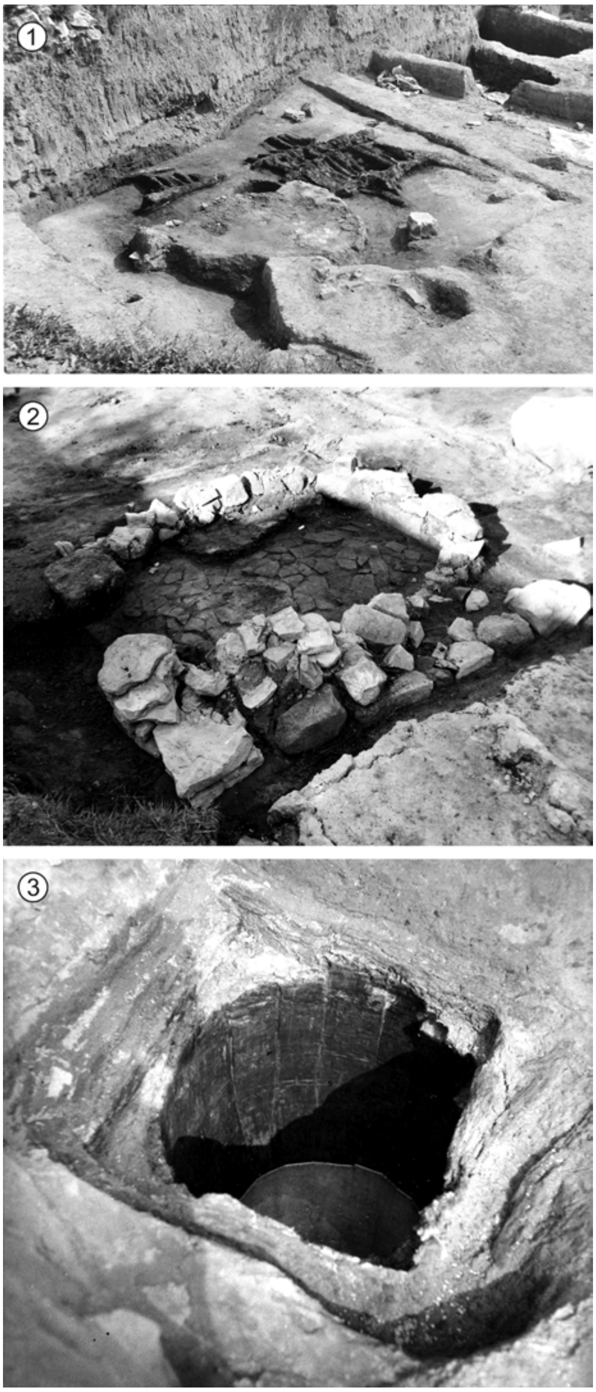


Fig. 166. Uherské Hradiště, Otakarova Street. Third phase. 1 – House s. u. g. 12; 2 – Baking oven s. u. g. 10, from east; 3 – Well s. u. g. 20, from south. 1, 3 – Photo by R. Procházka; 2 – Photo by L. Chvalkovský.

a feature of a rectangular layout with dimensions of 6 × 2.5 m and a depth of 0.6–0.8 m (s. u. g. 10a, Fig. 161; 163: 1). It was of stake construction, the longer walls of wattle. One of the shorter walls was of planks with horizontally laid boards originally set behind the stakes; the construction of the other wall cannot be established. The orientation of its longer axis was identical with all structures described thus far (northeast–southwest), its longer wall parallel to first-phase Pit house s. u. g. 28 in Plot A; s. u. g. 10a's stratigraphic position corresponded to it as well. Another house (s. u. g. 17; Fig. 163: 1; 164) was built later somewhat more to the southeast; part of its foundation ring of robust beams was detected, and it had an identical orientation with the living room and storage room of House s. u. g. 11. The northwest wall, the only one fully uncovered, was 4.8 m long. Timber frame or log construction can be considered (beam joints were not preserved). It is unclear why this building was surrounded by a trench from the outside, and it is stratigraphically younger than s. u. g. 17.

A little later, a large horseshoe-shaped bread oven (axes of 2 × 1.2 m) of a stone wall construction (s. u. g. 10; Fig. 164; 166: 2) was built on the surface of the northwest part of the vanished and buried pit house. It was oriented diagonally with respect to the house. Its initial operation might have taken place directly on the base soil; three later layers of clay lining followed, based on fragments of large pottery storage vessels. Another oven, probably with a similar function, was situated in the front part of the plot (s. u. g. 9). The inner dimensions of the rectangular feature were ca 1.8 × 1.5 m. Three layers of clay lining were also distinguished; only the third one was reinforced with a continuous layer of sherds. A much smaller oven (s. u. g. 9a) of a similar construction was built on the destruction of the earlier oven in the next phase with a preserved stone lining with a thickness of ca 30 cm (inner dimensions of at least 70 × > 65 cm), slightly shifted towards the road (Fig. 164). Three or four layers of clay lining gradually came into existence there; stones were used in addition to pottery fragments in the base layers.

At least partial subsistence by agriculture is also confirmed by the finds of sickles, mostly in fragmented condition, and of two plough coulters; one of them was found in the foundations of the wall of the earlier oven (s. u. g. 9; Procházka 1983, 111).

The dividing line between the plots ran perpendicularly to the street line. The houses were situated in the depth of the plots, dividing them into two parts; an L-shaped layout opened towards the street in atypical fashion with the inner angle. Two bread ovens on Plot B support the possibility that a baker lived there for some time.

3.3 256 and 21 Masarykovo Square, plot No. 31/2 (former Jesuit college, now Reduta cultural centre)

Other important excavated areas are situated in the southwest front of the other important town square founded by settlers from the royal town of Kunovice. The Jesuit college was built in the mid-17th century on 31 plots (Fišer 1921, 131; Procházka, Sulitková 1984, 57). The courtyard of the south section of the complex was investigated in 1997 (Fig. 151: 3).

The excavation was unique for the discovery of a part of a vanished street from the first town period (1257 – middle of the 14th century; Beroušek, Kováčik 1998; Kováčik 1997; 1999). Unfortunately, the excavation was carried out by two organisations and only the excavation conducted by the non-profit organisation Archaia (Area I in the present text) was evaluated in more detail with the use of some findings from the remaining part of the area excavated by the Museum of Moravian Slovakia in Uherské Hradiště (Area II).

In contrast to Mariánské Square and Otakarova Street, no recessed parts of buildings were discovered here; all the remnants were of a surface character founded on the Great Moravian strata.

The aforementioned authors described the development of the investigated areas as follows.

The **earliest phase** in the south part of the excavated area (the furthest from the square front) had the form of House s. u. g. 1 (S1)[2] consisting of at least two sections, oriented most probably by their longer axis to the more northerly street oriented NE–SW (Fig. 167). The southwest section consisted of Rooms A and B (5.7 m^2). Only a small part of Room A was uncovered; its existence is documented by identical grooves in vertical posts of the dividing wall and by a short section of the east wall. This narrow section was adjacent in the east to large Room C with an area of at least 11.6 m^2. The street front was shifted slightly forward. The methods of wall construction varied, but the basic principle was post-built structure and beam construction. The front of the house consisted of four roughly four-sided posts connected by sill beams set into grooves. While the two more westerly beams of

2 The original form of marking houses (S1 etc.) was adapted to the form used in this chapter.

the north wall of Room B and the west beam of the analogous wall of Room C had no horizontal grooves and, therefore, most probably bore other similar elements that were also fixed by tenons into the posts, the last, east section of the wall of Room C consisted of two beams bound by a side sheet with a cut upper groove for vertical boards (Fig. 168: 1–4). The beam or rather plank of the north wall of Room B was fixed by a stake from each side near the northwest corner post. Other walls were of a simpler construction. The partition between Rooms B and C consisted of boards (the lower one was partially preserved) set into the corner posts on both sides. The three remaining walls were comprised of wattle. In the southeast corner of the room, the wall boards simply adjoined the corner post. On the other side, however, it missed the corner prop by ca 26 cm towards the interior of the room, probably directly following the west wattle wall. The eastern side of Room C was also delimited by a wattle structure; the southern one was outside the investigated area. It appears that the walls were not daubed. Post 1429 situated in the front facade 20 cm from the northwest corner post of Room B (1428) is undoubtedly also part of this phase. As it is situated on the edge of the investigated area, its function cannot be precisely interpreted. It does not delimit the entrance to Room J in the next phase of the house, as presumed by the authors of the cited study (Beroušek, Kováčik 1998, 69, Fig. 4, 70), this being ruled out by the low clearance and by the fact that Post 1428 is overlapped

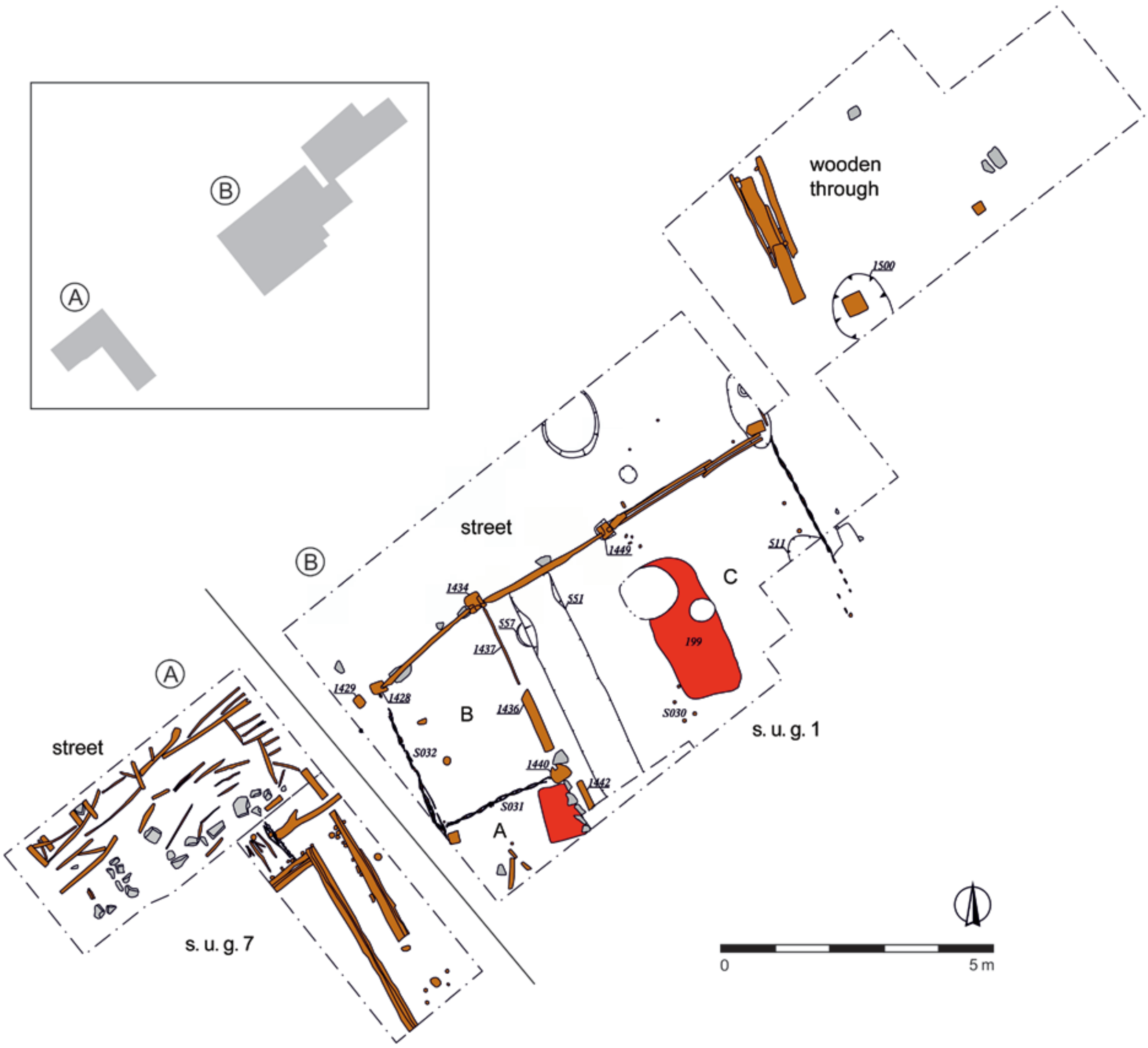


Fig. 167. Uherské Hradiště, Masarykovo Square, Reduta. First phase, House s. u. g. 1. Left – corner of House s. u. g. 7 in Test pit D. Graphics by B. Veselá, V. Kolařík, modified after Kováčik 1997.

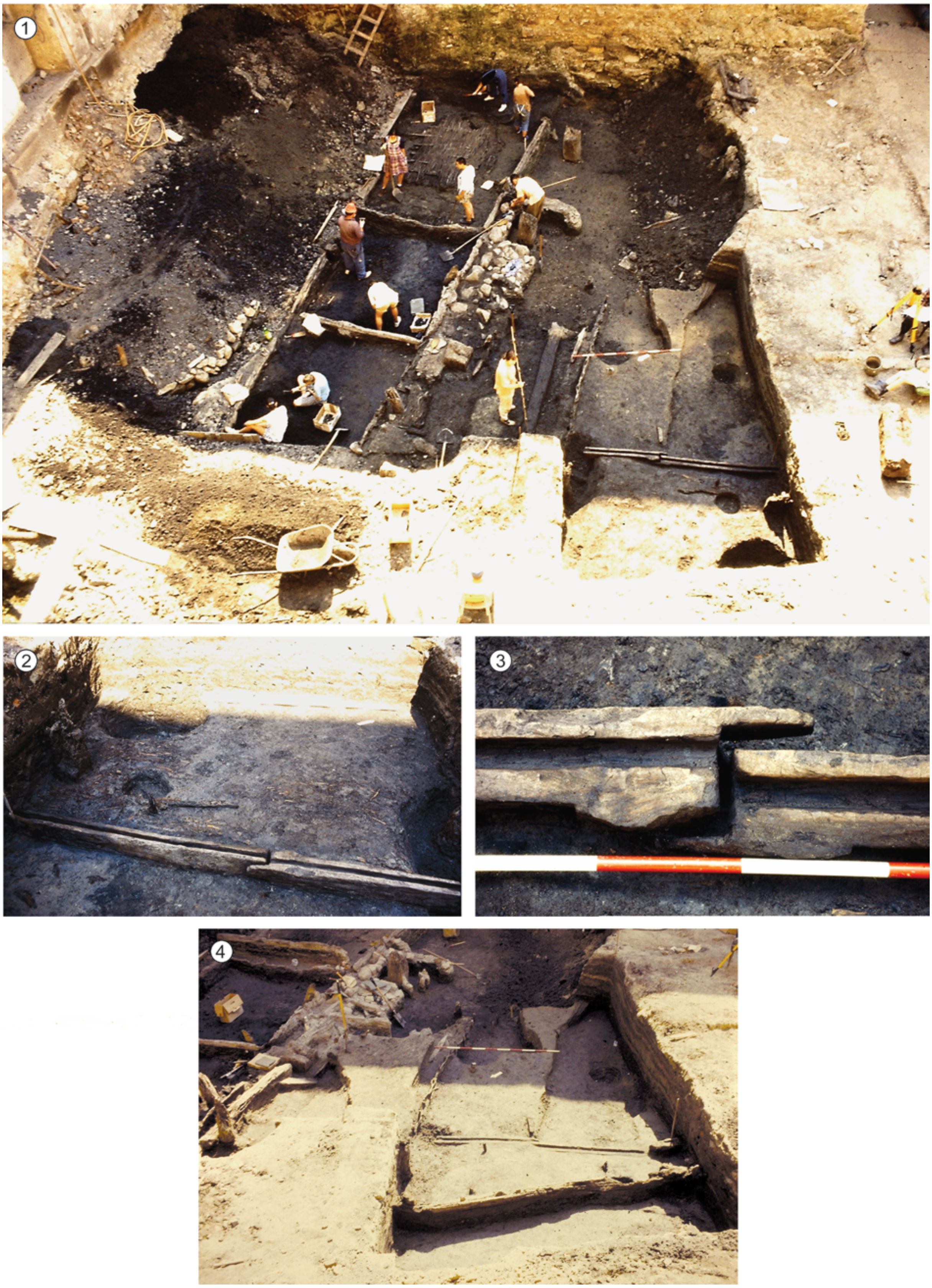


Fig. 168. Uherské Hradiště, Masarykovo Square, Reduta. Excavated area in courtyard. 1 – Left, House s. u. g. 3, right, northern and eastern wall of Room C of first phase of House s. u. g. 1; 2 – Room B and part of Room C of first phase of House s. u. g. 1; 3 – joint of two foundation beams of northern wall of first phase (s. u. g. 1, Room C); 4 – northern foundation beam of northern wall of Room K of second phase, House s. u. g. 4, in background the surface of walls of Room C of first phase of House s. u. g. 1. Photo by Archaia Brno.

by a sill beam of the later (second) period. According to a drawing in the excavation report, it seems that the west wall was shifted all the way to the more distant Post 1429 at that time (Kováčik 1997, Fig. 48). Its new line is indicated by the course of Timber 1430 (see also Fig. 169). Likewise, the south wall was moved when Post 1440 and the corresponding wattle structure ceased to function.

An oval fireplace, recessed by up to 22 cm and renovated several times, was uncovered ca 80 cm from the street line, almost in the centre of Room C (Layer 199, Fig. 167). The function of a renovated trench of a north-south orientation along the wall dividing the two sections (s. u. 551) is unclear; it was probably covered with boards. Presumably, it served for drainage. An earthen (bakery?) oven was built, probably while the house already existed, near the inner wall of Room A, almost in its east corner; it ceased to exist before the destruction of the house. It was delimited by a stone strip roughly in the line of the unpreserved east wall of the room. As many as five levels of earthen floors are listed for Room B in the documentation; the find of a shingle in the upper layer indicates the roofing material used. Several increases of the floor level are also listed in Room A; the destruction of the oven in Room A and the layer with the shingle in Room B were perhaps followed by as many as seven or eight layers. The walls were partially dismantled during the liquidation of the house; the post in the north corner of Room C was possibly pulled out as well. Remarkably, heating and cooking facilities were situated in two rooms. Room C can be considered the living room. The authors of the cited publication are of the opinion that it was not roofed and served as an enclosed courtyard. Arguments against that include the presence of any hearth or oven and especially the structure of the outer wall near the road; these more often took the form of wattle in outdoor complexes, although they are also not missing in house wall structures.

Kováčik and Beroušek included two buildings of a similar orientation in the subsequent **second phase**. In the southwest, it was the large Building s. u. g. 2 (S2). This post-built structure reportedly overlaid the north part of House s. u. g. 1, while the west part ceased to exist (Fig. 169). The front facade of the new building exceeded the previous phase's line by ca 1 m. A sill beam with vertically inserted boards, reportedly later used for the construction of the next phase, is listed in the documentation in the northwest wall. However, no corresponding grooves were registered in the relevant posts. Using documentation from Area II, where the southeast part of the layout was excavated, it was possible to reconstruct the whole area of the building with a trapezoidal layout with 9–15.8 m long sides. The load-bearing structure was reportedly based on eight robust columns of a square section (mostly ca 38 × 38 cm), four in each longer wall, their flatly cut ends set into pits. They were relatively well preserved to a height of up to 122 cm. A published illustration indicates a transverse structuring of the interior (Beroušek, Kováčik 1998, 68, Fig. 3). The authors consider a change in the shape of the house's front facade, where an angled line was supposed to have come into existence comprised of two sill beams with a groove for vertical boards; a small post was only documented behind the angle point. This wall headed towards the north corner post of Building s. u. g. 2 (402) and, on the other side, to Post 485 of the presumed third phase.

Built northeast of House s. u. g. 2 in its close proximity was three-section Building (?) s. u. g. 3 (S3) with an orientation perpendicular to the street line; except for its north facade, it was investigated in Area II (see below, Fig. 168: 1; 169). According to the published plan, its three consequently arranged trapezoidal rooms fluidly widened in the direction of the depth of the plot. The walls were reportedly based on a ring of sill beams with an overall length of 17 m. No heating and cooking facility is documented. The temporal connection to the second phase was primarily determined above on the parallel layout and the stratigraphy of the north front wall.

In the **third phase**, Building s. u. g. 2 was replaced by at least three-compartment House s. u. g. 4 (S4) with an orientation parallel to the street line, which returned to the area of the narrower section of House s. u. g. 1 (S1) of the first phase in the southwest (Fig. 170). Situated above former Rooms A and B was large Room J in the shape of an irregular quadrilateral (sides 6–8 m) and equipped in the south corner with an earthen oven with a clay lining that was renovated at least three times. In the northwest, this room and part of neighbouring Room K were delimited by a more than 5-m-long beam (s. u. 1484–1421) with vertical boards and stakes set in its groove. Traces of the southwest and southeast walls were preserved in the form of smudges. No posts were detected in the east and north corners; the corners were possibly bound by a log bond. The entrance from the street was reportedly situated near the west corner; this was questioned above. The room stood approximately above Room B of the first phase, but was slightly larger in all directions as described above; the front facade protruded into the street. At least four floor levels were discovered there as well. Narrow Room K (4.6 × 2 m) with posts in the south and north corners was adjacent to it in the northeast.

In the text, the authors do not discuss the situation further to the northeast. In the relevant figure (Beroušek, Kováčik 1998, 69, Fig. 4), the building's angled facade protruded into the road, evidently following the post of Building s. u. g. 2 denoted as No. 402 in the northeast part of the area (Fig. 168: 4; 169). Some uncertain wall with one post continues further, ended by later fourth-phase corner stone wall. There is no evidence of structuring of the relatively large, ca 8.5 m wide room (marked now L). The building ceased to exist in a fire, as documented by layers of burnt clay and charcoal.

However, the development of the built-up area can be somewhat specified based on the study of excavation reports (Kováčik 1997; Pavelčík 1997). The main question concerns the second and third phases, the connections between Buildings s. u. g. 2–4.

There is no doubt that the angled facade wall (Timbers 487 and 431) belongs to House s. u. g. 4. Its original ending by Beam 431 is unclear, as this element was disturbed by the post hole of Post 403, which was apparently dug later than the hole for north Corner post 402 of Building s. u. g. 2. However, it is highly likely that the facade wall followed Post 402. In the later phase, a wattle wall disturbed by the aforementioned masonry of the last phase continues further northeast from it. Below it there was a post hole and, more to the east of it, a preserved post with a groove in which a board of the

Fig. 169. Uherské Hradiště, Masarykovo Square, Reduta. Second phase, Houses s. u. g. 2 and 4, s. u. g. 3, oven in House s. u. g. 8. Graphics by B. Veselá, V. Kolařík, modified after Kováčik 1997.

north facade of Building s. u. g. 3 had been set. It seems that the wattle wall is related to a wall of boards propped up by stakes of an unclear function directed perpendicularly into the road in a length of 1.5 m (Boards 436, 448). The wattle structure therefore clearly appears to be later than the timber wall of Building s. u. g. 3 that lies below (Board 426), in accordance with the published interpretation. It seems, however, that the corner post of Building s. u. g. 2 remained functional even after the destruction of the original wall of Building s. u. g. 3.

We can agree with the opinion that the angled facade Wall of s. u. g. 4 represents a later adaptation with respect to the front facade of Building s. u. g. 2 = Room L, possibly a reaction to the town council's effort to prevent such a conspicuous violation of the street line (Beroušek, Kováčik 1998, 67). Load-bearing elements of the east wall of Room K can be considered identical with posts of the west wall of Building s. u. g. 2 = Room L. It is therefore evident that Building s. u. g. 2 and Rooms J and K of Building s. u. g. 4 represent parts of the same house, namely its second phase in the new numbering (Fig. 168: 4; 169). Its front facade delimited by two robust corner columns protruded up to 1.2 m into the street with respect to the building line of the first phase. This soon led to a somewhat bizarre adaptation of the facade, now broken in an obtuse angle using a carpentry joints alone, which reduced the extension in front of the building line to 85 cm. The large structure of the east section extended ca 3.4 m beyond the courtyard section of the house in the direction of the courtyard. The massive structure indicates an economic function of the building (congruently Beroušek, Kováčik 1998, 67). It might have been a granary; possibly, in view of the massive character of the load-bearing columns, a multi-storey one. The westernmost room was probably the living room (J), neighbouring on a narrow hall in the SEE (K). With its angled L-shaped layout, the homestead resembled the third-phase house in Otakarova Street (Plot A).

A wattle fence delimiting the new street line was attached to the north corner post of Room L and of the whole house.

The change of the facade of House s. u. g. 4 must have taken place soon after the foundation of Building s. u. g. 2, because no floor layer different from the earlier road deposit formed in the place of the abandoned space near Post 482 in the original corner of Room L.

The east wall of the storage room or the granary (s. u. g. 2) ran ca 80–100 cm from the southwest wall of the aforementioned neighbouring House s. u. g. 3 (Pavelčík 1997). Archaeological contexts were documented on five levels there. Based on a revision of the considerably imperfect documentation, we can conclude that the house had two phases; an alternative possibility is that the original structures of some walls were replaced by others.

The earliest activity is represented by two shallow pits, possibly filled-in natural depressions, one under the later south part of the house and the other on the west edge of the area (depth: 12–14 cm and 23 cm, respectively). A small layer with organic macroremains formed on the surface of the Middle Hillfort layer. A fireplace or oven bottom comprised of a 1–8-cm-thick layer of burnt clay also belongs to this phase.

A layer of light grey clay was situated on the fill, lying in places on the Middle Hillfort sediment and elsewhere on the 13th-century 'peat'; the latter probably represented the level on which the earliest wooden house was built. Situated somewhere in its neighbourhood was a wattle fence that was partly laid on the surface of a humus layer with macroremains deposited on an early medieval layer; alternatively, the fence might have been deposited concurrently with this adaptation towards the eastern edge of the sector.

The **first phase of the house (s. u. g. 3)** was apparently comprised of features denoted as 3 and 5 in the excavation report (Pavelčík 1997; Fig. 169). The more northerly room (Feature 3, in this text A) was delimited by a wattle wall in the southwest and a partition of a similar construction in the southeast. A robust column with a square layout stood ca 3.4 m from the south corner of Room A, near the inner side of the southwest wall. In the southeast, in the extension of the outer wall with an unclear bond, followed a foundation structure, a part of 'Feature 5', i.e. the following Room B. It consisted of two beams originally bound to the column. The elements of the south corner, the only one preserved, were probably jointed by some joinery techniques. As in other cases, the joints did not survive. Beams also comprised the whole eastern front of the building (the southeast corner was disturbed). The northeast front of the sill beam was structured by two posts, one in each room. No traces of a possible partition were detected. The building of a rhomboid (?) shape was at least 12 m long (Room B 5.2 m) and only 2.6 m wide. No hearth or oven were detected. The northwest part was considerably disturbed; the preserved street facade was represented in the first phase by a board set into a pair of posts.

The **later phase** of the building, possibly with two sub-phases according to the head of the excavation (Features 3A – higher and 3B – lower), came into existence once again on a raised level; the exact relationship between the sill beams and the individual layers of the fill is unclear (Fig. 168: 1; 169). Thin layers of clay, loose and hard-packed ('compressed') humus with a thickness of up to 45 cm, alternated there. The clay layers can be regarded as floors. A ca 10-cm-thick stone layer, probably mixed with Humus layer 6, lay on the surface of the lower floor (perhaps second from the bottom) in Room A.

Regrettably, we have no certainty that the beams of the higher level, which overlap the wattle walls at first glance, actually lie in the same line and whether or not the beams drawn in various levels in the place of the presumed walls are identical. It is also not quite clear whether there are indeed two phases. Remnants of vertical boards were preserved in the sill beams in places. Room A was divided into two spaces in the later phase; the partition was comprised of two beams. The partition between Rooms B and C was then apparently shifted by 40–50 cm to the south with respect to the earlier wattle. The sill beams

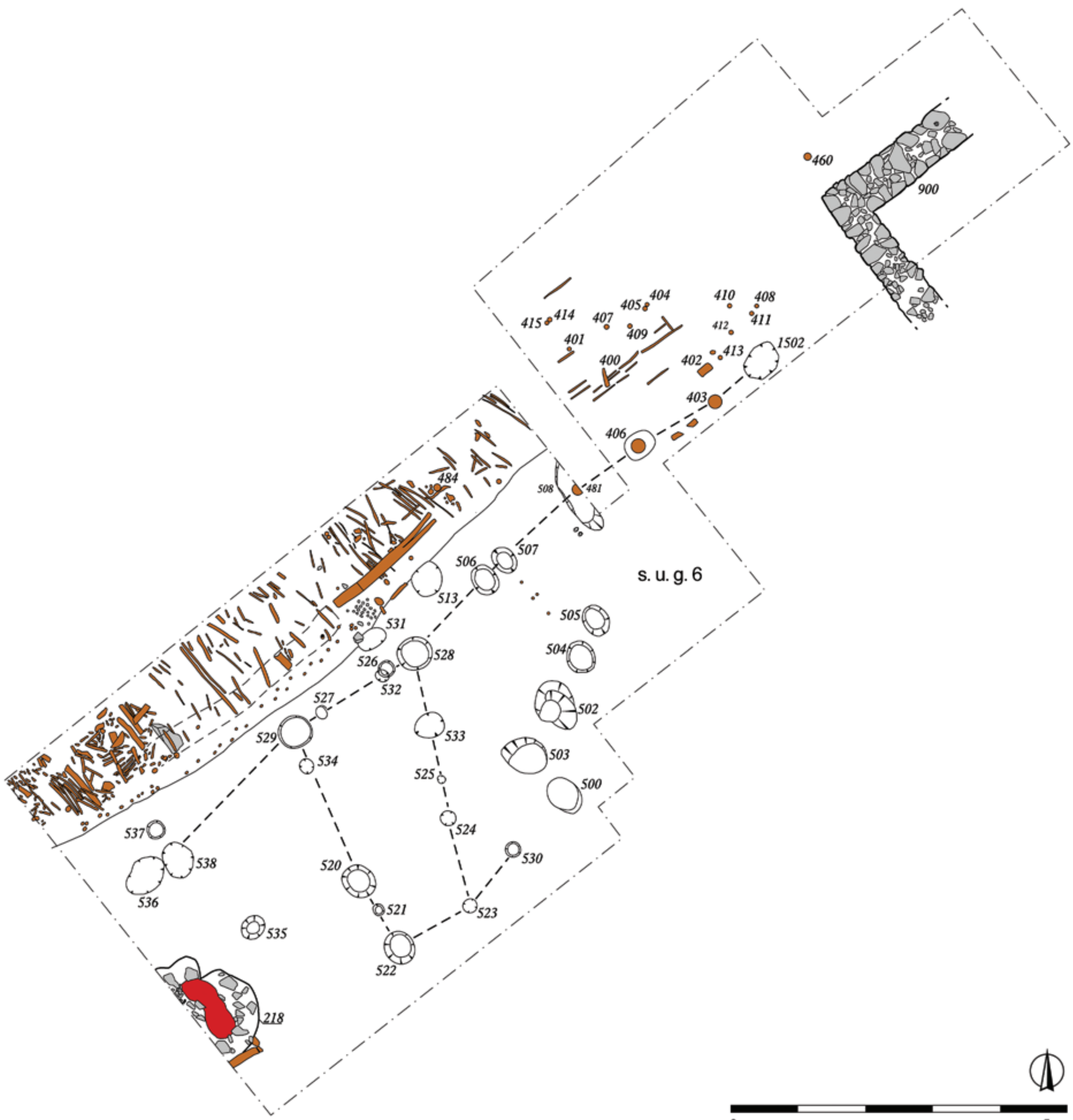


Fig. 170. Uherské Hradiště, Masarykovo Square, Reduta. Third and fourth phase, House s. u. g. 6, Stone wall 900 of fourth phase. Graphics by B. Veselá, V. Kolařík, modified after Kováčik 1997.

were probably jointed in the corners; the west walls of Rooms A and B were each structured by one post. A wattle wall reaching as far as the north corner post of neighbouring House s. u. g. 2–4 came into existence in the northwest; at that time, Building s. u. g. 3 might no longer have fulfilled its original function. Shallow interventions were detected in the latest sand feature in Room C – Features 1 and 2, which seem to be the latest activities. In this phase, Building s. u. g. 3 had a quadrilateral layout narrowing towards the street, at least 11 m long and 1.9–3 m wide. It apparently had no heating and cooking facility at that time. The structure could be used as a farming facility (in both phases); according to packed organic material layers, it might have been a stable.

Along the west wall of Building s. u. g. 3 from the outer side was a stone feature comprised probably of one or two layers of stones of various sizes; according to the level of the surface, it might have come into existence during the function of the earliest phase of the house with wattle walls. On it was laid a wooden trough of planks ca 24 cm wide (clearance: 17 cm) that probably leaned on one side on the post-built structure of the east wall of the courtyard section of the neighbouring homestead (Room L = s. u. g. 2). It is not quite clear on what the east wall of the trough leaned, probably on the wooden wall of the second phase of House s. u. g. 3. However, the stratigraphic relationship with its earlier phase was not clearly ascertained. The posts of the east wall of Room L sitting on a bed of small stones disturbed the lower stone structure below the trough. Presumably, therefore, Buildings s. u. g. 2–4 were somewhat later than s. u. g. 3, and the trench came into existence when they were both already standing. It can also be assumed that Building s. u. g. 3 was not the only part of the house; more sections might have been situated east of it.

The **third phase in Area I** is represented by Post structure s. u. g. 6, whose partial layout originating from the connection of post holes must be taken with reservations (Fig. 170). A new and rather uneven street line came into existence after the destruction of the second-phase house, returning to the facade line of the first-phase house (s. u. g. 1). The authors of the publication construct a quadrangular room in Square 5, but the published layout neglects numerous other post holes above all in Square 2 drawn more to the east in the excavation report (Beroušek, Kováčik 1998, 69, Fig. 4; 1997). A large stone oven was partially uncovered on the southwestern edge of the area, in the place of an earlier earthen oven. We can tentatively express the assumption that this was another room of the house. A wattle fence protruded 60–80 cm into the street in front of the facade of the house. However, it only ran along the west part of the building in a length of ca 6 m.

A fragment of a wooden structure consisting of two joined beams forming a right angle was documented above House s. u. g. 2. The shorter beam is followed in the north-south direction by another, identically oriented one with a slight shift to the east. The orientation of these elements roughly corresponds to the outer walls and partitions of the earlier phases; however, they are outside their course completely.

The beginnings of masonry structures are represented in the **fourth phase** by a corner of stone Building 900 (lengths of two walls: 2 and 2.7 m; masonry thickness: 65 and 50 cm). The southwest section ran in close proximity to the outer line of the northeast outer wall of House s. u. g. 3 (Fig. 170). An oven with a layer of sherds below a clay lining was perhaps even later (14th/15th century?). In the west corner of Reduta, in the same house front as the previous buildings of Area I, Test pit D of the team from the Museum of Moravian Slovakia in Uherské Hradiště uncovered the corner of another wooden house in **two phases** (Fig. 167, 169). Two levels of strengthening of the surface with various timbers were documented on the surface of a Middle Hillfort layer; between them were scattered stakes and two posts of an almost square and circular section (32 × 30 cm; 14 cm). An 80-cm-long row of stakes on the southwest side accompanied a fragment of a large tree trunk laid perpendicularly to the longer wall of the test pit. A wooden house was built after that, a corner of which was detected, comprising of two beams forming a slightly acute angle. They were apparently connected by a lap joint; each contained a lap for boards; in the upper one, it reached the end of the beam and was possibly a secondarily used building element. The northwest beam was strengthened from the outside up to the corner by a row of five stakes. Another row of stakes regarded as a wattle fence of a NNW–SSE orientation was found below this corner. A wooden trough extracted even higher was comprised of a small trough hollowed out in a beam in the northwest, which opened into a wider timbered trough. The structure reportedly overlapped into neighbouring Test pit C, but it was not drawn there. The aforementioned stake row ran in parallel with the southwest side of the trough; the stratigraphic relationship is not clear from either the text or the depiction, nor is the position of Pit 15 near the northeast wall of the test pit. It seems that the stakes are earlier than the channel and later than the house corner described above.

A corner of a later house was excavated on a higher level, this time shifted to the northeast so that it lined the northeast and northwest walls of the test pit. It was represented by a small trench filled with crushed burnt clay and a fragment of a charred beam. The corner's angle contained an earthen oven whose clay lining, renovated three times without the use of base stones or pottery fragments, was lined with stones. The last clay lining was overlapped with the debris of an earthen dome. Below the earliest clay lining was a brown clay layer delimited by a rectangle of boards standing on edge. A part of what was perhaps the living room of the house in multiple phases was uncovered there, but their reliable synchronisation with the development of Areas I and II is impossible at present (interpretation in Fig. 167 and 169 is more or less hypothetical).

Besides the development of the street line, the survey also brought valuable discoveries concerning road surfaces.

In Area I excavated by Archaia, the development could be followed in an approximately one-metre sequence. The width of the road is unknown, but it was undoubtedly several metres. We can state that except for one level towards the end of the first building phase, when the surface was strengthened with a layer of stones, the road was repeatedly paved by fragments of wood including twigs and branches, sometimes laid predominantly transversely to the longitudinal axis of the road, at other times in both directions (Fig. 169, 170). The strengthening of the surface started immediately on the basal medieval 'urban' layer; at the beginning, it concerned the whole surface. After the construction of the first-phase house, a marked difference is visible between the layers growing within the built-up area and outside it on the road. The layers inside were of clay or sand, mostly without plant macroremains; inside, they were more biogenic. The boundary was also constantly observable in higher layers, at least to the level of the second-phase house.

The context in Test pit C was similar, only the surface of the Middle Hillfort terrain was situated somewhat lower (Fig. 167). Of seven distinguished levels, once again, six included wood paving, and the highest level roughly corresponds to the highest level in the area on the opposite side of the courtyard, with regard to a slight decline of the terrain towards the edge of the former island.

Several significant conclusions can be drawn from the excavation of the southeast section of Reduta. A part of the southeast side of a vanished street heading from Dolní (Masarykovo) Square to the southwestern edge of the town was uncovered. Detected residential buildings developed in four main phases that can be only partially synchronised in the main areas and test pits. Only above-ground structures have been documented there. Two phases of a three-compartment house were uncovered in Area I. In the first phase, it was a compact two-section house. The narrower southwest section was perhaps divided into two rooms; the northeast one can be regarded as the living room. A larger, once again three-compartment house stood approximately in the same place in the second phase, but the individual rooms exchanged positions. The living room was situated in the southwestern area, while the opposite side was occupied by a massive building resembling a granary or storehouse, elongated into the courtyard, from which the central hall was entered. The subsequent phase is preserved in worse condition, and the fragments of the layout are difficult to interpret. An important feature of the described built-up area was a mostly slight variation of the street line. An apparently two-phase building was excavated in Area II, structured first into two and, in the second phase, three spaces, most probably with a non-domestic (agricultural, storage?) function. It stood just next to the northeast section of the second phase of the house (s. u. g. 2) described above. I believe it was also a part of a multi-compartment homestead. Test pit D situated southwest of Areas I and II uncovered corners of two phases of another house respecting the street line, but in a side-reversed position. In the latest phase, the second-phase corner was overlapped by an earthen oven. Judging from houses in Areas I and II, the walls were a post-built structure with a sill beam and boards set into it, or possibly without a beam ring with wattle. The transition from the post and beam to timber frame construction of buildings did not take place here, although indications of its locally limited use appeared. Another remarkable fact is that except for the masonry corner on the northeastern edge of Areas I and II, no evidence of medieval stone buildings was discovered throughout the area. Except for this masonry fragment, the duration of the wooden structures did not extend beyond the middle of the 14th century. A section of the rear part of a medieval plot with pits including a 15th-century cesspit and stakes was uncovered in the northwest section of the former 21 Jesuit college (Stuchlíková 1995; 1997).

3.4 Other sites in Uherské Hradiště with uncovered remains of wooden structures – an overview

An excavation conducted in 1993 at **1306 Františkánská Street, plot No. 193/1 (orig. No. 164, plot No. 128, 193/1, 193/2, 206; Fig. 151: 4)** was situated on the northeastern edge of the historical core near the town wall (Geisler 1994; 1997). It was the whole historical plot of a single house adjacent to Františkánská Street reaching all the way to the wall, as well as the plots of two small houses along present-day Hradební Street (formerly Velehradská Street) outside the medieval fortification. Here, the activities from the time of the founding of the town took place most probably on the lower level of the surface of the final early medieval deposit, which became soil during a settlement hiatus. Only the earliest unambiguous layer from the beginnings of the medieval town rested on it (Frolíková-Kaliszová 2009, 563–566, 569). A clay feature distinguished on its basis (Layer 116) was considered the floor of the feature delimited by Trench 500 described below (Geisler 1994, 2; taken over by Frolíková-Kaliszová 2009, 566). This is impossible, however, because the mentioned trench disrupted Deposit 116 and is therefore considerably later.

Unlike a similarly situated area in Otakarova Street, medieval contexts in Františkánská Street were poor in organic remnants of building structures. The most distinctive structure was the aforementioned 40–50-cm-deep and up to 90-cm-wide foundation Trench 500 filled with burnt clay, comprising a rectangular corner of a more extensive structure. Neither of the two walls was uncovered completely: the shorter northeast wall in a length of ca 2.7 m (3 m?), the longer southeast one of 4.6 m (5.2 m?). The construction relict was situated in the rear part of the plot, and its longer side was situated 5–6 m from the wall. It was not determined whether its prospective parts reached as far as the street, which was 17 m distant from the outer corner of the structure. The trench disturbed a pit with pottery from the second half of the 14th century; the finds from the trench fill were of a similar character (Frolíková-Kaliszová 2009, 566, 569). The lesser thickness of high medieval strata in the position near the wall is unusual in Uherské Hradiště, especially when compared to the situation in Hradební Street on the southeastern edge of the town.

A relatively small excavation in the northeast part of **plot No. 141/1 of House No. 13, Vodní Street** near the remnants of the town wall, which is only preserved below the level of the recent terrain near the Chapel of St Elizabeth (6 × 6 m, depth: 1.9 m; Fig. 151: 5), documented a thick layer of organic material with finds from the late 13th century on sterile subsoil. A beam secured by two posts and as many stakes laid on the bottom; more driven posts were found in its neighbourhood (Kohoutek, Merta 1999; Kohoutek, Procházka 1995). The wall is undoubtedly later. Most probably, this is once again the rear part of a plot.

The excavation of plot No. 48/2 (today 48/3) at **1245 Zelný trh Square** concerned ca 50 m^2 of the rear part of the oldest plot of House No. 35 in Masarykovo Square (plot No. 48/1) adjacent to the former Rechla millrace (Procházka 1997; 1999; Fig. 151: 6). Probably in the late 13th or early 14th century, the stream bed was delimited at the end of the plot by boarding made of longitudinally deposited timbers. Features of a roughly rectangular layout, pens of a sort, were founded close to the southwestern edge on the surface level of Layer 178; they were all only partially uncovered. Their walls were comprised of secondarily used, irregularly laid building timbers, some with evidence of joinery unused here. The timbers were not joined in any manner but were held by vertically driven stakes of both square and circular section variously distributed along the sides of the walls. These features presumably fulfilled the function of enclosures for domestic animals.

Only the rear parts of three historical plots belonging to former houses adjacent to Masarykovo (formerly Dolní) Square were also uncovered on an area of 700 m^2 at **12 Hradební Street (1232 Masarykovo Square / Růžová Street, plot No. 15/1; Fig. 151: 7, 8)**. A wooden beam floor, perhaps part of a stable, a loam pit, a cesspit and several wattle structures, most probably shelters and enclosures for small domestic animals, can be linked to activities of the second half of the 13th and 14th centuries. Four parallel fences in the north part of the area with NWW–SEE orientation probably delimited the slightly variable boundary between two historical plots (Kohoutek, Procházka 1997).

A high medieval stratigraphy with numerous organic remnants was also detected by test pits at **1239 Havlíčkova Street** on plot No. 186/1. No clear evidence of residential buildings was proven (Vitula 1994; 1997).

4. Oldest burgher houses in Uherské Hradiště in a contemporary context

Despite the mostly preliminary character of the evaluation of the evidence of the earliest burgher houses, the archaeological research carried out so far has brought several original pieces of evidence that are more or less unique in this country's territory in view of the preservation of wooden elements. First, it is necessary to emphasise the importance of the acquired evidence of the development of these houses, in two cases from simple single-room buildings to more complex layouts and twice even to a stone building.

It is evident that the earliest buildings respected the surveyed layout of the town; the unstable character of the built-up areas given by the construction material used was reflected in a fluctuation of the building line that is highly visible in Masarykovo Square (Reduta). Most houses stood by the street, with the exception of houses in Otakarova Street, which structurally resemble farmsteads with courtyards facing the public space; this is confirmed by finds of farming tools. The question of whether the detected bread ovens served the owners' own needs or documented a craft activity remains unresolved. The connection between farming and the processing of flour into a final product is conspicuous.

Layout variability and different development on the individual plots are characteristic features of oldest-period buildings in Uherské Hradiště; nevertheless, multi-compartment layouts were always detected. In Mariánské Square, the initial phase is represented by a separate living room adjacent to the marketplace and a 'storage room' at a distance behind it. In Otakarova Street, partially recessed post-built structures without hearth or ovens were situated in the depth of both investigated plots in the first phase; an above-ground storey – a raised ground floor – cannot be ruled out on Plot A (Donat 2000, 139). It is possible that during the time when these buildings were in use, their users were still partially economically bound to Staré Město or Veligrad. Multi-compartment houses were found from the beginning in Reduta in Masarykovo Square; the first phase can be interpreted as an at least three-compartment house with the rooms arranged in two parallel sections, while the second phase on the southwestern plot bore characteristics of a three-compartment house of an angled character. Its interesting feature is an extraordinarily large 'storage room', more likely a granary of a robust column construction. Only a part of the neighbouring house closer to the square was uncovered, probably an elongated, transversely structured courtyard section maybe with a non-domestic function. The second-phase house of Plot B in Otakarova Street undoubtedly had two rooms, but a heating and cooking facility is not clearly proven. The third phase represented a house with an angled (L-shaped) layout, with an unusual orientation of the storage room towards the street. The second building phase in Plot B might have had a similar ground plan. A very developed angled layout in consequence of the location of the alleged workshop near the square was also maintained in principle by the third building phase in Mariánské Square. According to the revised interpretation (see above), a large corner living room with possible production activity would be followed into the depth of the plot by a hall, a stable and a storage room, with a workshop and possibly selling premises along the square. Houses with an angled layout basically followed the classical scheme with an entrance hall, a smoke living room with an open fireplace and a storage room, with entrances from the courtyard into the hall.

The second phase, perhaps on a temporarily separated plot in Mariánské Square with the front facade into a side street, represented an exceptionally preserved the highly developed (5 rooms) three-compartment house with a transverse section; in its east corner, there was also an entrance from the courtyard. It was a combination of a post-built structure with timber frame construction.

It is evident that the presence of a high level of groundwater and the danger of frequent floods prevented the construction of cellars or recessed parts of buildings in Uherské Hradiště. Semi-basements of sorts only appeared in the first building phase, but deep cellars, such as those known from Brno, nearby Uherský Brod or Starý Plzenec cannot be expected in Uherské Hradiště; according to Peter Donat and Pavel Vařeka, the depth is more often around 150 cm or 100–200 cm (Holub et al. 2005a; Procházka 1984a; 1984b; Bartík et al. 2016d, 319; Čapek, Netolický 2014; Bartík, Novotný 2016, 319; Šimík 2020b; Kaiser et al. 2005, 103; Donat 1993, 227; Vařeka 2002, 256). However, semi-sunken cellars with a clear height of about half the human figure are even known from 'dry' sites such as Hradec Králové and Žďár nad Sázavou (Zatloukal 1999, 197; Bláha 2005, 119–121; Bláha, Sigl 2014, 138). Cellars with various levels of sinking within the house appear in urban houses in Germany and also in Prague in the 12th century; in the 13th century, they can also be found in the rural milieu. In the Czech lands, they ordinarily occurred in institutional towns from the 13th century, already in connection with non-masonry buildings. This is another important innovation characterising top medieval residential buildings on their way to both horizontal and vertical structuring (e.g. Donat 1993; Bureš et al. 1997; Juřina et al. 2009; Holub et al. 2005a; Küntzel 2010, 183–201).

Post-built structures with sill beams, less often with wattle, predominated at all Uherské Hradiště sites; frame construction asserted itself more considerably only in the second-phase (s. u. g. 3, 4) houses in Mariánské Square. The robust foundation trench without posts in Plot B in Otakarova Street (s. u. g. 17) also offers log construction for consideration. No evidence of central columns bearing the ridge beam in the axis of post-built structures, a design that appears in Germany and Austria (see below), has been encountered. The roof structure was apparently based on the outer walls alone.

Heating and cooking facility have only been documented in living rooms so far, not counting production facilities (especially bakery ovens) outside houses. In all cases, they had the form of a smoke room (on smoke operations, see Vařeka 2004, 265–266; 2018, 145, 147, with additional references). A fireplace lined with stones with a clay lining based on sherds was uncovered in one case. Other similar facilities were only represented by layers of clay lining. Ovens of a stone construction, most probably bread ovens, were also encountered in the interiors (Masarykovo Square – Reduta, third phase; Mariánské Square). Earthen ovens on a partial stone base or without one were also documented (Reduta – first and second phase). A special case is represented by hearths or ovens recessed by up to 45 cm in House s. u. g. 2; however, it was accompanied by other smaller burnt areas, not necessarily contemporary. A first-phase fireplace in the Reduta's courtyard was also slightly recessed. The location of the heating and cooking facility in the living rooms was varied and could not always be clearly determined from the available documentation. In the classical position in the corner, it was proven in Otakarova Street (third phase, s. u. g. 11) and in the houses of the first two phases in the Reduta's courtyard. Other variants included a fireplace roughly in the middle of the room (Mariánské Square – second phase, Reduta – first phase) and in a variable position near one of the walls (Mariánské Square, s. u. g. 4 – third phase). A special case is perhaps represented by small production ovens surrounding a large bread (?) oven in the living room (?) of House s. u. g. 4 in Mariánské Square; one of them was accessible from the adjacent workshop. The apparently non-contemporary fireplaces on the opposite side of the living room had variable locations – closer to the wall as well as in a greater depth, roughly in the longitudinal axis of the room. The first-phase house in Reduta was also equipped with two heating and cooking facilities; besides a fireplace in the living room, there was also a (probably bread) oven in the storage room.

The varied manner of the formation of the 'rural' three-compartment house in Uherské Hradiště, occurring in Otakarova Street in the angled variant unusually turned by the courtyard to the road, need not be merely a direct reflection of the development of this building type but also of the local specifics given by the resettlement of population from nearby regions. The detected building variants show a tendency to complement the main residential room with spaces of a storage function, suggesting a close relationship between early urban and rural houses. Interestingly, above-mentioned timber houses from Uherské Hradiště remain outside the attention of scholars dealing with the genesis of the multi-compartment rural farmstead.

Multi-compartment wooden buildings without cellars are well known from several Central European sites; Donat summarised them into three groups: 1) structured, multi-room timber frame buildings ('gegliederte', 'mehräumige Ständerbauten'); 2) unstructured, multi-room timber frame buildings ('ungegliederte', 'mehräumige Ständerbauten'); 3) unstructured, single-room timber frame buildings ('ungegliederte', 'einräumige Ständerbauten') (Donat 2000, 134–152). While houses of the second group have individual rooms arranged additively without further structuring, the first group is characterised by additional structuring of some parts. Donat categorised the second-phase house in the rear part of the plot in Mariánské Square (s. u. g. 9) into the first group and the third-phase house in the same place and, tentatively, the third building phase in Plot A in Otakarova Street into the second group. At least the first phase of s. u. g. 2, 3 in Mariánské Square can be added to the third group. With these multi-aisled houses, it is usually believed thought that the partitions in the side aisles that were directed towards the central room, the 'Diele' in north-German terminology, did not have a load-bearing function. The roof structure was supposed to rest on the outer walls. The parallel development of rural and urban houses is emphasised; vertical structuring into storeys gradually asserted itself in the latter (Donat 2000, 138–139; 2005, 47, 49, Fig. 12: 2; Küntzel 2010, 142–155 in detail). Relics of surface houses of a timber frame construction close in general features (as to the ground plan) to House s. u. g. 9 in Mariánské Square or possibly to the first phase of the Reduta building are known from the south German milieu, from the Swiss town of Laufen in the Basel region, dated to the second half of the 13th through the early 15th centuries. Their ground plans vary, the most complex one being three-section; two-section buildings with a transverse section near the street, similar to those in Uherské Hradiště, also occur. They were probably multi-storey, which, however, fundamentally affected their functional structuring (Pfrommer, Gutscher, 1999, especially 110–121). A wide multi-compartment timber frame house with a further divided transverse section near the street from the second half of the 12th or the early 13th century has been excavated in Villingen, Swabia (Jenisch 1999, 125). Of other examples, we can also name the small town of Altreu, Switzerland, with timber frame multi-compartment (three-room) houses from the second half of the 13th century (Hardmeier 2018, 70–92; more examples: Donat 1996; Procházka 1996, 138). The sporadic finds from Austria thus far indicate the presence of both timber framing and post-built structure with sill beams as early as the 12th century (Vienna – Mitchell 2001, 210–212; Graz – Lehner 2011, 236).

In the major cities of northern Germany, especially Lübeck, a post-built structure, including the transition variants with beam sills (Schwellriegel-Pfostenbau; on the types of construction, see Scheftel 1990; Zimmermann 1998), only remained in use for farm buildings already from the late 12th and early 13th centuries (Küntzel 2010, 206–207; Teuber 2009, 293–304; Legant-Karau 1994; Legant 2010, 130–149). The speed of the transformation was not uniform, however; two-section and, less often, three-section post-built structures with sill beams were uncovered, besides timber frame buildings with a rectangular layout and orientation perpendicular to the street line, from the late 12th century in Warburg, Rhine-Westphalia. They were presumably single-storeyed at the beginning. The development was still heading towards multi-storey timber frame buildings in the 13th century (Kneppe, Peine 1995, 5–39). Other examples of multi-compartment houses with a rafter roof structure from smaller northern German towns come from Einbeck, Lower Saxony, where timber frame construction dominated in the residential sphere since the beginning of occupation in the mid-13th century, whereas post-built structures with sill beams were still documented as complementary in the late 14th century. Stefan Teuber emphasises that Donat's Type 2 occurs in Eastern Europe as well as northern Germany (Teuber 2009, 302–321). A relatively close analogue to the plan of House s. u. g. 9 in Mariánské Square is a roughly contemporary house from Daugava Street in Riga with a large living room (Caune 1984, 104, 107, Fig. 87: 1; 1990, 174, 180). Post-built structures survived longer in Mecklenburg and Pomerania than in most westerly states of Germany. Houses in these later settled and restructured eastern lands of Germany including the former territory of the Teutonic Order are highly varied in terms of plan; most of them already had a rafter roof structure. Post-built structures with a domestic function can be encountered relatively longer in some places. Partial analogies to the mentioned house of Donat's Type 2 can also be found in a row of plans of wooden houses of timber frame construction from the late 13th and early 14th centuries excavated in the town of Eberswalde in Mecklenburg. An absolute majority of these buildings is characterised by a central heated room adjacent to the street accompanied by narrow uneven spaces along its sides (called aisles in German literature) and mostly also by another room in the rear. In one case, a single-room house represented the first and third structures on a plot; a similar one with an oven was situated in the rear of another plot (Donat 2000, 134–135; Krauskopf 2012, 143–146; Krauskopf, Wiese 2014, 132–138). The earliest building in the place of a house in Rotgerberstraße, Greifswald from after 1245 was a five-aisled post-built structure. Timber frame construction asserted itself more strongly, albeit not exclusively, in residential buildings there after 1270, to be later replaced by masonry, brick construction (Enzenberger 2007, 34–77). A multi-storey house of timber frame construction from Brüggestraße is dated to the end of the third quarter of the 13th century (Rębkowski 2001, 132). Multi-compartment wooden buildings are also known from Brandenburg; the term 'rural type houses' is used for the earliest ones, such as a three-aisled post-built structure from the late 12th century from Mauer Straße, Neu Brandenburg (Müller 2000, especially 150). A basically three-aisled but relatively narrow house of a timber frame construction with an orientation parallel to the street from the late 13th century was excavated near the street line in Ratuszowa Street, Kołobrzeg. The largest middle room with a heating and cooking facility was divided longitudinally by a light wattle partition (Rębkowski 2001, 141–142). In Wrocław, on the other hand, post-built houses with simple rectangular or square layouts and timber frame construction of the walls, sometimes with cellars, are already encountered in the pre-urban phase in the late 12th and early 13th centuries. Smaller houses were not internally structured, while a larger house in Nowy Targ Square had a heated living room separated by walls from the rest of the space (Piekalski 2004b, 174–181; 2014, 116–120).

In terms of hydrological conditions, Litovel is closest to Uherské Hradiště in Moravia; it also occupies an island in the River Morava and it was likewise founded in the first half of the 13th century. Regrettably, area excavations of an extent that would make it possible to uncover the whole layouts of structures have not taken place at the site. In the Middle Ages, the absolutely predominant building material in the town was wood. Elements mentioned in the literature include corners of sill beam trenches, post holes, a foundation wall with a beam bed and layers of burnt daub. However, layouts of buildings comparable to Uherské Hradiště are missing thus far (Šlézar 2005, 288; 2018, 83; Šlézar, Faltýnek 2004, 206).

One section divided into three rooms, most probably part of a more complex layout likely from the late 14th century, was excavated in Košice; as in Uherské Hradiště, it featured a timber frame construction in the two front rooms as well as a post-built rear room (Rusnák 2012, especially 89–94).

Analogies to houses from Uherské Hradiště are difficult to find in the Czech lands; the same is regrettably true of the east part of south Germany, from where a considerable part of foreign-language settlers came to south Moravia above all in the 13th century, judging from the character of the high medieval pottery component. Only the sunken parts survived from most wooden houses of the first phases of urban occupation in Czech towns, although there can hardly be doubts about the existence of buildings with multiple rooms, at least partially without cellars. This is evidenced, for instance, by the find of the remnants of a late 13th-century three-compartment (?) post-built structure with a sill beam from Plzeň (Nováček 2000).

An apparent analogy offers itself to the relationship between the stone and wooden structures in House s. u. g. 4 in Mariánské Square in the form of a north German 'double house', where a front wooden part is followed by a masonry building called a 'kamenate' or 'Steinwerk' with a granary and later also had a residential function (e.g. Rötting 1996; Piekalski 2004b, 99–121; Küntzel 2010, 158–167). Similar buildings presumably also existed in the Czech lands, especially from the second half of the 13th century (e.g. Hauserová 1995, 46; Piekalski 2004b, 189). However, the situation in south Moravian towns, especially in the best-excavated Brno, shows very different layouts of the earliest stone houses (ca 1250–1350). In the absolute majority of cases, the stone cores are adjacent to the street, mostly with an orientation perpendicular to the street line. Some buildings were detected deeper in the plots, which, however, raises the possibility of a wooden part shifted forward analogous to the north German 'double house'. Three-compartment buildings near the road are most numerous, usually with a perpendicular, less often a parallel orientation (Merta et al. 2004; Holub et al. 2013, 461–467). However, this analogy is considerably relativised by the aforementioned stratigraphy unclarities, which make it impossible to unambiguously decide the relationship between the two parts in the case of the building from Uherské Hradiště, and also by the different layout of the German counterpart (usually a perpendicularly oriented three-section structure). In any case, the stone house in Mariánské Square indicates the beginning of the 'petrification' (German 'Versteinerung') of urban buildings, a process that had very different dynamics in Central European towns.

We cannot discuss the development of multi-compartment houses in the rural milieu in detail here, even if we limit ourselves to the Czech lands and the likely source region – south, southeast and possibly central Germany. Surface residential post-built buildings, one or two-aisled, accompanied in places by pit houses probably of non-domestic function predominated there in the Early and a considerable part of the High Middle Ages (up to the 12th century or 1250 at the latest in the Western European chronology). Buildings whose rectangular core is flanked by an arcade of anything as archway also occurred. From the 11th and more distinctively from the 12th century, post-built structures also started to be superseded in these regions by timber frame construction with a sill beam ring – first on the surface of the terrain, later on a stone base or foundation wall. The transitional period was long, and farm buildings retained post-built structures deep into the 'Late' Middle Ages. At the beginning, even in multi-compartment houses, the ridge beam was borne by posts in the central axis of the house. A fundamental change (with beginnings dating as early as the 7th/8th centuries) was brought by the transfer of the weight of the roof to posts in the walls on which transverse ceiling joists were based – this rafter roof structure was also the only one used in Uherské Hradiště. A cellar appears as a new element in the house layout in the 11th century, at first in higher social strata and from the 13th century also as a common part of farmsteads. Yet it is usually only a stone base that makes it possible to consider a multiple, mostly three-compartment house; thanks to that, timber frame construction can be predominantly linked with houses with more complex layouts. Additively arranged functionally different compartments can be encountered, as well as compact multi-aisled, almost square layout resembling House s. u. g. 9 in Mariánské Square in Uherské Hradiště and its other urban analogies. Here, we can point out a house in Höfstetten, Bavaria, dendrochronologically dated to 1367. It is a three-aisled building ended by a transverse section. In the larger part of south and southeast Germany, the farming part of the house is regarded as a stable, whereas in the east of the studied area, they speak about a storage room – or a granary, which was also part of the originally two-compartment urban houses in north Germany. A question is whether a stable and a storage room can be reliably proved from archaeological remnants, even leaving aside the possible variability of the function of the individual parts of the house. After all, in advanced forms of a three-compartment house, the third, farming part sometimes includes an attached stable as a fourth space beside a storage room. However, a settlement where the birth of a three-compartment house would be well documented is still missing; to a considerable extent, this is due to the poor conditions for the preservation of organic materials in the studied territory. Admittedly, however, the mentioned building type came into existence relatively quickly during the late 12th and 13th centuries, although the period of its spread in the individual countries of Central Europe was different (Donat 1995, 421–433; 2005, 49–52; Bedal 2002; Grimm 1939, 14–36; Timpel 1982, 30–39; Ruttkay 2002, 270; Vařeka 2004, 168–199; 2018; Schreg 2002, especially 116–119; 2006, 296–299; Felgenhauer-Schmiedt 2002; 2008, 132–137). A somewhat surprising phenomenon in Uherské Hradiště is the long use of post-built structures even in domestic buildings. Its long lifespan has been proven by the research of deserted villages in the lowland milieu of Lower Austria, where two and three-compartment layouts with the roof structure built using the traditional principle of load-bearing posts under a ridge beam ('Firstsäule') were documented in the late 13th century and probably even later. Pit houses with an agricultural function and timbered cellars can be encountered there as well. In the same period, multi-compartment houses on foundation walls can be found in hilly Waldviertel (the deserted village of Hard; regrettably, peasant houses in the nearby older village of Klein Hard have not been investigated). The occurrence of two-compartment houses without a hall led Sabine Felgenhauer-Schmiedt to a theory that this type is earlier than the three-compartment house (Krenn 2012, 164–171; Felgenhauer-Schmiedt 2008, 74, 132–137).

The situation in the Czech lands seems to be very diverse as well. Leaving aside early medieval, mostly one-compartment predecessors of log or wattle construction, which undoubtedly still existed in the first half of the 13th century, it is evident that in some high medieval villages founded in previously unoccupied places, the first phase might have been represented by one-compartment buildings of a traditional pattern with separate storehouses or granaries, or by groupings of separate residential and farm buildings. A classic example is the deserted village of Bystřec founded around the middle of the 13th century; in it, an earlier building phase with dominant, albeit not exclusive post-built structure with a separation of residential and farm buildings has been proven for about half of the cases. Pit houses of a depth corresponding to urban cellars occurred sporadically. Even later, after constructions with a beam ring on a stone foundation wall or base asserted themselves, compact two- or three-compartment layouts seem to be rare; they represent later phases of houses or new buildings from the 14th century. Most farmsteads have functionally different rooms separated in the form of stand-alone buildings (Vařeka 2004, 245–247; Klápště 2005b, 267–270; Kos, Kala 2021); in several cases, however, traces of hall walls might have remained unrecognised (Kypta 2007). In other cases, especially in the deserted medieval settlement of Mstěnice, an absolute majority of archaeological contexts were interpreted as the replacement of an early medieval village by multi-compartment houses with a stone foundation or whole walls of some granaries. Even there, however, wooden buildings were proven in the front of the farmstead in two or three cases (Farmsteads I, II and III), one of a log (or frame) construction with ridge posts, one with post walls, later replaced by log ones (the third case is unclear); more rooms, already containing stone elements, were added later. In another case, a separately standing living room with foundation walls was additionally connected with a recessed stone granary through a hall (VIII). Many granaries stood separately; some even did not respect the orientation of a three-compartment house. Regrettably, a detailed assessment of the stratigraphic relationships in connection with the finds, which could clarify the transition between the Late Hillfort (ca 1200–1250) settlement and the high medieval village, is missing; the farmsteads of the latter were surely not all built within a single phase (Nekuda 1997, 9–73; for a discussion on this theme, see Smetánka 1994, especially 131–132; Klápště 2005b, 271–272; Vařeka 2004, 249–251). The existence of an advanced three-compartment house can already be considered in the rural milieu in the late 13th century, even though at least some of the following sites with layouts discernible thanks to stone foundations or bases would deserve a revision excavation (deserted medieval settlements of Svídna, Konůvky, Vilémov or Pfaffenschlag) (Smetánka 1994, 120–125; Klápště 2005b, 252, 270, 273–274; Šaurová 1973; 1977; Měchurová 1997, 17–27; Nekuda 1975; Vařeka 2004, 252). 'Archaic' features similar to Bystřec, albeit differing in detail, have been documented in some regions. In Tábor, south Bohemia, for instance, excavations proved two or one-compartment (?) farmsteads with a sunken living room; in the Plzeň region, fully developed three-compartment buildings can be found beside single-room ones, possibly with a loosely (not in the whole width of the wall) attached storage room (Vařeka 2004, 243–244, 254; 2008, 20–23; Krajíc 1987; Smetánka 1994, 123, 126). A compact angled layout does not occur as often as a row one; of examples of frequent use, we can name the aforementioned Vilémov or Konůvky; sporadically, it was encountered by archaeologists in Bystřec (Farmstead XIX with log and perhaps, in places, also earthen walls, partially on a stone base; Belcredi 2006, 237–264; summarily Vařeka 2004, 261). For the sake of completeness, we should mention the evidence of sill beam rings, of which the trenches remained. Regrettably, we only know fragments of the layouts so far (Vařeka 2004, 253). The orientation of the third-phase house from Otakarova Street in Uherské Hradiště has no analogy; however, the houses in Konůvky, for instance, were of an orientation parallel to the street line, with the living room and the hall in the front of the urban plot. The research has not contributed much to the dating of Konůvky houses so far; as in many other cases, the discovered layouts correspond to the situation at the time the village ceased to exist (Měchurová 1997, 17–27; Vařeka 2004, 248–249).

The origin of a multi-compartment house in the rural milieu of the Czech lands has not been satisfactorily clarified yet. The theories of its genesis are dominated by the process of interconnecting an originally separate living room and storage room/granary with the hall documented in individual cases; however, it did not take place in this manner everywhere within the same time interval. Besides seemingly 'advanced' house plans, long-surviving 'archaisms' in the form of loose multi-compartment layouts are encountered as well, especially in better documented cases. A clear trend was the standardisation of the functionally distinct buildings of a farmstead; it was heading, with various speeds, towards a regular layout whose main parts were already interconnected. It is certain, however, that this development took place, concurrently to a considerable extent, in a large part of Central Europe; it represents one of the typical manifestations of the transformation of the rural milieu that started in the west part of the region in the 12th century at the earliest. Although an influence of models from the relatively more advanced parts of what was then the Holy Roman Empire can also be admitted in the Czech lands, the process was so diversiform, both temporarily and spatially, that it could not have taken place without the deliberate inventiveness of the local inhabitants (summarily especially Smetánka 1994; Vařeka 2004, 256–267; Ježek et al. 2002). It is evident that urban and rural houses of the time of the great 13th-century transformation showed common features caused by the trend heading towards the emergence of a multi-compartment layout with functionally differentiated parts. Historians of architecture had noticed this before, especially for urban houses in the 'wide plot' resembling the scheme of an advanced rural farmstead. However, they only had houses from the 13th, 14th or 15th centuries at their disposal (especially Radová 1995 with further literature). The case from Uherské Hradiště goes further, to the very beginnings of the formation of multi-compartment houses that help clarify the beginnings of multi-compartment rural farmsteads as well. The specific conditions forced local builders to give up basement spaces after a brief episode and develop the house horizontally instead in the first century of its existence. It is unfortunate that further development from the described buildings of the town's first century to the few preserved late Gothic houses is unknown. Masonry buildings appear only sporadically in written sources; in 1390 and 1393, for instance, one of the members of the council was a certain *Ulo in lapidea domo* (Líbal 1967; Procházka, Sulitková 1984, 60–62).

5. Conclusion

The remnants of houses excavated in Uherské Hradiště represent testimony, unique not only in this country, of one of the variants of the formation of an urban house. It is remarkable that in the first building phase on the investigated urban plots, we encounter elementary stages of development with separate one-compartment buildings of various functions, or possibly with semi-recessed provisional houses or semi-basements of two-storey houses, as well as advanced multi-compartment layouts. This may be due to several factors, including the different origin of the settlers or an individual approach to the solution of the new situation (possible provisional houses in Uherské Hradiště indicating a link to the previous place of residence). It seems that the first inhabitants were already aware of the principle of the cellar as a lower storey of the house, but the hydrological conditions soon forced them to build surface houses. Unique evidence of secular stone buildings can be expected probably starting with the early 14th century; presumably, however, the town remained predominantly wooden throughout the Middle Ages.

The house building technologies and layout designs used reveal connections to the German lands (especially southern ones) as well as the effects of a domestic tradition. The considerable representation of post-built structures with sill beams indicates a certain conservativism in comparison with the contemporary urban milieu in Germany; its manifestations may also be indicated by some contexts excavated in Lower Austria. The presumption of a close connection between the development of urban and rural houses during the transformation period has been confirmed, centred on a large territory of especially Central and Eastern Europe in the 13th century. However, while the development of rural houses culminated with the emergence of a full-fledged three-compartment house with linearly arranged rooms emphasising agricultural functions, with more buildings gradually added around the courtyard, urban houses followed more complex and more differentiated paths of multi-storey buildings with regard to the needs of production and market as well as self-presentation.

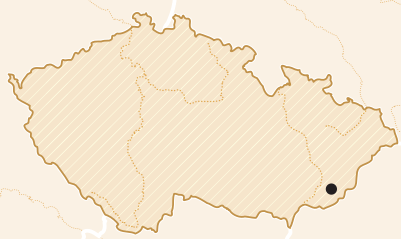
Acknowledgement

The chapter was published with institutional support RVO: 68081758 – Czech Academy of Sciences, Institute of Archaeology, Brno.

Chapter 16

Preserved by fire – Unique remains of high medieval wattle-and-daub architecture from Uherský Brod

Jaroslav Bartík – Jakub Šimík – Tomáš Chrástek



1. Introduction

Uherský Brod is one of the oldest royal towns in southeast Moravia. Its strategic location above a ford near the Moravian-Slovak border (Fig. 171) and highlighted by the White Carpathian Mountains predestined it as an important strongpoint in the medieval Moravian border, serving, among other things, to secure toll collection at the crossing of the River Olšava. The development of the town in the High Middle Ages was dramatic and accompanied by a number of military invasions, epidemics and fires (Kučera 1903; Růžička 1956; 1968; Tomeček 2002; Měřínský, Plaček 2008, 21), which are also heavily reflected in archaeological records. Rescue archaeological excavations at the site have a relatively long tradition dating back to the first half of the 20th century (comprehensively in Bartík et al. 2016b, 133). However, without detailed documentation of the archaeological contexts, the testimonial value of the data obtained from these older excavations is very limited in terms of understanding the development of burgher construction. This unfavourable state of affairs has improved only in the last decade (with the exception of the excavation in Soukenická Street in the 1980s; Procházka 1984a), when, thanks to the intensification of construction activity in the town's built-up area, it was possible to investigate several high medieval plots, including the remains of wattle-and-daub architecture (Bartík et al. 2016a; 2016b; 2016d; Bartík, Chrástek 2019; Bartíková, Bartík 2019; Chrástek et al. 2017; 2019; Šimík 2020a). It is the subsurface basements of these buildings that have primarily survived to the present day. The town of Uherský Brod is unique in terms of the extent and quantity of preserved basements of medieval houses, since many plots remained abandoned during the modern period, or only single-storey buildings were built on them, thus leaving earlier building phases without the destruction commonly found in other Moravian towns. It should be noted that unlike other sites, wattle-and-daub construction in Uherský Brod lasted for the entire High Middle Ages. Stone architecture did not become more prominent in Uherský Brod until the 15th and especially the 16th century (Kohoutek 1996, 383; Bartík et al. 2018, 187). More than two dozen partially (and several fully) preserved basements of medieval houses in various parts of the town (Komenského, Moravská, Hradišťská, Bří Lužů and Soukenická streets, Hradní Square, Masarykovo Square and Mariánské Square) are currently registered. Their comprehensive analysis, including a typology based on dimensions and structural elements, has not been carried out to date and is an important task for future research.

This chapter focuses on a presentation of the preliminary results from the excavation of two basements of medieval houses destroyed by fire. The first was investigated in 2018 in Hradišťská Street (Fig. 171: 1), the second a year later on Masarykovo Square (Fig. 171: 2). These basements are unique, especially due to the fact that when they were destroyed by fire, a significant part of the structure of the house collapsed into them and were never subsequently cleaned, thus leaving intact preserved archaeological contexts with the remains of their original inventories. In addition, the burnt-out ruins of both basements provided valuable insights into the structural design of the wattle-and-daub

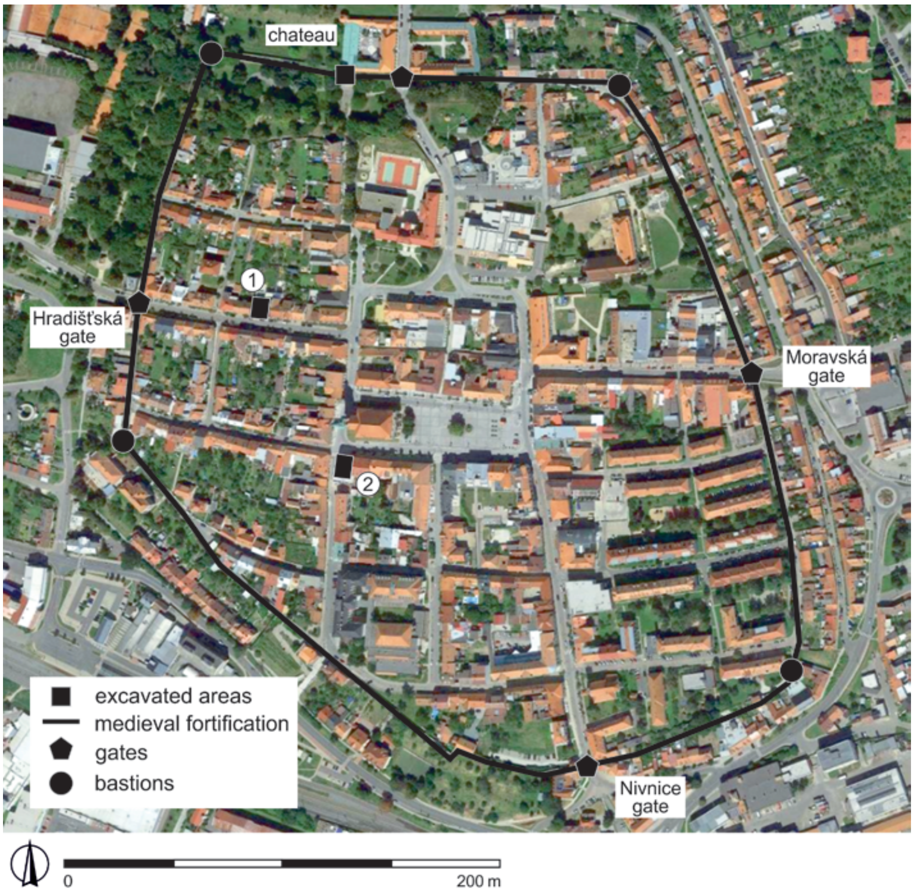


Fig. 171. Map of the town of Uherský Brod and the position of the two plots of land described in the text with the remains of wattle-and-daub buildings in the context of the layout of the medieval fortification. Sites: 1) 9 Hradišťská Street; 2) Masarykovo Square, plot No. 120. Source: Google Maps, graphics by J. Bartík.

houses, whether in the form of information about the location of the timbering elements, the location and design of the entrance staircase and the presence of heating devices. Further data were then obtained from impressions of structural elements in the burnt daub from preserved building fittings and other portable finds.

2. Location of town and its development in the High Middle Ages

Uherský Brod is situated on the southern hillside above the confluence of two rivers – the Olšava and the Nivnička and, from a historical-geographical perspective, is located at the eastern periphery of the Kingdom of Bohemia. From as early as the first half of the 13th century, mention is made of a suburban settlement at the site of Uherský Brod with market rights and a parish church (Procházka 2008, 217). It is not clear whether the region was affected by the Mongolian raid in 1241 or the Hungarian-Cuman raids in 1252–1254. In any case, unrest on the eastern border of the land could have initiated the founding of the town. The town was likely established in 1253–1272 at the will of Ottokar II (Zemek, Hosák 1972, 51–54; Kohoutek 2008, 189). The king's goal was probably to secure the eastern part of the country against invasions from Hungary, with another reason being the need for a permanent station overseeing trade between the two states. The town's location was grand in size. The new town built with a regular grid street plan and an enormous square was surrounded by stone walls forming an irregular pentagon 2,107 m in length.

The border town did not have an easy fate. A document from the 1270s issued here by King Stephen V of Hungary to negotiate peace terms with Ottokar II is probably evidence of the short-term seizure of the town by the Hungarian army. The town also suffered the hardships of war during the conflict between Ottokar II and Rudolf I, King of the Romans, which broke out three years later. The town likely also suffered after the Battle on the Marchfeld in 1278 (Zemek, Hosák 1972, 55). In the early 14th century, the town faced an increasing number of military conflicts, the most destructive of which was the Cuman raid in 1304 and the plundering of the Moravian borderlands by Máté Csák of Hungary around 1315 (Zemek, Hosák 1972, 56).

After several decades of relative peace, the town suffered during the Margrave Wars at the turn of the 15th century, and the situation in the region apparently remained bleak up to the beginning of the Hussite Wars, when both parties transited regularly through Uherský Brod. From that point on, the town was ruled by various members of the lower nobility. During the Bohemian-Hungarian War, the town was taken by Hungarian King Matthias Corvinus; after his death, ownership reverted to the aristocracy. Massive fires struck the town in 1489 and 1513, and in the intervening years it became a vassal town when Jan of Kunovice (Zemek 2004, 22, 220) acquired hereditary ownership in 1506.

As such, over the course of less than two centuries, Uherský Brod experienced numerous hardships that contributed significantly to its economic stagnation.

3. The basements of fire-ravaged houses with original furnishings

3.1 Hradišťská Street

A rescue archaeological excavation at 9 Hradišťská Street (plot No. 5876/1) was conducted in Uherský Brod in 2017–2018 in connection with the construction of a new family house (Fig. 171: 1). The unique archaeological context uncovered at the site documents the construction development of the urban plot throughout the High Middle Ages. The uniqueness of this context lies primarily in the fact that except for the area of the demolished brick cellar of recent age in the southeast part of the grounds, the original medieval terrain has been preserved without extensive damage from the early modern or modern period. In total, five subsurface basements of wattle-and-daub buildings were documented in the front (southern) part of the parcel, three of which were in superposition and two were destroyed by fire. The rear (northern) part of the plot, where the outbuildings were probably located, was not investigated, as it was not affected by the construction and, on the contrary, the ground was being raised. From a chronological perspective, it was possible to document the development of settlement on the investigated plot from the second half of the 13th century (i.e. after the founding of the town) until the final third of the 15th century. Only a single feature represented by an irregular oval waste pit containing 16th-century pottery could be attributed to early modern activity on the plot. A preliminary analysis of the horizontal stratigraphy shows that the development shifted over time from the centre of the plot towards the street line, i.e. from the north to the south, and the documented superposition shows that there was also a shift on the east-west axis, with the features located more to the west being later. It cannot be ruled out that from the point of view of the medieval parcellation of the time, the front parts of two plots, not just one, were partially investigated, which corresponds to the early modern parcellation of the town (cf. Kučera 1903). The individual basements differ from one another in their construction and each is essentially unique and distinct in terms of dimensions, orientation, location of the entrance staircase and the design of the internal structure. A certain chronological structure is apparent in the orientation of the entrance. While the earlier basements from the 13th to 14th century have their entrance staircase situated on the south or east side, the later basements from the 15th century (500, 501) have entrances facing north.

The most interesting archaeological structure on the investigated plot is Feature 502, the basement of an above-ground building with an access staircase for which the final horizon is preserved in the form of fire destruction. The preservation of this context has made it possible to capture the course of the extinction event and to preserve in the form of a kind of ‘time preservation’ the almost complete furnishings of the basement and also some of the above-ground parts of the building that collapsed into the basement. However, in terms of overall shape, not even this basement was preserved as a whole. Its smallest western part was destroyed during the construction of a new building and its basement (Feature 501). On the other hand, the superposition of these features is an important clue for solving the chronology of the local building development during the High Middle Ages.

Basement 502 was built as a pit originally of a rectangular shape with its longer side on the northwest-west – southeast-east axis, a width of 5.63 m and a length of 7 m (Fig. 172). The length is presumed on the basis of the superposition context from Feature 501, i.e. a larger part of Structure 502 was preserved in the floor part than in the upper part, which is apparent on a perpendicular plan after the area was cleaned. The preserved length of the basement on the north side is 4.95 m, on the south side only 3.19 m. These figures are valid only for the interior space of the basement, and if the entrance staircase (dimensions: 1.36 × 1.46 m) on the east side is also counted, the maximum preserved length would be 6.31 m. The depth of the pit was not uniform, as can be seen on the documented profiles. The deepest spot was in the north part of the basement, where the depth reached 1.22 m, and towards the south the depth gradually decreases to a minimum value of 1.08 m. This difference was evidently influenced, among other things, by the location of the feature on a gently sloping site. Other differences in levelling compared to the floor level were found on the northwest and south sides of the feature. Along the north and east walls of the basement, the ground was 30 cm higher and formed a raised step (Fig. 173). Regularly spaced post holes were sunk into it around the perimeter of the lower edge to carry the wooden lining of the walls. In the northern part, the width of the raised step was up to 25–35 cm. Roughly in the middle of its length, however, it was widened in an arc to 65 cm, and in this space there was another smaller post hole. On the east side, the raised step was significantly widened up to 1 m. In this expanded area, an *in situ* accumulation of five vessels with the remains of fillings inside and a larger iron knife were found (Fig. 174). Typologically, it consisted of one large and two smaller ovoid pots with a frilled rim and two larger jars with one strap handle and a spout on the opposite side. A raised step was also located along the south edge of the feature, but here it was not as regular and the transition to the floor horizon was rather gradual. The width of the upper surface without the slope was 20–40 cm, even with it from 45–70 cm.

Fig. 173. Uherský Brod, 9 Hradišťská Street. View of the basement of the wattle-and-daub building destroyed by fire with the remains of the original equipment (Feature 502). Photo by J. Bartík.

The entire feature had signs of having suffered a heavy fire (Fig. 173). Except for the south elevated level, the entire lower level of the basement was covered with a layer of charred wood. This permits an interpretation that the wooden ceiling, which also forms the floor horizon of the ground floor, collapsed into the basement during the fire. Remnants of the wooden lining of the walls (Fig. 173) and some of the posts (especially around the staircase; Fig. 175) are preserved in the form of compact charcoals in several places. On the basis of an anthracological analysis, it was possible to identify the tree species used. While the supporting columns and planks that lined the basement were made almost exclusively of oak, other woods – beech, fir, linden, elm and hornbeam – were used for the basement ceiling and other wood furnishings from it and the ground floor from which they fell. Among the burnt structural elements, several charred worked pieces of wood (willow, linden) were discovered on the basement floor, which could represent the remains of wooden tools or containers/crates used for storing supplies.

Fig. 172. Uherský Brod, 9 Hradišťská Street. Plan view and cross-section of Feature 502. Graphics by J. Bartík, T. Chrástek.

Fig. 174. Uherský Brod, 9 Hradišťská Street. View of the raised step in the NE part of the basement with a concentration of pottery vessels and an iron knife. Photo by J. Bartík.

Fig. 175. Uherský Brod, 9 Hradišťská Street. View of the east entrance to the basement with the staircase carved into the bedrock and the remains of a charred column. Photo by J. Bartík.

Important finds include the preserved remains of the original furnishings of the basement discovered on its floor (made of non-perishable materials, as well as objects made of wood, fabric and other organic materials). These are primarily four large storage vessels, all of which were turned upside down (Fig. 172, 173), indicating that they were probably empty at the time of the fire. Two of the vessels were preserved intact, the other two in fragments due to the disruption of later Feature 501 (Fig. 176). In terms of their spatial distribution, one vessel was located at the north edge of the pit, in a niche formed in the raised step described above, two lay close together in the middle of the basement and the last one was found at the southwest edge. A smaller jug with a handle and a precisely polished surface stood directly on the floor next to the fourth storage vessel. Also noteworthy are several iron construction fittings lying on the floor just a few centimetres apart in the centre of the feature after apparently falling here from the ground floor during the fire. A large number of samples for the wet sieving of sediment were collected from the entire area of the floor. Thanks to the application of this method, it was possible to obtain small burnt grains and other types of plant macroremains, which after their determination (the analysis has not yet been completed) will provide more information about stored food and subsistence habits. The internal structure of the basement is composed of 28 post holes (Fig. 172). These are concentrated around the perimeter of the feature, in two cases next to each other in the centre of the feature and also near the entrance staircase. Several post holes have signs of having been joined with other holes or repaired. On the south side of the basement, this may also be due to the older construction phase of the entrance staircase (Feature 503). The post holes had an average width of 22 cm and a depth of 18–30 cm. However, several significantly deeper holes were also found (maximal depth of 68 cm). Two more post holes, which probably formed the construction of the door, were documented near the east entrance to the basement (Fig. 172).

In terms of structure, it is also worth mentioning the method of construction of the internal lining of the basement. Particularly on the north side, a slight deflection can be clearly seen, where a pit a few centimetres larger was dug, a wooden structure was created and the remaining free space between it and the edge of the feature was then covered with stones

Fig. 176. Uherský Brod, 9 Hradišťská Street. View of the damaged ceramic storage vessels standing upside down on the bottom of the basement. Photo by J. Bartík.

Fig. 177. Uherský Brod, 9 Hradišťská Street. View of the fill of Feature 502 with a thick layer of daub, burnt wood and vessels that were part of the furnishings of the basement and which fell into it from the ground floor. Photo by J. Bartík.

and backfilled. A total of 13 contexts were macroscopically determined in the fill of Feature 502. The fill's stratigraphy can be divided into two parts. The lower part with a significantly higher content can be linked to the destruction of the above-ground part of the building, which collapsed into the basement, including the material located on the ground floor. With the exception of the aforementioned layer of burnt wood at the floor level, the lower part of the fill consisted mostly of a thick layer of daub rubble with recognisable pieces of burnt wood in places (the high magnetic susceptibility of the layer peaked due to burning between 1.19–8.25 × 10^{-3} SI units). The layer is not flat and instead appears to form an oblique cone from the east and southeast towards the northwest (Fig. 177). Another seven complete pottery forms that had fallen from the above-ground part of the building as the ceiling and walls collapsed were found at various heights in the described layer of daub rubble. Typologically, these were five bell-shaped lids, one large ovoid pot with a body decorated with grooves and a frilled rim decorated with a simple wavy line, and one small beaker with a wide neck and also furnished with a frilled rim. An iron key heavily damaged by heat was also found with them.

Also noteworthy is another rubble cone consisting of a distinct accumulation of burnt stones and a yellow-brown clayey deposit. This accumulation was located in the southeast part of the basement fill and extended from the surface almost to the bottom of the feature. In (or under) one of the documented profiles it was possible to identify one other smaller layer consisting of a light yellow-grey loose deposit with a large amount of small pebbles (sandy gravel). Most of the stones from this rubble are burnt or blackened, which need not necessarily have been caused only by the fire in the feature. Given the shape and size of the rubble cone, the interpretation that the structure of the heating device originally located on the ground floor of the defunct building collapsed into the basement fill cannot be ruled out. Similar archaeological contexts in which it is assumed that a heating device was installed in the basement come, for example, from Masarykovo Square in Uherský Brod (see below) and Mozartova Street in Brno (Holub et al. 2005a, 65, 86). The uppermost part of the fill of Feature 502 consisted of a series of fill layers (Fig. 177) covering the entire rubble and thus levelling the terrain for subsequent later development. On the basis of the documented stratigraphic situation and the recovered pottery vessels (Fig. 178), which were part of the internal furnishings of the investigated building, we date its existence between the end of the 13th to the first half of the 14th century, a dating also supported by the discovery of a small coin from the layers of debris that covered the rubble of the building after its demise.

3.2 Masarykovo Square

A rescue archaeological excavation was conducted in 2018–2019 on plot No. 120 in the southwest corner of Masarykovo Square (Fig. 171: 2). Six basements and one tunnelled cellar were uncovered over an area of 369 m². These subsurface spaces are related to the wattle-and-duab architecture that was built on the plot from the second half of the 13th to the 16th century. Also excavated were three above-ground heating devices associated with the high medieval development and, last but not least, two late medieval stone cellars, one of which was still in use in this millennium. Due to early modern landscaping and recent demolition activity, the medieval layers on the plot have not survived to permit a stratigraphic link between the period ground levels and the subsurface features.

Fig. 178. Uherský Brod, 9 Hradišťská Street. A set of ceramic vessels discovered on the floor and in the rubble cone of the fill of Feature 502. Photo by T. Heřmánek.

Three of the mentioned basements were destroyed by fire. The excavation of the features containing the ruins of burnt-out above-ground buildings brought a great deal of information regarding the form of burgher houses in Uherský Brod. The two burnt-out basements (07, 08) date from the second half of the 13th to the first half of the 14th century, i.e. from the beginning of the settlement of the investigated plot. These are characterised by their location within the plot. The third, Basement 01, which was also destroyed by fire, was located at the head of the plot and even extended into the area of today's square. This building was built after the destruction of both previous basements and its violent demise can be dated back to the 15th century. The same dating belongs to Basements 02 and 03, which were also located at the head of the plot. The whole extensive superposition is closed by Basement 04, which is the last evidence of wattle-and-daub architecture on the plot. Its fill contained material from the second half of the 15th century and first half of the 16th century.

Basement 08 contained an archaeological context that was unique for the plot. During the fire, the debris of the above-ground part of the house fell into the basement area, burying its entire inventory. The following text describes the discovery circumstances of this exceptional context.

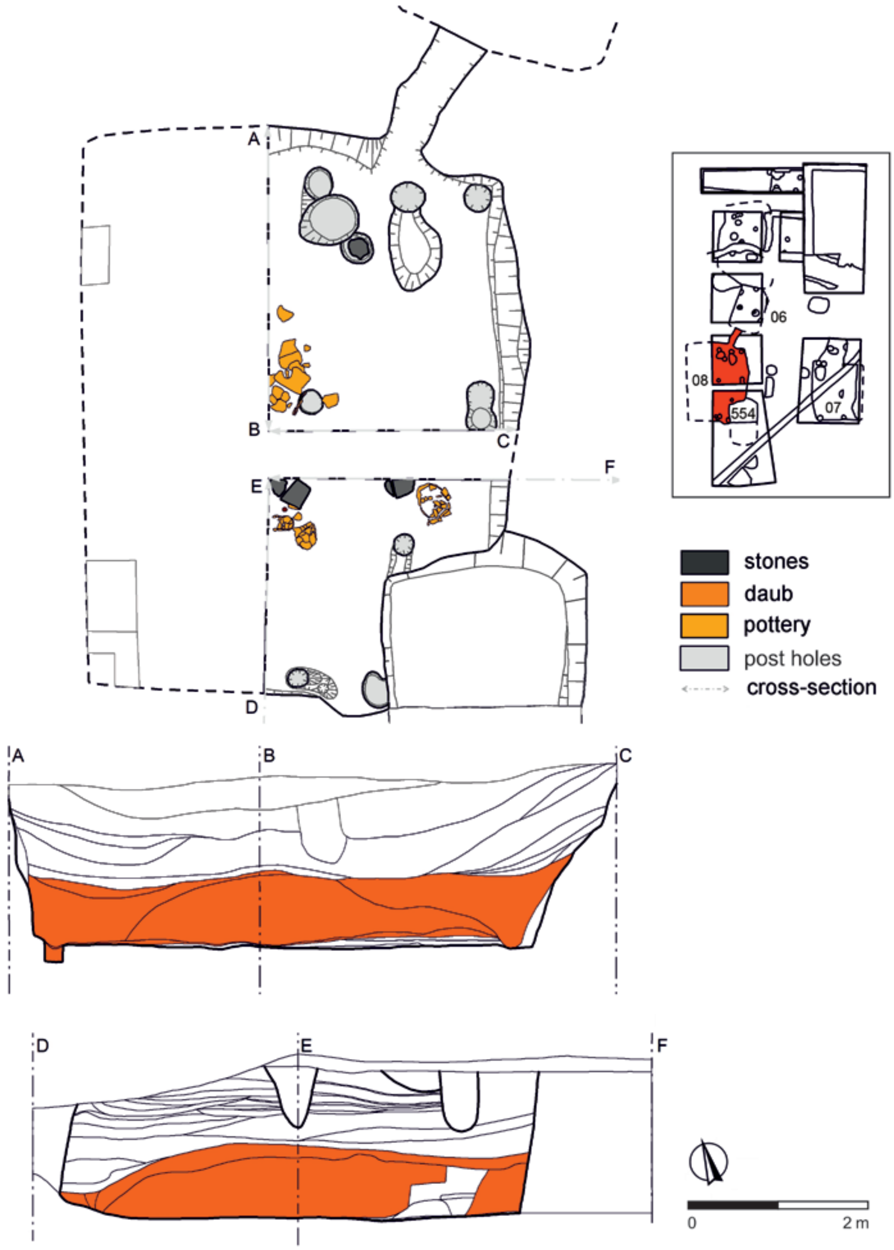


Fig. 179. Uherský Brod, Masarykovo Square. Plan and cross-section of Feature 08. Graphics by J. Šimík.

Fig. 180. Uherský Brod, Masarykovo Square. Vessels on the floor of the basement and a detail of two cup-shaped weights before and after cleaning. Photo by M. Přibylová, drawing by M. Maršíčková.

Fig. 181. Uherský Brod, Masarykovo Square. Fill of Basement 08. Above: fragments of storage vessels that fell into the basement from the above-ground levels of the building. Below: detail of charred mixture of cereals found on the basement floor. Photo by Archaia Brno.

Basement 08 was located in the southwest corner of plot No. 120, the western edge of which followed the course of Komenského Street at a right angle to Masarykovo Square. The feature could not be explored in its entirety as part of the rescue archaeological excavation. However, based on subsequent monitoring of the construction work, we can say that the basement was approximately 6.4 × 5 m, with the long axis oriented north-northeast – south-southwest. Although the excavation did not capture an entrance neck, it was most likely not located on the east side of the basement, i.e. the side facing the core of the plot. For Basement 07, which is identical in construction and dating, the entrance neck was captured in the northwest corner of the feature. Basement 08 could have had its entrance in the same place. However, the northwest corner could not be investigated in this feature. The entrance neck may also have been located in the southeast corner, but here the basement was disturbed by early modern Trench 554. The depth of the excavation varied from 1.5 m to 1.7 m from today's surface. A number of post holes were recorded at the base of the feature, indicating a columnar basement structure (Fig. 179). This type of construction predominates on the plot in a ratio of 4 : 2 compared to the frame construction that is represented in the two 15th-century basements.

A set of post holes accompany a shallow pit of an unknown function in the northeast corner of the feature. Basement 08 was connected by a hallway to Tunnelled cellar 06, which was located to the north of the basement. The two features were connected by a hallway 1.35 m long and 0.43–0.63 m wide. The hallway connects the northeast corner of the basement to the south side of the cellar. The 3.66 × 2.41 m basement was dug into the compact loess subsoil. The hallway between the features was intentionally filled. This conclusion was reached on the basis of the finding that the space above it was not penetrated by the above-ground levels as occurred in the basement space after the collapse of its ceiling. No floor layers or pottery material dating to the period of the feature's operation were captured from the bottom of the cellar, which was approximately 2.6 m below today's terrain. The northern part of Tunnelled cellar 06, accessible from Basement 08, contained two post holes. The posts were probably part of the reinforcement of the loess ceiling. The pottery found above the collapsed cellar ceiling comes primarily from the 14th and 15th century. Tunnelled cellars are a relatively common occurrence on plots with loess subsoil and they are often accessible through a hallway dug from the basement, as was the case here (Zůbek 2016, 353; 2018a).

While no artefacts from the period of the functioning of the feature were found in the space of Tunnelled cellar 06, the context in Basement 08 was very different. In the southern half of the investigated part of the feature, three ceramic pots and two bowl-shaped merchant weights of non-ferrous metal lay *in situ* on the floor (Fig. 180). A large amount of a charred mixture of wheat and rye combined with linden charcoals was also uncovered. We can assume that a container made of linden wood holding a mixture of cereals intended for the preparation of flour was stored on the basement floor (Fig. 181). This was the only basement on the plot that was not completely searched after its demise for the purpose of salvaging items that survived the fire.

The entire context was covered by a mass of daub that was created during the fire and subsequent collapse of the house into the bowels of the basement (Fig. 182, 183). This rubble also contained a concentration of fragments of storage vessels which likely collapsed into the basement along with the debris (Fig. 181, 182). It is puzzling why the occupants of the house would deliberately clutter the living space in the residential part of the building with large storage vessels while using the basement to store supplies in smaller containers. It is possible that there was simply no room in the storage area of the house for the storage vessels. The basement may have been

Fig. 182. Uherský Brod, Masarykovo Square. Documentation phase of the NE part of Basement 08. Above: part of the fill of the basement *in situ.* Below: Basement and post holes after excavation of fill. The entrance neck to Cellar 06 is visible on the north wall. Photo by Archaia Brno.

Fig. 183. Uherský Brod, Masarykovo Square. Southeast part of Basement 08. Above: detail of hypothetical heating device captured in the profile of the test pit. Below: artefacts buried by the house rubble on the floor of the basement. Photo by Archaia Brno.

filled with containers made of organic materials (e.g. cloth sacks, pouches or wooden vessels), which can be archaeologically identified only very sporadically. As such, pottery storage vessels had to be deposited outside of the basement. Ceramic pots on the basement floor could have served to store more perishable foods, which was why it was preferable to store them in the cooler basement. At the same time, foods needed for the daily operation of the household could be stored in the storage vessels, which makes their deposition in the living spaces understandable. It should be noted that only half of the basement was uncovered and the context in the other half could have been radically different. Any conclusions as to how foods were stored and distributed within Basement 08 and its associated above-ground house may therefore be somewhat misleading.

Based on an analysis of the daub impressions, it can be said that the above-ground part of the house had a predominantly timbered construction in combination with a supplemental mortise and tenon technique. The daub was only used to tuck the joints, not to coat the wooden structure. The use of timbered construction can be observed in all of the daub assemblages from the investigated plot. As such, there were probably no significant typological changes in the construction of the wattle-and-daub buildings at the site. The presence of large fragments, including the covering of structural elements with daub, demonstrates the use of another structural solution. Only impressions of worked elements are represented in these fragments. However, the exact type of construction could not be determined. Variants associated with frame construction can be considered.

A shingle roof could have been put on the wattle-and-daub construction of the house. The absence of fragments of burnt roofing (and building ceramics in general) in the fill is consistent with this, as is the small amount of heavily corroded nails that may have been used to fasten the wooden roofing. The assemblage of finds from Basement 08 also completely lacks any building fittings, perhaps the result of the poor conditions for their preservation or the preference for carpentry joints in the construction of the house.

As the building burned, a great deal of oxygen probably entered the debris, causing the more or less complete combustion of the wooden structural elements. Thus, only a very small amount of charred wood (oak, beech and fir) was found in the basement fill. An oak fragment provided a dendrodate indicating that the tree was felled after 1261. However, it is unclear whether the individual fragments come from the structure of the building or from the wooden inventory of the house.

A daub block, which included a distinctive burnt crust, also collapsed into the basement during the fire (Fig. 183). With a great deal of circumspection, this context could be interpreted as a relic of a heating device from the upper floor that fell into the basement during the fire. This is also suggested by the presence of stone in close proximity to the hypothetical heating device. A similar context was uncovered in Basement 01 in Mozartova Street in Brno (Holub et al. 2005a, 65, 86).

4. Conclusion

Despite the rich history of archaeological excavations in the built-up area of Uherský Brod, the development of local medieval town architecture remained an unexplored topic for many years. Although a comprehensive analysis of the remains of the wattle-and-daub buildings examined so far has not yet been completed, it is already possible to point to several interesting developmental structures. First, it is necessary to emphasise the uniqueness of Uherský Brod in terms of the number and preservation state of basements of wattle-and-daub buildings, which tend to be significantly less damaged by early modern or recent buildings than in the case of certain other towns with more dynamic development. Another special feature of Uherský Brod is the continuation of wattle-and-daub architecture throughout the entire High Middle Ages. Stone elements are encountered in the town only sporadically, mainly in the form of the constructions of heating devices typically located on the ground floor of houses. It was not until the 15th century that stone began to be used in the construction of wells, cellars and – later – houses. Preliminary structures that will need to be tested further in the future include a change in the position of the basement relative to the street line. Based on preliminary results, it appears that the earlier basements from the 13th to the first half of the 14th century are situated deeper into the plot (in the central part), while the later basements (mainly from the 15th century) are situated towards the front of the plot (towards the street line). In some cases then, the late medieval street line appears to have been moved further into the centre of the street compared to the current state, as some basements extend beyond the level of the current street line. A considerable number of basements of wattle-and-daub houses in Uherský

Brod show signs of destruction by fire. In a small number of cases, we also encounter archaeological contexts in which the burnt debris of houses that have collapsed into the basement have not been searched. This chapter is devoted to two examples of these unique contexts containing remnants of the original basement or ground floor furnishings from which they dropped into the basement. The first basement was explored in Hradišťská Street, in the west part of the town, the second in the centre on the southwest corner of Masarykovo Square. Both basements date back to the second half of the 13th to the beginning of the 14th century and share several identical features. Both contained a distinctive daub rubble cone, many pieces of which bore impressions of structural elements that aided an understanding of the types of construction employed. Another shared and not entirely common element is the presence of contexts interpreted as relics of heating devices that fell from the ground floor into the basement area during the fire. The evaluation of charcoals and charred structural remains of wooden structures and furnishings also provided valuable information. In addition, on the floors and in the fills of both basements it was possible to discover remnants of the original inventory in the form of metal artefacts and ceramic vessels of various sizes and shapes that were used to store food and other supplies. Despite the fact that both described basements of the wattle-and-daub houses were damaged by later construction, they provided a great deal of unique data that undoubtedly enrich the mosaic of knowledge of the development of medieval urban architecture in Moravia.

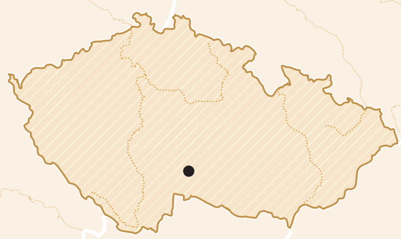
Acknowledgement

The chapter was published with institutional support RVO: 68081758 – Czech Academy of Sciences, Institute of Archaeology, Brno.

Chapter 17

Market settlement from the 13th century, view of the interior of the house: The case study of Počátky

Petr Duffek – Lenka Lisá – Marek Peška



1. Introduction

The town of Počátky is located on a circular hillock above the right bank of the Počátecký Stream in the area of the Bohemian-Moravian Highlands. It was founded almost directly on the Czech-Moravian border south of the town of Pelhřimov. We only have the first written reports from 1285 to 1290. In 1303, Počátky appeared in the possession of the lords of Švábenice, and in 1389 was already called a small town. At this time, the town also became the property of the lords of Hradec, where it remained until the family died out in 1604. There is an interesting report related to the year 1439, according to which Menhart of Hradec allowed the townspeople, as an appreciation for their fight against the Hussites, to build the town walls, which were supposed to replace the earlier fence enclosure. However, the stone fortification was finally built only after the mid-15th century (Razím 2020, 649–650). Only a few archaeological excavations testify to the fact that the character of the town was wood-and-clay until at least the end of the 15th century. The first brick burgher buildings are only reliably documented from the Renaissance period (Poche ed. et al. 1980, 103). The plan of the Stable Cadastre from 1829 indicates that the fortified town was probably created by splitting off from a larger urban complex, which is also supported by the results of the latest archaeological excavations (Fig. 184). This older settlement was characterised by a sickle-shaped, north-south oriented marketplace into which a block of houses was later inserted, within which a late Gothic wall was also situated.

In general, Počátky has always belonged to little-known regions, and extensive excavations in the historical core of the medieval town in 2010 and 2011 represented an exceptional opportunity to examine the archaeological contexts that can help clarify the development of medieval buildings and

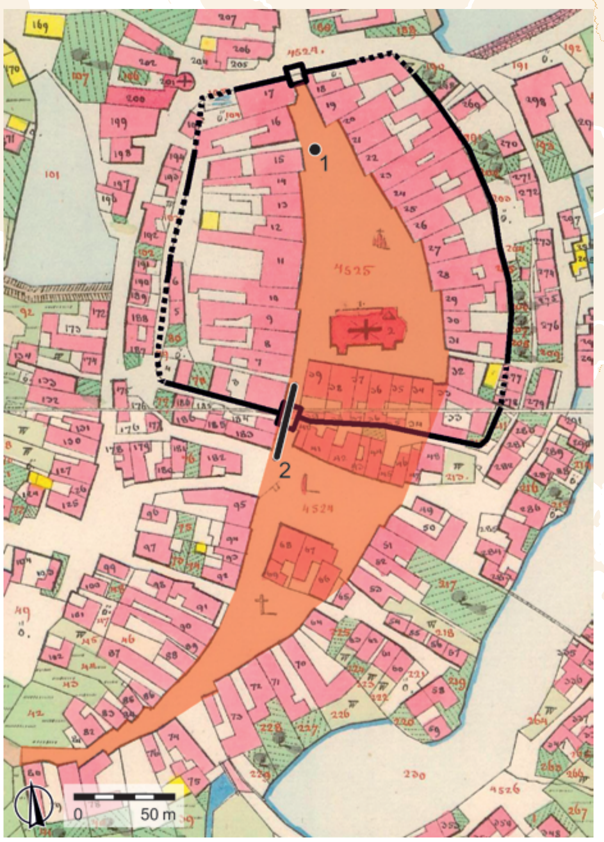


Fig. 184. The town of Počátky on the plan of the Stable Cadastre from 1829. The black line marks the perimeter of the town walls. The red line marks the former village square/market. © CUZK Počátky, modified by M. Peška.

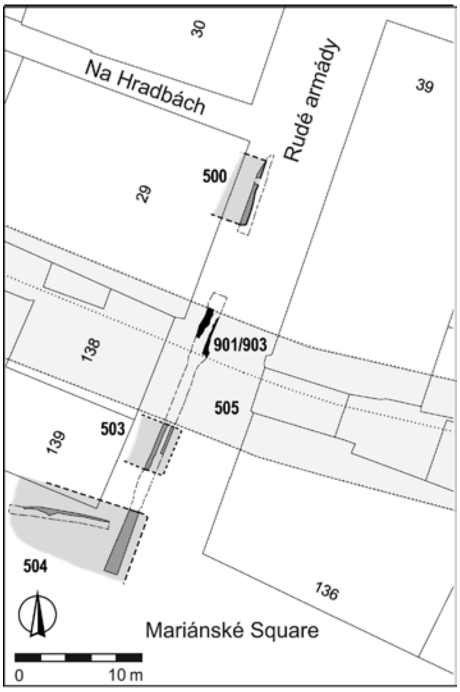


Fig. 185. Plan with the location of the archaeological contexts including the remains of the wood-and-clay basements (s. u. 500, 503, 504) and the town fortification (901/903) in Rudé armády Street. Author M. Peška.

older topographical situations. The last of the rescue archaeological excavations were carried out in 2018 in connection with the reconstruction of the engineering networks in Rudé armády, Školní and Pod Brankou streets. A group of the remains of several medieval wood-and-clay buildings destroyed by fire (s. u. 500, 503, 504) were also documented there, which is mentioned later in the text (Fig. 185). The research was a continuation of the general excavation of Palacký Square from 2010–2011 (Černoš 2012) and 2015 (Duffek et al. 2017) and the excavation of Mariánské Square from 2016 (Duffek et al. 2017).

2. Micromorphology in the archaeological context – The methodological approach

Samples intended for micromorphological analysis were cut out of the set of floor layers of wood-and-clay basements in the shape of elongated cubes. These cubes were wrapped in stretch food film, their orientation was marked and then the fixed samples were transported to the laboratory of the Institute of Geology of the Czech Academy of Sciences. Once

Sample	Microstructure	Mineral composition	Organic and organomineral particles	Pedofeatures
500 subfacie A	Complex, pores: cracks, compound packing; $C/F_{(50\,\mu m)}$ = 95 : 5; sandy loam	Angular Q, Ptg, large biotite crystals (Fig. 186a), partially corroded; matrix rare, yellow–orange, partly striatic	Rare fragments of partially decomposed OM (roots – Fig. 186b); rare black dotting	Illuvial bands, Fe impregnation along pores (Fig. 186c)
500 subfacie B	Platy; pores: horizontal plates; $C/F_{(50\,\mu m)}$ = 80 : 20; silty loam	Angular Q, Ptg, weathered biotite; grey orange matrix, horizontal oriented (Fig. 186d), stipple-speckled	Decomposed OM, black dotting, fragments of non-burnt wood, charcoal (Fig. 186e), bone fragments, non-articulated phytoliths	Depletion, accumulation of phosphatic accumulations, aggregates of excrements (Fig. 186f)
503 subfacie A	Complex; pores: single and compound packing voids; $C/F_{(50\,\mu m)}$ = 95 : 5; well-oriented sandy loam (Fig. 187a, b)	Angular and well-corroded Q, Ptg, small biotite crystals; beige with the signs of striation	Not preserved	Depletion
503 subfacie B	Platy; plates; $C/F_{(50\,\mu m)}$ = 70 : 30; silty loam	Angular Q, Ptg, weathered biotite; grey orange matrix, horizontal oriented, stipple-speckled	Charcoal and microcharcoal (Fig. 187c, d), bone fragments, decomposed OM, non-articulated phytoliths	Phosphatic accumulations and first stages of nodule growing
503 subfacie C	Granular; compound packing pores; $C/F_{(50\,\mu m)}$ = 95 : 5; sandy loam	Subangular Q, Ptg, weathered biotite, rock fragments soil aggregates (Fig. 187e); grey orange matrix with signs of striation but without orientation	Decomposed OM, rare charcoal, fragment of partly decomposed OM (Fig. 187f), locally phytoliths	Bioturbation, depletion

Tab. 7. Micromorphological description of the studied samples. Q – Quartz, Ptg – plagioclase, OM – organic matter.

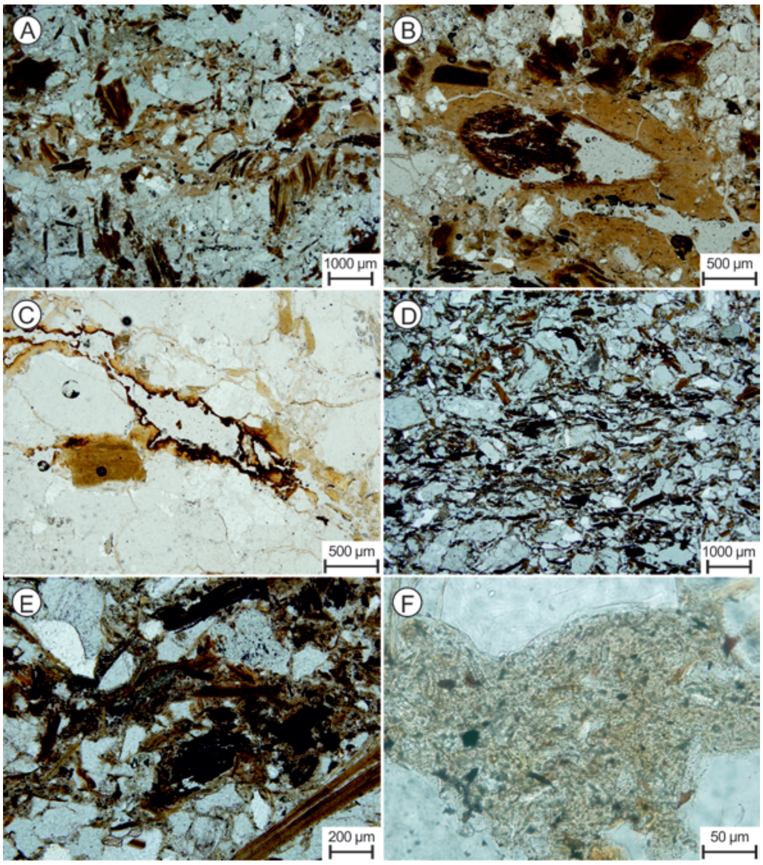


Fig. 186. A – The passive layer of Basement 500 contains an approximately 1 mm thin illuvial band composed of fine clay. The geological substrate is typical of large biotite crystals; B – partly decomposed organic matter represented by a root in the passive layer; C – Fe hypocoating along the pores after the root bioturbation inside the passive layer; D – horizontally oriented matrix, as well as biotite crystals, are typical for the active layer; E – the matrix of the active layer is typical of the presence of microcharcoal and charcoal; F – aggregates rich in non-articulated phytoliths are also part of the active layer. Such aggregates are commonly interpreted as herbivore excrement. All photos were taken in PPL (plane-polarised light). Author L. Lisá.

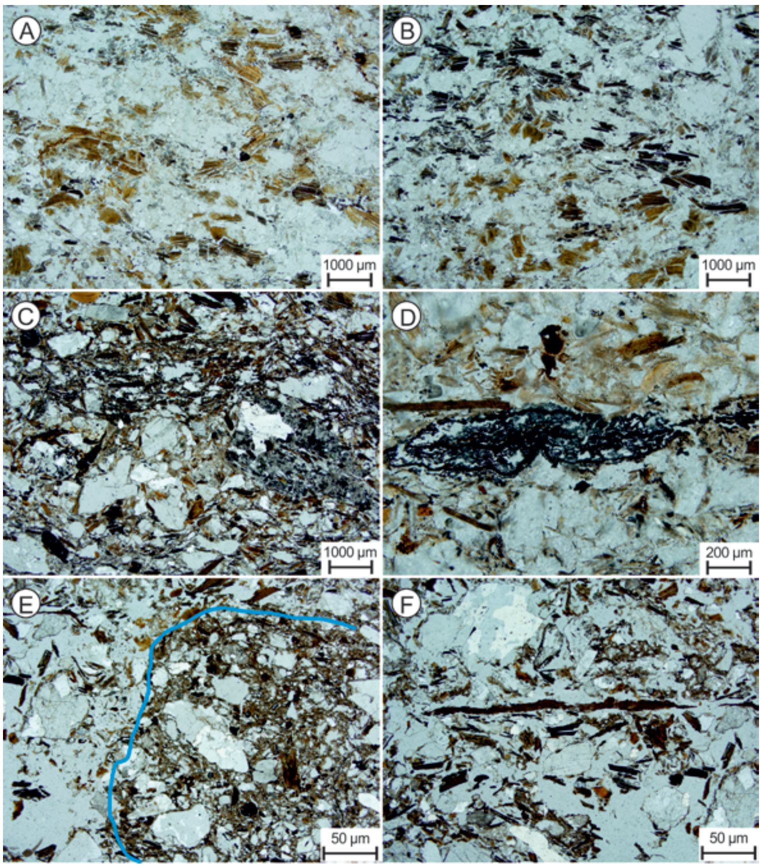


Fig. 187. A, B – The passive layer of Basement 503 is typical of its well-oriented and sorted mineral fraction; C – the active layer is also oriented, but the material contains anthropogenic features, for example, microcharcoal. Soil aggregates sometimes appear in well-oriented material; D – horizontal oriented charcoal fragment; E – soil aggregate as a part of the layer interpreted as a destruction/constructed passive layer; F – horizontal oriented non-burnt wood fragment. All photos were taken in PPL (plane-polarised light). Author L. Lisá.

there, they were partially unpacked and dried at a temperature of about 30˚C for several days. The samples prepared in this way were impregnated in a vacuum with Polylite resin. After hardening/curing (in the order of weeks), geological thin sections with a size of approximately 7 × 4 cm and a thickness of approximately 30 μm were made from the impregnated blocks. These were subsequently studied under a binocular and polarising microscope at a magnification of 4–400× and micromorphologically described according to Stoops (2003).

3. Results

3.1 Basement s. u. 500

On the western side of the excavations for the water pipe construction, a sedimentary section through the basement was documented. The basement belongs to the wood-and-clay house, is 5.6 m long and a depth of 0.7–1.0 m into the weathered gneiss bedrock was documented (Fig. 188, 189). The walls of the basement were vertical and straight, with a sharp transition to the bottom. Two post holes with a diameter of 0.26 and 0.4 m were uncovered at the bottom near the walls. The entrance neck was not captured in the documented part of the excavation.

Fig. 188. View from the south of the section of the wood-and-clay Basement s. u. 500. Photo by Archaia Brno.

At the bottom of the basement there was the easily recognisable Floor layer 115 with a thickness of 0.04–0.10 m. This consisted of loose sandy clay with charcoal fragments with a greater concentration on the surface. At the edges of the basement, fragments of charred wood (s. u. 400, 401) were preserved on Layer 115. The infill consisted of Layers 110–112, mainly sandy loam with numerous charcoals, with rare finds of ceramic fragments and four pieces of daub, two of which bore the imprints of wooden structures (a circular piece of wood and a flat element). Metal finds were represented by a belt buckle with rollers and a mandrel. The context also included remains of modern and recent road structures. Sample 1 was taken for micromorphological analysis from Floor layer 115 with an overlap into Backfill 110 and the subsoil. This sample clearly showed two facies, one represented by the geological substrate, or passive layer of the floor (subfacie A), and the second represented by the active layer (subfacie B). For more on the subject of passive and active floor layers (see Chapter 1). The micromorphological description of individual subfacies is contained in Table 7.

Subfacie A of Basement 500 represents weathered bedrock, formed by biotite migmatite. A 0.5–1.5 mm thick lamina consisting of a clayey matrix was detected (Fig. 186a) approximately 5 mm from the gap between the subsoil (Subfacie A) and the active layer (Subfacie B). Within this matrix there are clear microfragments of the oxidised matrix as well as the remains of partially decomposed organic matter (root system – Fig. 186b). This lamina was formed by illuviation, which is also evidenced by signs of illuviation in the rest of the layer although these are non-layered deposits, or their layering is very indistinct. The edges of the pores are highlighted by Fe hypocoating (Fig. 186c). The transition to the overburden is sharp. Subfacie B of Basement sample 500 represents the active floor layer. Its rectification is probably predisposed by sweeping (Fig. 186d). The presence of moisture or water during sweeping may have caused the redeposition of fine material towards the bedrock into Subfacie A, thus depleting Subfacie B of the finest clay component. However, the amount of water used could not have been great because the clay deposits in the subsoil do not show classic stratification. The presence of microcharcoals (Fig. 186e), very rarely rounded bone microfragments or a fragment of herbivore excrement (Fig. 186f) were deposited into these subfacies by a footprint, so it is not classic kitchen waste. It cannot be ruled out that animals also moved in the area although this is not the

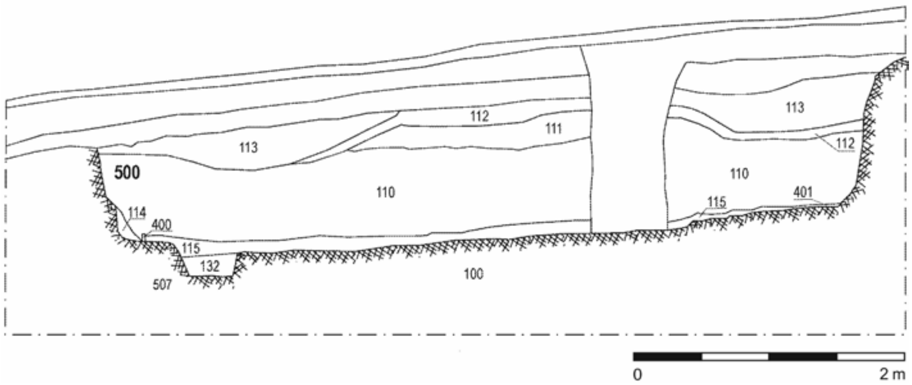


Fig. 189. A section of the former wood-and-clay Basement s. u. 500. Drawing by Archaia Brno.

place where they were housed. Overall, it is a walkable horizon, which has been kept clean for a long time by repeated maintenance.

3.2 Basement s. u. 503

This feature extended into both walls of the excavation for the water pipe construction and reached a length of 5.9 m on the western profile (Fig. 190–192). The deepening into the geological substrate reached a depth of 0.8 m. The walls of the excavation there was perpendicular and straight, with a sharp transition to the bottom. At the bottom of the basement was a grey layer of sandy clay (Layer 129) with a thickness of 0.40–0.14 m. On top of this, a layer of dark grey clay loam (Layer 131) with a thickness of 0.01–0.02 m with numerous tiny charcoal fragments was deposited. The layer consisted of a sequence of several floor levels. Above there were red-grey sandy layers (Layers 128, 130) with charcoal and fragments of charred wood 403–405. It was not possible to date the wooden structures using dendrochronological analysis; the wood species was only determined for Structure 403 lying horizontally at the interface of Layers 130 and 128. Layer 128 can be interpreted as burnt wooden structures of the basement or the above-ground parts of the house mixed with sandy clay; some surfaces bear traces of long-term exposure to high temperatures. The western profile above was breached by a recent excavation for a storm drain, the remaining infill of the eastern profile of the basement consisted of Layers 124–127, mainly loamy sands with numerous coals, smaller stones and random finds of ceramic fragments. Sample 2 was taken for micromorphological analysis from Floor layer 131 with an overlap into Backfill 130, Layer 129 and subsoil.

Fig. 190. View from the north-east of the section of the former wood-and-clay Basement s. u. 503. Photo by Archaia Brno.

The sample clearly showed three facies, one represented by the geological substrate, or passive layer of the floor (Subfacie A), the second represented by the active layer (Subfacie B) and the third probably represented by backfill (Subfacie C). The micromorphological description of the individual subfacies can be found in Table 1. In the case of the geological substrate at Basement 503, it is a weathered sorted subsoil, probably displaced by surface washes down the slope (Fig. 191a, b). Granular sorting occurred during redeposition. Flushing may have been inhibited by deforestation prior to development. The transition to the overburden is sharp. The active floor layer, which is relatively thin and undulating, sits with a sharp boundary on the geological substrate. Internal straightening of clasts (mainly biotite and microcharcoal – Fig. 191c, d) is visible, but in this case, it was not necessarily created by sweeping because there are quite a lot of fine-grained fractions that would have been removed by the sweeping. Another reason for this argument is that the underlying Subfacie A lacks clay-like deposits that would have necessarily been created by the modification of the active layer. Subfacie C at Basement 503 probably represents backfill or could have served as an additional passive layer for the new floor level. It does

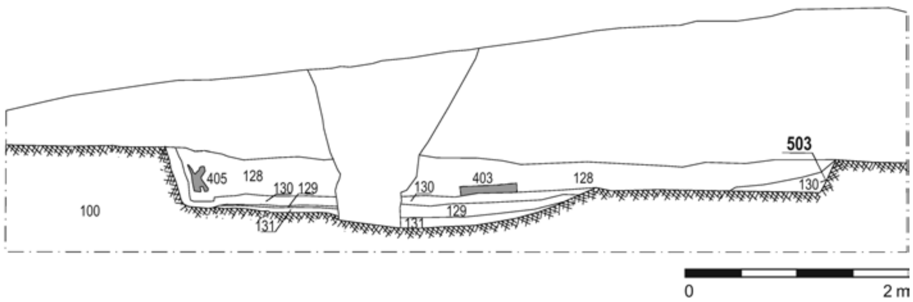


Fig. 191. A section of the former wood-and-clay Basement s. u. 503. Drawing by Archaia Brno.

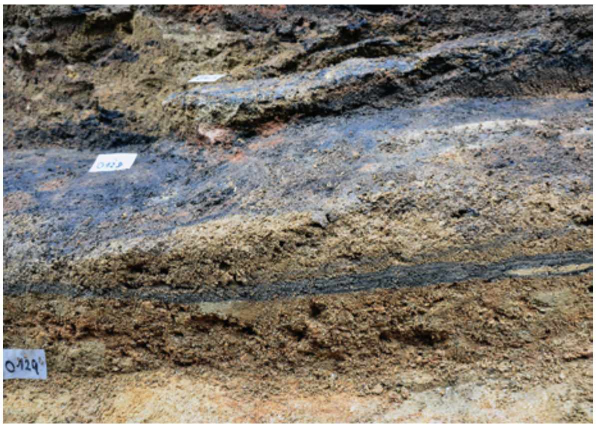


Fig. 192. View of the floor laminated set and the backfill of Basement s. u. 503. Photo by Archaia Brno.

not show any signs of modification and its internal structure is fundamentally different from the underlying active floor layer represented by Subfacie B. This layer is made up of relatively unsorted material and also contains rock fragments and soil matrix lumps (Fig. 191e). However, it also contains the remains of decomposed or partially decomposed organic matter (Fig. 191f).

3.3 Basement s. u. 504

The basement of the wood-and-clay house located at the intersection of Rudé armády and Školní streets was captured at the intersection of the excavations for engineering works and was extensively destroyed by them. In the north-south direction, the length reached 5.7 m and it was buried approximately 0.6 m into the geological substrate. In the east-west direction, its length was more than 5 m, but none of its walls was captured. A 0.06–0.10 m thick sandy clay layer (Layer 137) with numerous charcoal fragments was found above the bottom. Several floor levels could be discerned in the layer. A lying wooden flat board (Structure 402) with dimensions of 0.8 × 0.2 m was cleaned in the area; the wood species was determined to be fir without dating. The structure can be interpreted as a burnt floor or a fallen wall or ceiling of the basement of a wood-and-clay house. Above Floor level 137 there were several larger storage vessels. The filling consisted of the layers (135, 136), which were mainly sandy loam with numerous coals and rare finds of ceramic fragments and slag. Layer 136 contained larger fragments of charcoal and charred wood and was similar in character to Layer 128 in Basement 503. The sample from the floor level for micromorphology was not collected due to the poor preservation of the infills.

4. Discussion and conclusion

All three documented basements were probably destroyed by fire in the same period. The ceramic material from the backfill corresponds in its character to the previously processed and published medieval ceramics from the town and we date it to the second half of the 13th and the beginning of the 14th centuries (Těsnohlídek et al. 2017, 673–675; Těsnohlídková et al. 2018, 119–128). The last, previously published basement of a clay house was found near the northern edge of Palacký Square. This was a square building with dimensions of 5.2 × 3.6 m and a depth of 0.5 to 1.1 m into the bedrock (Fig. 193, 194). Its south-eastern corner extended up to 9.5 m into the public space in front of House No. 6. A foundation groove with the remains of a beam crown was carved around the perimeter of the flat bottom. A thin floor tread was also preserved throughout the area. Archaeobotanical analysis of the extinction layers brought findings about advanced deforestation around the town of Počátky in the High Middle Ages. Ceramics from the final horizon are widely dated to the second half of the 13th century to the beginning of the 14th century, i.e. the extinction period of the basements. The creation of the buildings cannot be dated, but it can only be assumed that it also dates back to the

Fig. 193. View of the cleaned-up floor with the perimeter gutter of the former Basement s. u. 518 in Palacký Square. Photo by Archaia Brno.

second half of the 13th century (Těsnohlídek et al. 2017, 670–675; Těsnohlídková et al. 2018, 117–118).

The modest ensemble of three basements has a number of common characteristics. These are slight recesses, a square plan with side dimensions of around 5 to 6 m, straight walls and traces of a frame structure. The floors of these basements differ in several ways. In the case of Basement 500, the passive non-structural layer consists of weathered migmatites, while in the case of Basement 503, it is most likely flat washes of weathered eluvia. In the case of Basement 500, the active floor layer itself was mainly created by the repeated footing of ordinary outdoor waste (excrement, bones, phytoliths from decomposed organic matter or excrement). The minimal aggradation of the kitchen waste correlates with the archaeological interpretation that it was probably primarily a storage area. However, the matrix rectification indicates a repeated sweep. The presence of clay deposits in the subsoil of Basement 500 can be used as an argument for the use of water and subsequent sweeping. A very similar situation can be documented in Basement 503. Again, there is basically no kitchen waste there, the tread layer contains oriented clasts, the orientation of which can be attributed to sweeping. However, this is without the presence of water, which would wash fine particles into the subsoil (Lisá et al. 2019). In both cases, these were the areas that were kept clean.

Of particular importance is the final horizon in the second half of the 13th century to the beginning of the 14th century and the location of the buildings in the public space. In one case, one of the basements (503) collides with the late Gothic (?) fortification. The absence of fireplaces probably points to the storage function of the building, which was usually tied to the urban environment. Therefore, it is likely that Počátky was already considered as a small town (market settlement?), which, after an unknown fire that occurred sometime from the second half of the 13th century to the beginning of the 14th century, somewhat changed its layout and expanded its public space. We still have no archaeological evidence of later buildings on the sites of the plots and can only guess that sometime during the 15th century the ground plan was reduced to include only a fortified hill that divided the former large village square/market. In the case of Počátky, it is one of the few sets of wood-and-clay constructions from the area of the Bohemian-Moravian Highlands, except for Jihlava, with which they are typologically related. In the future, it will be interesting to observe other cities in the vicinity to help us to shed further light on the form of the oldest urban development in this region.

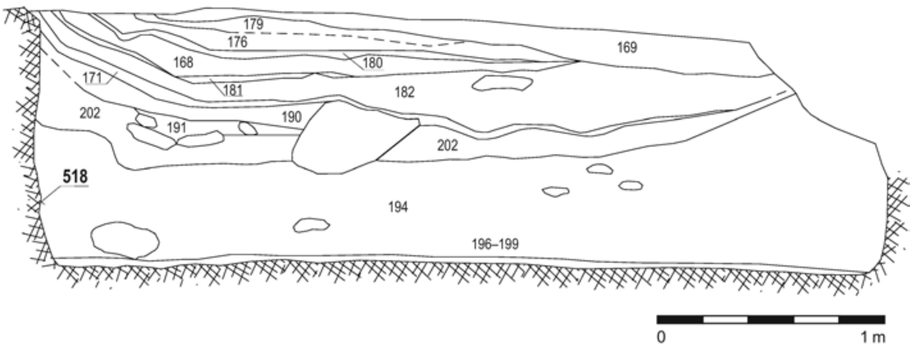
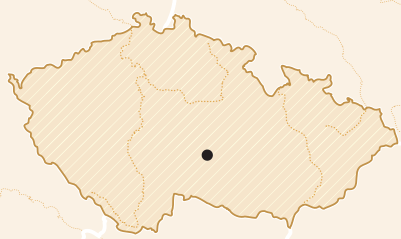


Fig. 194. A section of former Basement 518 in Palacký Square. Drawing by Archaia Brno.

Chapter 18

The formation processes of the fills of wood-and-clay buildings in the mining settlement of Jihlava – Staré Hory

Jakub Těsnohlídek – Lenka Lisá



1. Introduction

Approximately 2 km northwest of what is now the centre of Jihlava is the medieval mining agglomeration of Staré Hory (Old Mountains). Before the discovery of ore deposits near Kutná Hora, Staré Hory was a key source of precious metal in the Kingdom of Bohemia during the reign of the last Přemyslids. The initial phase of silver mining falls in the late 1230s and is thus connected with the founding of the city of Jihlava. The heyday of the centre occurred during the reign of Otokar II (1253–1278) (Hrubý 2011, 37–41). Archaeological research was carried out there in connection with construction development almost continuously from 2002 to 2016 (Fig. 195). In 2018, the Jihlava department of Archaia Brno carried out a rescue archaeological excavation on one of the last undeveloped parcels of land in Staré Hory, triggered by the construction of a kindergarten. A number of features from the 13th century were discovered on a 30 × 30 m area located on the border of the mining and settlement area. The site contained mining and test shafts, production buildings and, above all, four recessed residential buildings (Fig. 196; Těsnohlídek et al. 2019). Micromorphological samples were taken from the floor levels, aiming at verifying how the structures were used, what comprised the construction of the floors and whether this method could contribute to the knowledge of the daily life of residential buildings in Staré Hory. The issue of residential buildings at mining sites, including Staré Hory, has recently been comprehensively evaluated in several studies (Hrubý 2011, 148–183, 242–245; Crkal et al. 2019). Therefore, the following text focuses on the description of the context of the uncovered features from 2018 and the evaluation of micromorphological samples.

2. Methodological approach

Samples for micromorphological analysis were taken from the fills of four features, from the horizons that represented the basal parts so that the assumed walking layer and the sediment above and below it were included in the sample area. The samples were cut from the documented profiles in the form of cubes with a thickness and width of approximately 7 cm, while the length of these cubes varied according to the specific situation. The samples were secured in milk or juice cartons and stretched using cling film. Their orientation was marked and they were then transported to the laboratory of the Geological Institute of the Czech Academy of Sciences in Prague. After partial unpacking, the samples were dried and vacuum-impregnated with Polylite resin. After hardening, approximately 2 cm thick slices were cut from them, which were transformed into geological thin sections with a size of 5 × 7 cm so that the area of the cuttings fully covered the surface of the samples. The resulting thin sections were studied under binoculars and then a polarising microscope and were described according to the methodology of Stoops (2003).

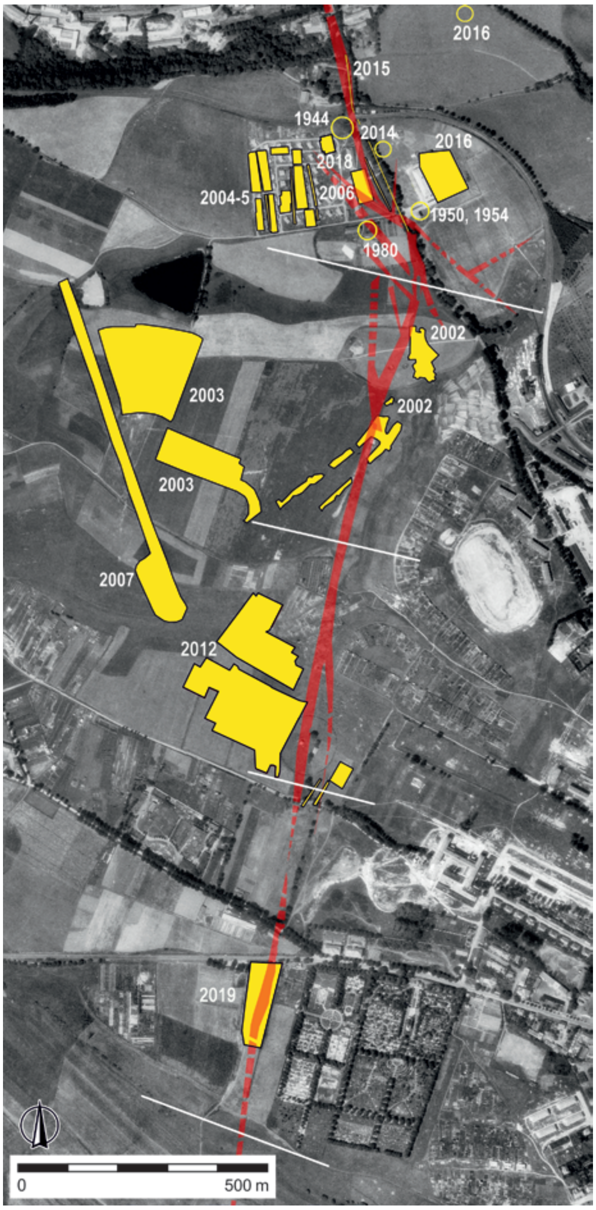


Fig. 195. Jihlava – Staré Hory. General plan with markings of the course of ore formation (red) and 2002–2016 excavation areas (yellow). Kindergarten Na Dolech is marked 2018. Author P. Hrubý, editing by Š. Kochan.

3. Results

3.1 Residential buildings in the context of the Jihlava – Staré Hory site

From 2002–2015, three dozen remains of recessed residential buildings were documented at the site during various construction events (Fig. 197a, b). These were square or slightly rectangular pits with a flat bottom, vertical walls and often with an entrance, stepped neck and traces of an internal stone or wooden structure. Massive occurrences of daub, or possibly a significant and powerful fire layer, in the fills of four buildings, indicate the existence of above-ground parts that fell victim to fire. In general, in the context of the investigated sites and other mining settlements, they are considered to be the remains of buildings used for accommodation, with possible use for processing ores, raw materials and the associated production processes (smithing). The floor level mostly consisted of a thin layer rich in charcoal and ash, and in some cases, charred woody material was preserved. The current state made it impossible to recognise whether the floors were bare or constructed of wooden elements. In exceptional cases, we found burnt areas on the floor, possibly the remains of fireplaces. Opinions on the specific form of the houses differ (Hrubý 2011, 56–57; Crkal et al. 2019, 896–900). However, according to the latest findings, these features cannot simply be considered temporary, as was the case in the past, when they were simply considered earthworks. That is a partially recessed living space, which was a specific form of a miner's house (Vařeka 2002, 274; Klápště 2005a, 3). However, according to the latest research and syntheses, there is no further evidence for the interpretation of recessed buildings as residential undergrounds than for urban milieu. On the contrary, a number of indications also point to the existence of basement houses in mining centres (Crkal et al. 2019, 896–897, 917–918). From this point of view, it is also necessary to view the presented discovery contexts.

3.2 Description of the excavated contexts

The most representative discovery of the reported rescue excavations from 2018 is the recessed wood-and-clay structures 7556, 8512 and 7565, recessed 1.5–1.8 m below the ground level with a flat bottom and traces of a post-built structure in the corners, possibly also in the middle of the longer walls. The recessed Feature 8524, which was structurally different from the previous ones, was also included in the evaluation. Since its basal part showed layered clay sediments, it was macroscopically interpreted as a floor horizon belonging to a residential building.

3.2.1 Basement 7556

Basement 7556 represents a typical example of a recessed wood-and-clay basement, probably belonging to an above-ground house. It was the only basement where we could study its entire dimensions. With dimensions of 3.6 × 3.8 m and a preserved depth of 1.4 m, it was equipped with an entrance neck from the east side with five steps, perpendicular walls

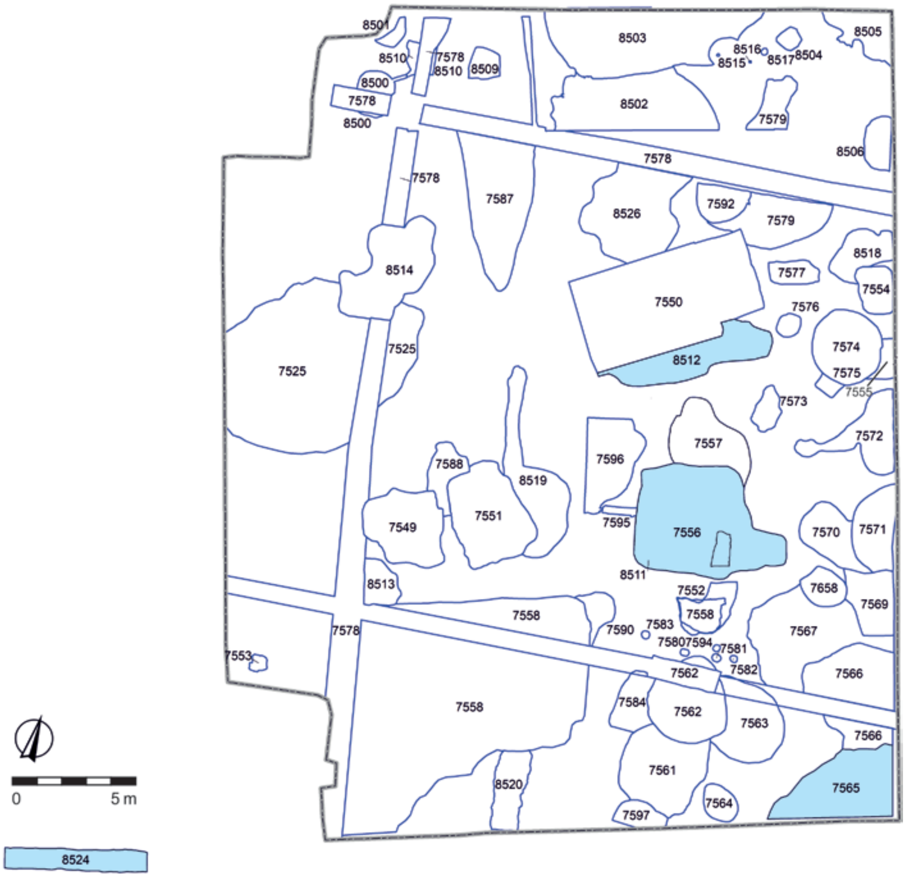


Fig. 196. Jihlava – Staré Hory. Excavation area in 2018 with the marked location of Basements 7556, 7565, 8512 and Feature 8524. Digitised by M. Košťálová.

and a smooth flat bottom, which was not disturbed even by the superposition with the older (trial?) shaft (7557). The basement was recessed into the geological substrate, and in the corners were post holes with a diameter of 10–20 cm, while the northwest pit was lined with stone. Under the last step on the floor of the building was an artificially created threshold made of clay-sandy loam and several stones (Fig. 198, 199). The basement floor, including the stone threshold, was covered by a 1–3 cm thick floor layer (8107), consisting of a dark brown-grey stiff clay-like substance with an admixture of isolated small fragments of ceramics and bones. In some places (mainly in the southwest corner), three burnt areas of Context 8140 were noticeable. From the point of view of the find spectrum, I would consider Basement 7556 to be quite poor. The only artefact on the floor was part of a pot lying on a step of the stairs. Most of the finds were obtained only from backfill layers and we date them to the second half of the 13th or the beginning of the 14th centuries. Due to the absence of decayed or charred wood and findings of material culture, we assume that Basement 7556 was deliberately dismantled and backfilled.

Given that this basement could be uncovered in its entirety and that it was not disturbed by later construction interventions, there was an opportunity to use micromorphological analysis as a tool to compare different types of floor horizons within one building. As mentioned above, one sample was taken directly from the active trampled layer, in the place of the burnt area. The second sample was taken on the staircase and the other two in the landing area at the end of the stairs. The floor itself, i.e. the passive preparatory and subsequently active trampled layer, has a relatively complicated origin (Fig. 200a, b). The presence of a sandy geological substrate is typical for this basement. The medium to coarse-grained sand relatively sorted in this way is burnt to a depth of approximately 2 cm (Fig. 200c), but no longer in the lower parts of the passive layer of the floor (Fig. 200d). However, there are distinct post-depositional illuviations of the clay fraction. Unravelling the composition of the active step on the floor is difficult because this part of the floor was largely burnt. In the picture (Fig. 200b), it is clear that the active part of the floor set was primarily made up of organic matter and microcharcoal, while organic residues which are

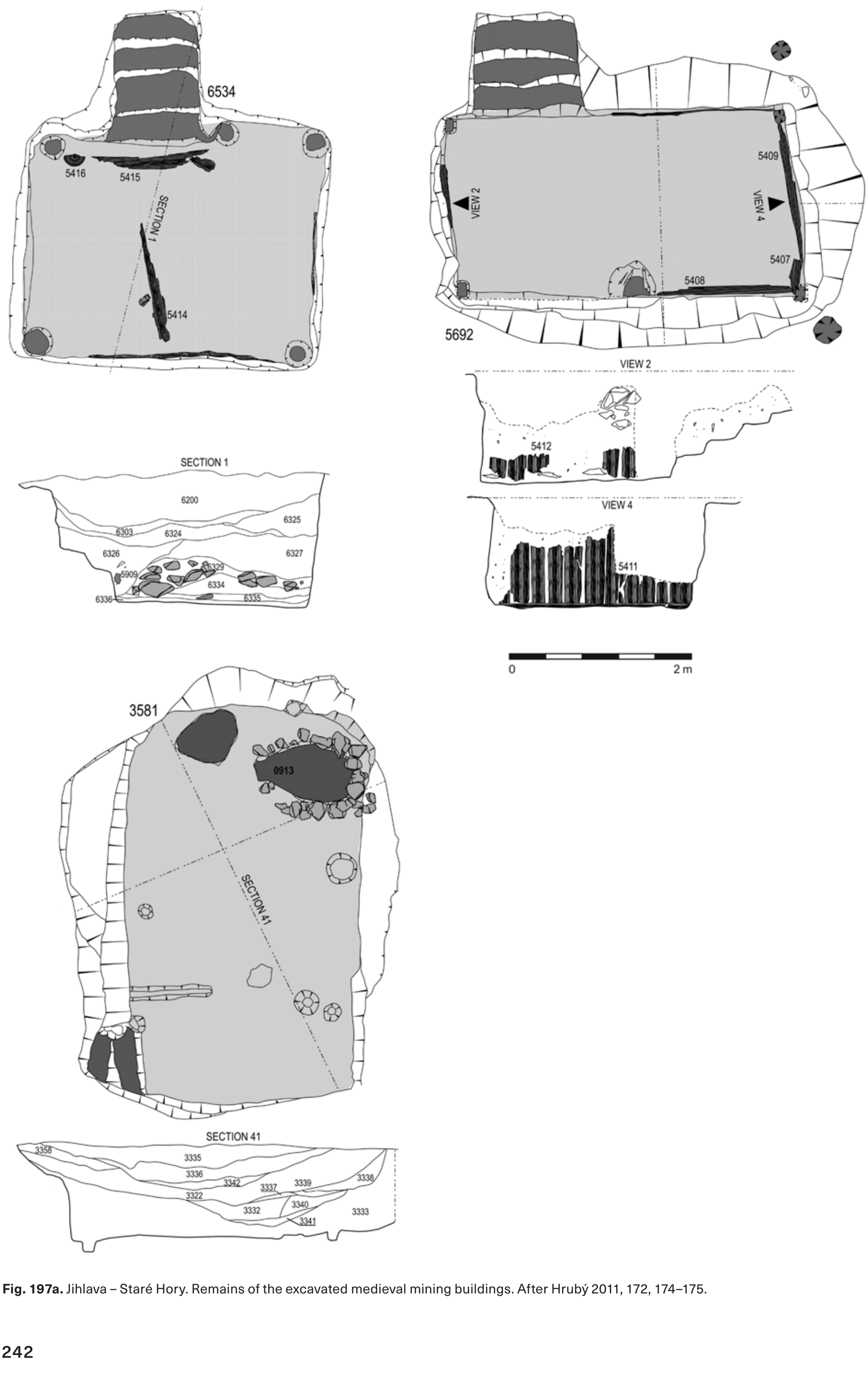


Fig. 197a. Jihlava – Staré Hory. Remains of the excavated medieval mining buildings. After Hrubý 2011, 172, 174–175.

usually referred to as kitchen waste (bones, ceramic fragments, shells) or excrement were not indicated. Within the trampled active layer, a sequence of formation processes can be indicated, which as a whole, subsequently create a macroscopic appearance in the terrain. This part of the floor was primarily created on a sandy substrate (passive layer) on which ordinary organic waste was trampled. The active layer of the floor was probably not maintained in any significant manner and only swept as much as possible to prevent the accumulation of organic waste. After this part of the basement was burnt through, the organic part of the trampled layer was largely charred (Fig. 200a, yellow arrow, Fig. 200b). Due to changes in pH and humidity, iron impregnations started to form (Fig. 200a, green arrow). Only later, when additional sediments were deposited on this active layer (probably a type of destruction), the basement fill began to be washed away by rainwater. Due to the favourable pH, active displacement of the clay fraction began to occur. This

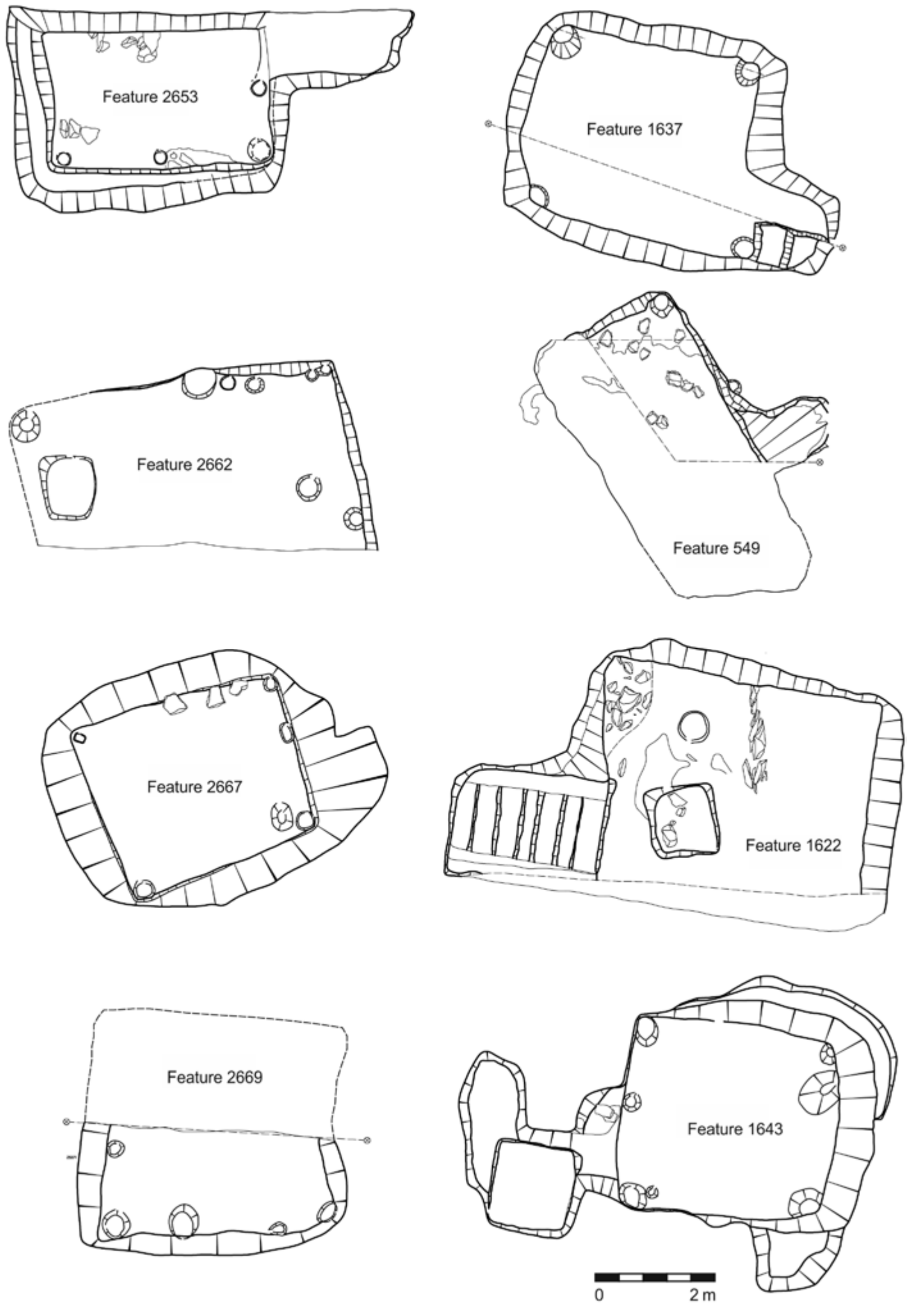


Fig. 197b. Jihlava – Staré Hory. Remains of the excavated medieval mining buildings. After Hejhal, Hrubý 2005, 138–140, Fig. 7–11.

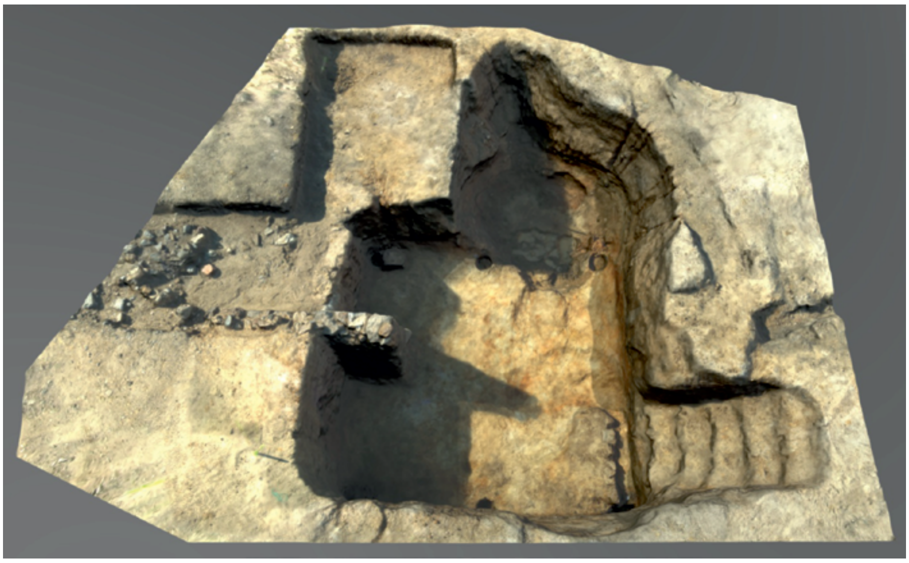


Fig. 198. Jihlava – Staré Hory. Digital model of Basement 7556. Author M. Košťál.

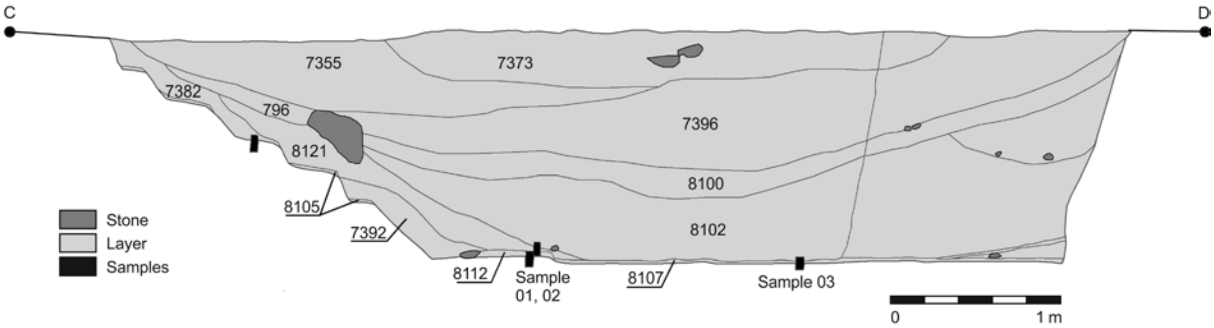


Fig. 199. Jihlava – Staré Hory. Section of the fill in Basement 7556. Author J. Košťálová.

was primarily concentrated on the charred parts of the active layer (Fig. 200b, blue arrow), and below it penetrated between the inhomogeneities (cracks) of the preparatory floor layer. In the next phase of the development of the layer, to which we refer today as the active floor horizon, or the trampled layer, the sedimentary record above the floor was further washed away. This time, it was not the clay-like material that moved in the profile, but the dust, which was concentrated in the pore fills (Fig. 200a, red arrow).

Since the sample taken in the area of the active basement trampled layer was largely destroyed by fire, it is difficult to predict how the active floor layer looked in the first place. However, we have the possibility to monitor the composition of the active trample in the area of the entrance to the building, i.e. from the sample on the staircase plus two samples in the area under the stairs (Fig. 201). On the staircase, a relatively strong trample would be macroscopically indicated. This is formed by a layer of microcharcoal mixed with a clayey matrix (Fig. 201a). Layers that are richer or poorer in microcharcoal repeatedly alternate in the footprint, which creates a macroscopically detected layering of the footprint. The essential point about the footing is the signs of repeated loading of the surface, which are reflected in the penetration of horizontal pores in the foundation of the trample and the trample itself (Fig. 201a, b). While the trample on the staircase is very well preserved and was created by repeated aggradation of material brought on the soles of shoes, the footing under the stairs is relatively poor in material from the active trampled layer. Only a thin layer was detected there (Fig. 201c), which consists of an abundance of microcharcoal and possibly decomposed organic matter. Humic acids together with ferric solutions begin to concentrate at the edges of the pores and as matrix impregnation. Along with the decomposition of organic matter, the decomposition of microcharcoal into the form of char is also visible (Fig. 201d). In the direction of the building

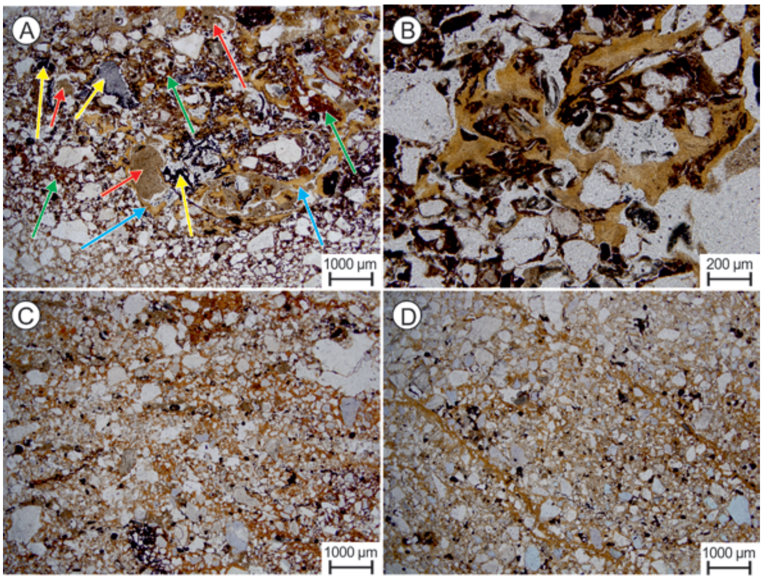


Fig. 200. Jihlava – Staré Hory. A – The transition between burnt sandy floor and burnt active layer postdepositionally impregnated by clay coatings; yellow arrows – charcoal; green arrows – Fe impregnations; blue arrows – clay coating; red arrows – silty fills; B – ditto in detail; C – rubified sandy passive floor layer; D – the lower part of the floor not influenced by heat, but postdepositionally influenced by clay impregnation; all pictures were taken in plane-polarised light (PPL). Author L. Lisá.

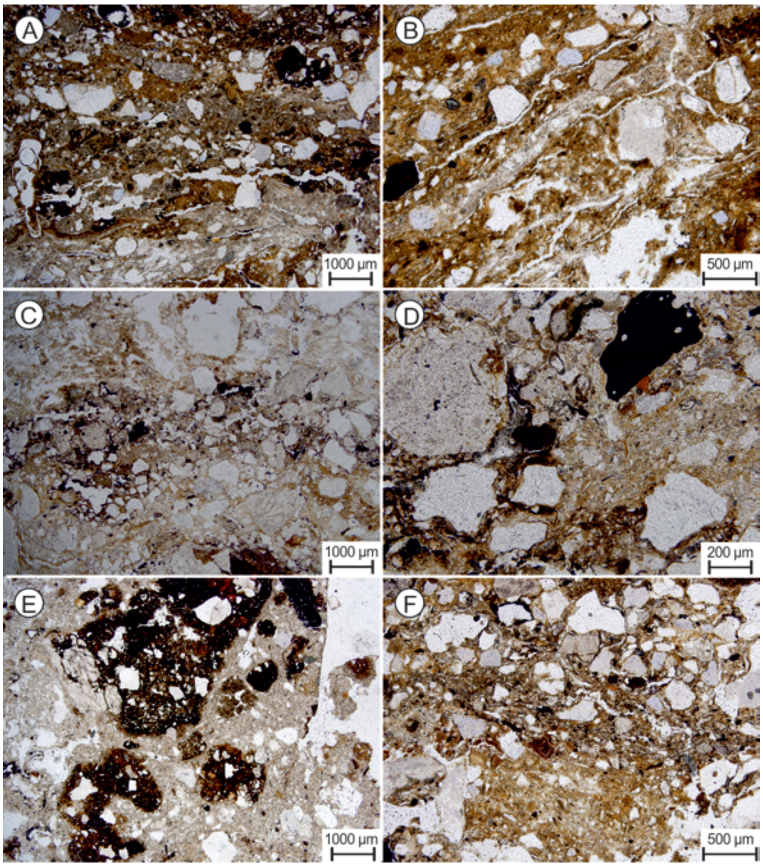


Fig. 201. Jihlava – Staré Hory. A – Unsorted trample on the staircase composed of bands rich in microcharcoal or Fe staining. Visible presence of horizontal pores as a result of repeated mechanical pressure after beating; B – ditto in a different part of the trample. The horizontal pores developed under the angle are well-developed; C – thin band representing the trample at the end of the stairs; D – the active layer of the trample at the end of the stairs contains charcoal with visible degradation into char; E – part of the passive layer related to the area at the end of the stairs is typical of the presence of redoximorphic nodules; F – the direction in the basement of the thickness of the active layer increase. It is composed of decomposed organic matter and charcoal but there are no visible bands as in the case of the trample at the staircase. All figures were taken in PPL. Author L. Lisá.

and at the end of the stairs, a ridge was visible, from which a micromorphological sample was taken. The material that formed the elevation is typical of the amount of *in situ* oxidationredoximorphic multi-layered nodules, which are created by repeated wetting and drying of the material (Fig. 201e). Towards the inner part of the basement, the thickness of the active layer increases although does not change to the form of layers, as was the case on the staircase (Fig. 201f). The composition of the active layer consists of microcharcoal and a humus-rich matrix. Again, there is no kitchen waste of any kind.

3.2.2 Basement 7565/8523

Basement 8523 (7565 respectively) was documented during the digging of the foundation passes for the kindergarten building in the southeast corner of the area and, unfortunately, was only documented as sections. It most likely originally represented a rectangular building with perpendicular, straight walls and a sharply connected flat bottom, recessed 1.3 m below the level of the subsoil. For the most part, it intervened outside the excavation area. Unlike the other three residential buildings in question, it was destroyed by fire. As a result, remains of charred wood were preserved in the northeast corner of the basement, on the walls and the floor. In the northeast corner was the remains of the column with planks inserted with a thickness of approximately 2 cm and a width of at least 20 cm (Fig. 202, 203). The above-ground part of the building, or part of it, was built from rounded logs and plastered, which is evidenced by an abundance of burnt plasters with wood imprints in the decaying backfill. Plaster imprints of rounded wood trunks have been repeatedly documented in the fills of Staré Hory basements, while horizontally laid slabs on the walls of the basement have been captured for the first time (Crkal et al. 2019, 897–898). The sedimentary fill destroyed by fire contained numerous fragments of high medieval pottery, including whole vessels. Lids, the part of the kettle with the spout and the entire ceramic plate with the mark on the bottom (Fig. 204) can be mentioned. Near the west wall of the basement, the backfill contained a concentration of burnt stones with the torso of a pot. It cannot be ruled out that this could have been the destruction of the heating device from the above-ground part of the house, which collapsed together with the wall and roof structure during a fire. It was not possible to determine whether the basement was equipped with an entrance neck, the conditions of the excavation limited a closer interpretation of the structures.

Fig. 202. Jihlava – Staré Hory. Photo of the NE corner of Basement 7565 with a post hole, the remains of a charred column and charred horizontal planks on the eastern wall. Photo by Archaia Brno.

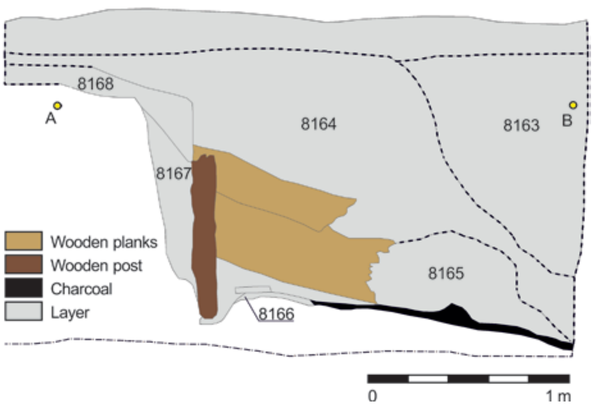


Fig. 203. Jihlava – Staré Hory. Part of the eastern profile of Basement 8523 with the remains of timbering. Author J. Košťálová.

Fig. 204. Jihlava – Staré Hory. Ceramic vessels excavated from the fill of Basement 7565 damaged by fire. Photo by J. Těsnohlídek.

The micromorphological analysis recorded burnt-out destruction typical of the rubified matrix (Fig. 205a) and with large charcoal fragments (Fig. 205b). The presence of a wooden element charred from the upper part was indicated as the possible floor layer (Fig. 205c). Changes in pH caused by burning and thus alkaline ash production probably accelerated the movement of clay minerals. These can subsequently be easily detected in the form of clayey coatings (Fig. 205d). Given that the active trampled layer was not evident in the micromorphological sample, we can work with several hypotheses. One of these is that, at least at the point of sampling, the active trampled layer was either removed or sufficiently damaged that it mixed with the geological substrate. Another hypothesis is that part of the floor would be made of wooden planks and any active trampling would only occur on the wooden part

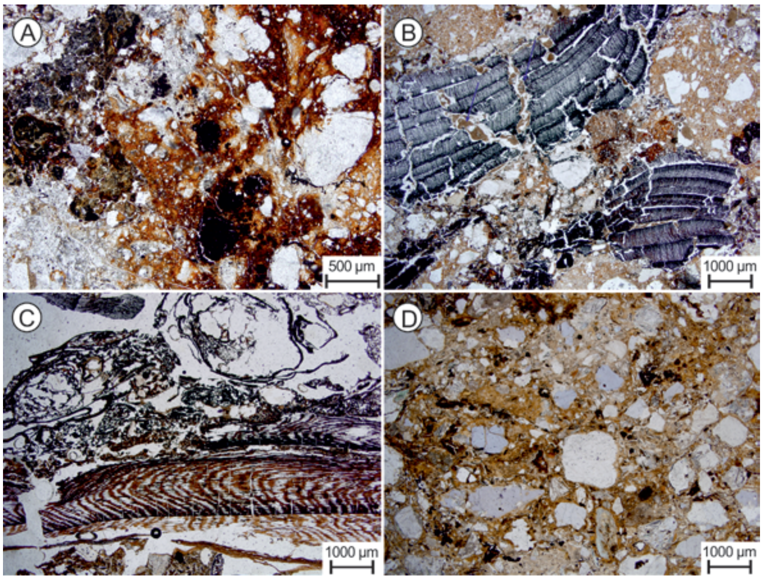


Fig. 205. Jihlava – Staré Hory. A – A destruction part of the fill. Reddish fragments represent areas impregnated by Fe. Black areas are composed of charcoal or microcharcoal; B – part of the destruction is also composed of charcoal fragments; C – the floor is composed of unburnt wood fragments with an amount of charred wood laying on it; D – the sedimentary layer below the wooden floor is composed of unsorted sandy clay loam with visible clay illuviation. There are also darker particles visible, representing decomposed organic matter as well as microcharcoal. All photos were taken in PPL. Author L. Lisá.

of the floor. That it was not preserved in the studied sample could mean that the wooden floor was cleaned and that the aggradation of the trample did not primarily occur. Unfortunately, there are presently few arguments for each hypothesis put forward although the first hypothesis is the most likely, namely that the active layer was so damaged during a fire that it is not clear in the studied sample and only contaminated geological substrate appears under the wooden element (Fig. 205d). From this part of the sedimentary record, the presence of decomposed organic matter and microcharcoal is evident, which is clearly bioturbated and subsequently saturated with clay coatings and fills. The amount of redeposited clay can primarily give a stiffer impression during the macroscopic evaluation of the context, which is why such positions are often referred to as the 'floor'.

3.2.3 Basement 8512

Basement 8512 was located to the north of Basement 7556 and was largely destroyed by the construction of a worker's house in the 1950s. The remaining part corresponds in size and type to Basement 7556. The rectangular floor plan, perpendicular walls, smooth bottom, depth, post holes in the corners and the entrance neck from the west with a stone threshold were very similar (Fig. 206). The range of findings was again poor. We assume that the basement was intentionally abandoned (dismantled) and buried, as with Basement 7556. Due to the damage, the micromorphology sample was only taken on the staircase of the entrance neck. Basements 8512 and 7556 could form the basis of orderly development, for example, from the locations Vyskytná-Štětinka or Utín-Buchberg. However, the distribution of previously found residential buildings in Staré Hory suggests a rather disorderly character of the settlement (Hrubý, Derner 2018, 218–221; Crkal et al. 2019, 889–890).

The micromorphological sample includes the relatively strong trampled accumulation (minimum 3–4 cm), formed under an inclination of about 50°. This trample is formed by a number of charcoals and microcharcoals oriented at the angle of the staircase (Fig. 207a, b in detail). The clayey matrix deposited below this trample shows signs of repeated and intensive passing, namely in the form of horizontal pores. On the staircase with the trample, there is an approximately 0.5 cm deposited thick

Fig. 206. Jihlava – Staré Hory. Photo of the entrance neck and SE corner of Basement 8512. Photo by Archaia Brno.

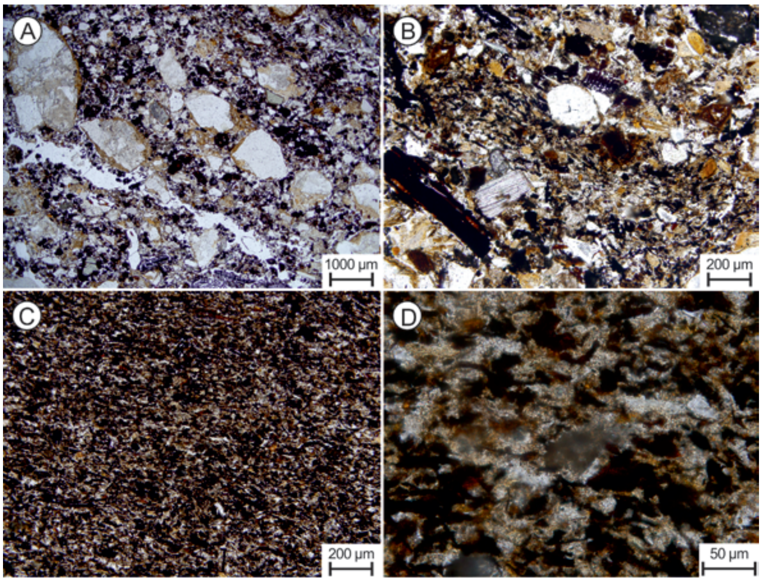


Fig. 207. Jihlava – Staré Hory. A – Oriented matrix of the trampled layer composed of unsorted sandy loam impregnated by clay matrix; B – ditto in detail; C – the thin layer above the trampled staircase is composed of unknown burnt, organic material; D – ditto in detail. All pictures were taken in PPL. Author L. Lisá.

layer of redeposited bedrock, on which partially burnt organic matter of unknown origin is located (Fig. 207c, d in detail). Its fibrous character may indicate, for example, bark or fur or a similar type of material. The uppermost part of this organic layer is comprised of charcoal. The sedimentary sequence is again terminated by material similar to the bedrock material.

3.2.4 Recessed Feature 8524

Feature 8524 was examined in a cross-section, in an excavation for a water supply connection. Moreover, it was mostly destroyed by the building of the worker's house, so it is not possible to reliably determine what type of structure it was. With a documented width of at least 3.7 m and a depth of 1.1–1.2 m from the upper limit of the subsoil, it had slightly sloping straight walls and probably a flat bottom. At the base of the fill was clayey-sandy deposit (8174) and primarily concave level (8175), interpreted as a floor, from which a micromorphology sample was taken. This was a sharply demarcated dark grey to black layer approximately 10 cm thick in the lower part and orange in the upper part with no visible impurities. The torso of a ceramic lid from the second half of the 13th or the beginning of the 14th century was laid in the middle of this layer, approximately at the transition between the darker and orange-coloured deposits. The rest of the fill consisted of grey-brown clay-sandy loam, enriched only with isolated charcoal and small stones (Fig. 208). The fragmentary nature of the feature offered very limited scope for interpretation. In the context of the other recessed buildings at the site, this feature falls among the shallow ones but is more extensive in the area. With no traces found of the construction of the buried and above-ground parts of the structure, and without knowledge of the overall dimensions of the structure, the analysis of well-developed floor level (8175) remained the only piece of information.

In this case, the micromorphological analysis of the 'floor horizon' turned out to be essential for further interpretations of the entire structure. As stated above, the structure was interpreted solely as a basement with a question mark, since it was not possible to verify the presence of structural elements. The clayey, finely laminated sediment at the base of the feature was a possible indicator of its function. However, in this case, it is not the floor level, even though it is suggested by the macroscopic description. The lamination of the sediment was created in an area of stagnant or slowly flowing water and is therefore a technical structure. The approximately 10 cm thick, finely laminated layer shows colour differences that are determined by the presence or absence of iron and are related to redoximorphic processes. The sediment itself is made up of sorted clay-dust-like sediment in which microcharcoals are evenly dispersed (Fig. 209a, b in detail). At the same time, partially decomposed, horizontally deposited organic matter is preserved in the sample (Fig. 209c). This appears as occasional fragments, so it does not form concentrations (Fig. 209d). Unarticulated phytoliths are abundantly scattered in the sample, but the presence of diatoms was not detected, even though it is an aquatic environment. A possible explanation is the

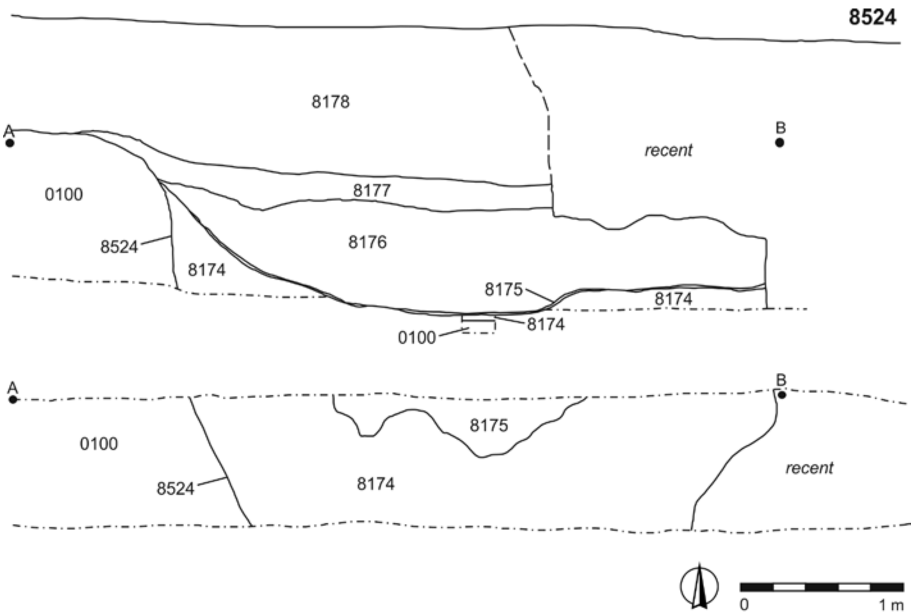


Fig. 208. Jihlava – Staré Hory. North profile and floor plan of Feature 8524. Drawing by J. Těsnohlídek.

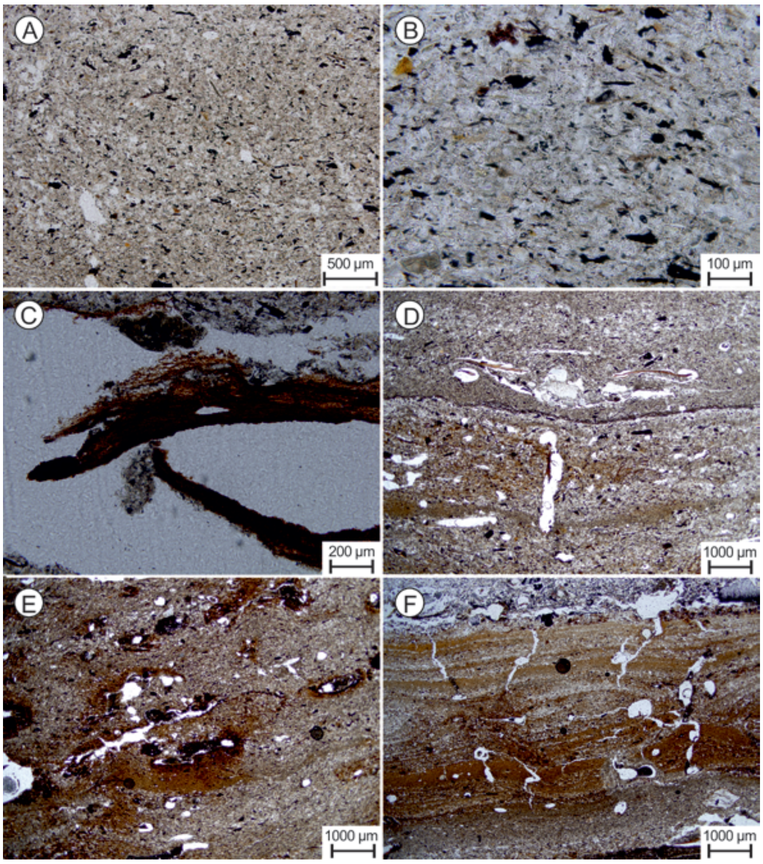


Fig. 209. Jihlava – Staré Hory. A – Well-sorted clay loam with well-distributed microcharcoal and small fragments of decomposed organic matter; B – ditto in detail; C – partly decomposed organic matter as a relic of a leaf. These fragments are always horizontally oriented; D – horizontal oriented decomposed organic matter (in the centre) with other horizontal oriented fragments of organic matter; E – the upper part of the layer is typical of Fe impregnations with the development of Fe/Mn nodules; F – the uppermost part is finely laminated with clearly visible positive gradation. The topmost part of the sample shows the concentration of charcoal. All photos were taken in PPL. Author L. Lisá.

absence of daylight, which diatoms need to survive. The upper half of the described layer is coloured differently. The reason is the presence of iron, which forms either impregnation or concentration around the pores or nodules (Fig. 209e). In the uppermost part of the layer, the concentration of microlaminae (Fig. 209f) with a positive gradation accentuated by impregnation with iron hydroxides is very detailed. The layer is finished with a 1 mm thin layer of charcoal (Fig. 209e).

4. Discussion

Micromorphological analysis applied in an archaeological context is currently a standard part of archaeological research both in our country and abroad (in summary, e.g. Macphail, Goldberg 2018). In the last ten years, it has been applied in the Czech Republic in various archaeological contexts from prehistoric times (e.g. Nejman et al. 2018; Lisá et al. 2015) to the Middle Ages (Dejmal et al. 2014; Lisá et al. 2020a). At mining sites in our territory, it was only used in the study of the formation processes of the defunct settling pond near Česká Bělá (Vejrostová et al. 2017). To date, it has not been used in the study of the fills of archaeological features in the context of mining sites (Crkal et al. 2019).

Since it was possible at the Jihlava – Staré Hory site to sample floor horizons from several time-related features, a relatively unique study was created. Its meaning is important both from a methodological point of view and from knowing the possible variability in the preparation of the passive layer of the floor or the use of individual features. The first of the studied basements, marked as 7556, differs significantly from the other basements in the type of passive layer. While in the other two basements, the passive layer is comprised of unsorted sandy, dusty clay-like material, in the case of Basement 7556 the passive layer is comprised of sorted medium-grained sand. However, this only applies to the bottom of the basement, while the staircase is made of the same material as in the other two basements. The sandy passive layer could have had a drainage character (Lisá et al. 2009) but we cannot describe in detail the form of the active layer that formed above it, because it was burnt to a depth of several centimetres and the active layer was destroyed by burning. However, the trampled layer must have been primarily composed of microcharcoal and decomposed organic matter and probably did not differ in any way from the organic part of the trampled layer caught on the staircase in the same building.

Active floor layers were probably created in all three studied basements by the same formation processes. It was only the material brought in on the soles of the shoes. The absence of kitchen waste points to the fact that the premises primarily had a storage function. The presence of horizontal pores, especially in the area of the stairs, indicates intensive use. As the staircases mostly contain repeated tramples, while the interior spaces of the basements only contain a relatively thin layer, this probably indicates that the interior spaces were cleaned, i.e. swept, whereby the repeated tramples were gradually reduced.

In the case of Basement 7565, a layer of partially burnt wood was detected at the level of the active floor horizon. The micromorphological analysis should clarify whether it is the floor as such or whether it is a fallen and partially charred wooden structural element. Given that the typical trampled layer was not indicated anywhere in the studied sample, and it was not even on the burnt part of the wooden element, this question remained unsolved. However, we are inclined to believe that the active floor layer was more or less identical to the other two basements and originally consisted solely of a relatively thin layer of trampled charcoal and decomposed organic matter as a result of trampling.

The micromorphological analysis in the case of Feature 8524 yielded relatively interesting results. Given that this feature was the most damaged and was primarily captured only by a narrow excavation, the question was whether it was a basement at all. Micromorphological analysis revealed that the finely laminated layers that make up the basal part of the feature were formed by sedimentation in stagnant or slowly flowing water. No bioturbation was recorded within these sediments and the sediments do not contain diatoms. One of the possible explanations is the absence of light, i.e. a covered tank, and the other is the contamination of the water environment, for example by heavy metals, which would prevent the growth of diatoms.

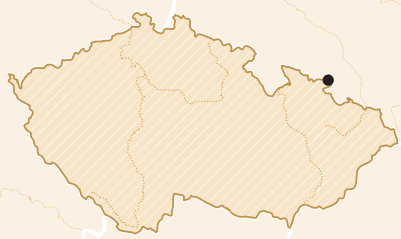
5. Conclusions

Three basements and one feature of unclear origin were discovered during rescue excavations at the Jihlava – Staré Hory site. There was no aboveground part that would extend beyond the basement floor plan identified in these features, which corresponds to the findings made at the site in the past. Due to the micromorphological analysis, it can be concluded that one of the studied features had a purposefully created passive layer, which must have partially served for drainage. During the entire period of use, only a relatively thin layer was formed inside the basements, while thick trampled horizons were formed on the stairs, which most likely indicates that the floors of the basements were cleaned (swept). In the case of disputed Basement 7565 with a possible wooden floor, it is not possible to state with certainty whether it is a wooden floor or a fallen and burnt structural element although we believe that the active layer of the basement floor did not differ in any way from the other basements and was only considerably damaged (mechanically broken) during the destruction of the basement by fire. From a methodological point of view, one micromorphological sample taken from the floor level can be misleading in its interpretation and it is appropriate to sample different parts of the features, including staircases. By combining the information obtained, the formation processes can then be interpreted in time and space. In the case of Feature 8524, the micromorphological analysis surprisingly revealed the presence of sediments formed in the water reservoir. However, based on the results of the rescue excavation, it is not possible to say with certainty whether, in the case of Feature 8524, it was primarily technical equipment needed for the technology of mining and ore processing or whether it was a secondary use of the feature excavated for this purpose. Regardless of this, the presence of a water reservoir could probably not be revealed in such a limited excavation space, and the micromorphological analysis thus provided another piece of the puzzle of formation processes within the settlement complex.

Chapter 19

Basements of wood-and-clay houses in Osoblaha

Peter Kováčik – Veronika Dudková



1. Introduction

In the post-Great Moravian period, as part of the Golensizi (Holasice) province, the Osoblaha region came predominantly under the powerful influence of the Polish Piast dynasty. However, the Piasts could not retain their influence and the whole region became part of the Czech state in the late 12th century. A small river called Osoblaha is mentioned in sources as early as 1107 (*Uzablace*) and 1201 (*inter flumina Ozoblogam*). This later gave its name to a settlement, which is mentioned for the first time in 1233 as *Osobloga* (Hosák, Šrámek 1980, 197). However, this pre-urban settlement may not have actually been located in the position of the later town but nearby, probably close to the Baroque cemetery Church of St Nicholas, where early medieval finds have been detected in the past (Kuča 2000, 763). The town of Osoblaha was founded before 1275, perhaps as early as the mid-13th century, by the Bishop of Olomouc Bruno of Schauenburg (Hosák, Šrámek 1980, 197; Kuča 2000, 763). One of the Moravian enclaves of the Olomouc bishops' domain in the Silesian duchy gradually came into existence around this new centre over the following decades (Bakala 1977, 97–122; Zezula, Prix 2011, 60–61). The town was located on a flat wide promontory rising in places as high as 10 m above the confluence of the small River Osoblaha and the Lesná Stream on an irregular oval area of approximately 11.5 ha. Old cadastral maps show that the new rectangular urban structure of the town was centred on a small rectangular square. The main road ran from the centres of the shorter sides ending at Dolní Gate in the northeast and Jižní Gate in the southwest. The other main road ran from Horní Gate in the northwest towards the Church of St Mary Magdalene in the southeast (Fig. 210).

In 1389, Osoblaha already appeared in a list of towns that received the right of escheat privilege from the Bishop of Olomouc Nicholas of Riesenburg in exchange for a pledge to strengthen their fortifications (Razím 2019, 244–245). Most of the fortifications, including gates and towers, were demolished before 1836; parts of the wall and the moat on the southeastern periphery of the town between the streets Pod Hradbami and Hrnčířská have survived to this day. Among the medieval events that might have been reflected in the destruction of archaeological horizons, we can primarily name a large fire in 1408, the damage to part of the town including the fortified episcopal residence by the Hussites in 1428, later fires in 1545 and 1563 and the capture and burning of the town by Mansfeld's army in 1626. The historical form of Osoblaha vanished almost completely towards the end of the Second World War when war events destroyed 90% of the town. The expulsion of the German population followed shortly after, and the final destruction of the town came with the insufficient repopulation by the Czech inhabitants, who even demolished the repairable historical houses during the clearing of the rubble and renovation of the town (Kuča 2000, 758–764). Besides historical plans and post-war aerial photographs, archaeological records are indispensable for knowledge of the historical development of the vanished form of the town. However, the first extensive excavation was only conducted in 2014 during the construction of new sheltered housing on Slunečná Street in the west of the historical core. The results of this contributed extensively to our knowledge of the first centuries of the town's existence.

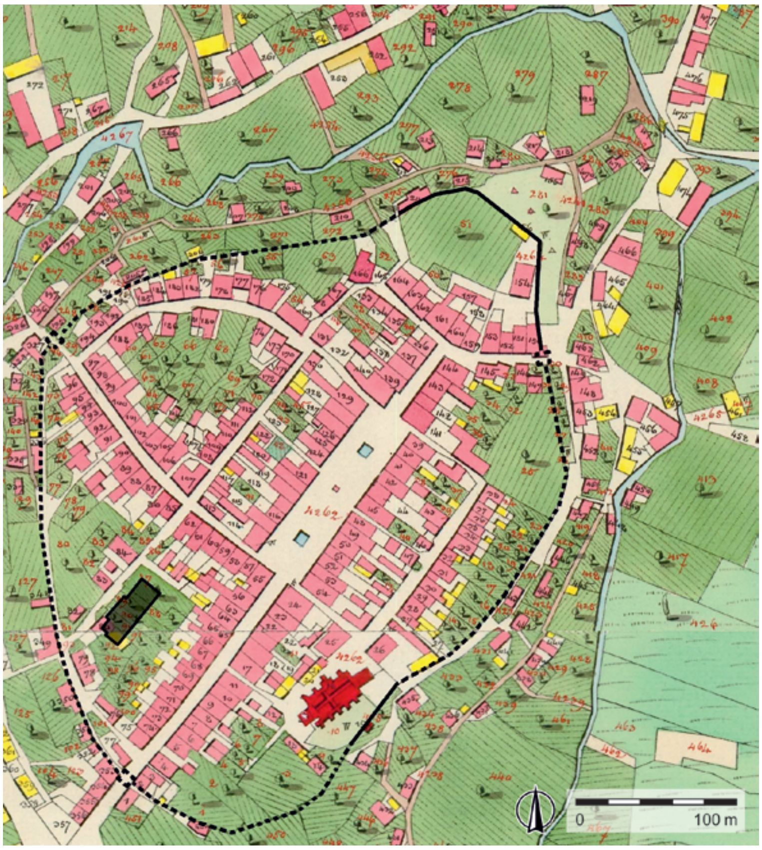


Fig. 210. Osoblaha. Cut-out from the Stable Cadastre from 1836. Black and dashed lines – course of the town fortifications; shaded dark grey area – excavated area. © CUZK Osoblaha, modified by M. Peška.

2. Archaeological context

The examined site was situated in a former plot block delimited by the main road of the historical town in the southeast, partially by the square and the second main road in the northeast – the predecessor of present-day Slunečná Street in the northwest and the town wall arch in the southwest and west. An extensive excavation conducted over an area of approximately 55 × 18 m detected dozens of medieval and modern contexts. The most distinctive of these were the recessed parts of nine wood-and-clay buildings (Fig. 211). Based on a Stable Cadastre map from 1836, the excavation area can be pinpointed to a block of houses in the southwestern quarter of the town near a side road where gardens were situated in the early 19th century while the frontage facing this alley was mostly free of buildings. Except for one case (Basement S1), the recessed parts of the wood-and-clay buildings were oriented along the northwest-southeast axis, in accordance with the historical parcelling of the block of houses. The above-mentioned exceptional Basement S1 was the only one that came from the 17th century. The basement was oriented along the southwest-northeast axis and according to the Stable Cadastre map, was located below a former wooden building (marked in yellow and partially located within and below the excavated area marked on the map from 1836). It used to be part of a plot delimited within the block of houses probably sometime during the modern period; its front facade was oriented to the west, towards the town wall. All the basements were roughly rectangular in shape and relatively small, with an area of up to 20 m^2. The documented sinking was rather shallow, between 0.7–1.7 m (see Tab. 8). However, it should be pointed out that the original basements were deeper, as part of the historical stratigraphy with the original surface of the terrain was not preserved. Regrettably, no wooden elements of the framework were detected. Even though some post holes were documented for almost all of the basements, it can be reliably stated that only Basements S6 and S9 were of a post-built structure. Some form of framing can be presumed for the others. The basements situated near the street line, except for Basement S9, contained an entrance neck accessible from the rear of the plot. In contrast, Basements S2, S3 and S4 situated at a distance of 10–12 m from the street line had their entrances oriented towards the street. The staircase socle of Basement S2 reached the interior of the cellar (Fig. 212–214). Numerous post holes were excavated close to Basements S3, S6 and S9, possibly indicating some form of an above-ground structure partially situated outside their ground plan. Stonework reinforcement of the walls of Basements S2, S5 and S7 testifies that the structures were repeatedly repaired. In the case of Basement S5, this might have partially been the foundation masonry of a later above-ground building that was,

Fig. 211. Osoblaha. Aerial view of the excavated area with marked former basements of wood-and-clay buildings. Author V. Dudková.

Fig. 212. Osoblaha. Basement S2. View from the northwest. Photo by Archaia Olomouc.

Fig. 213. Osoblaha. Basement S3. View from the south. Photo by Archaia Olomouc.

Fig. 214. Osoblaha. Basement S4. View from the east. Photo by Archaia Olomouc.

Fig. 215. Osoblaha. Basement S6. View from the southeast. Photo by Archaia Olomouc.

Fig. 216. Osoblaha. Basement S8. View from the northeast. Photo by Archaia Olomouc.

for structural stability, based on the original floor of the former medieval basement. The context of Basements S6/S7 was of extraordinary interest and two phases of the entrance neck were documented for them (Fig. 215). A daub accumulation containing stone pebbles was detected in the eastern part within the destruction stratigraphy of the later of these two basements (15th century). Its character could indicate the destruction of a heating device situated on the ground floor of the house. The destruction horizons of the two basements, dated to the first half of the 14th century and the 15th century respectively, also indicate that they might represent a relatively long continuity of one house with traces of partial

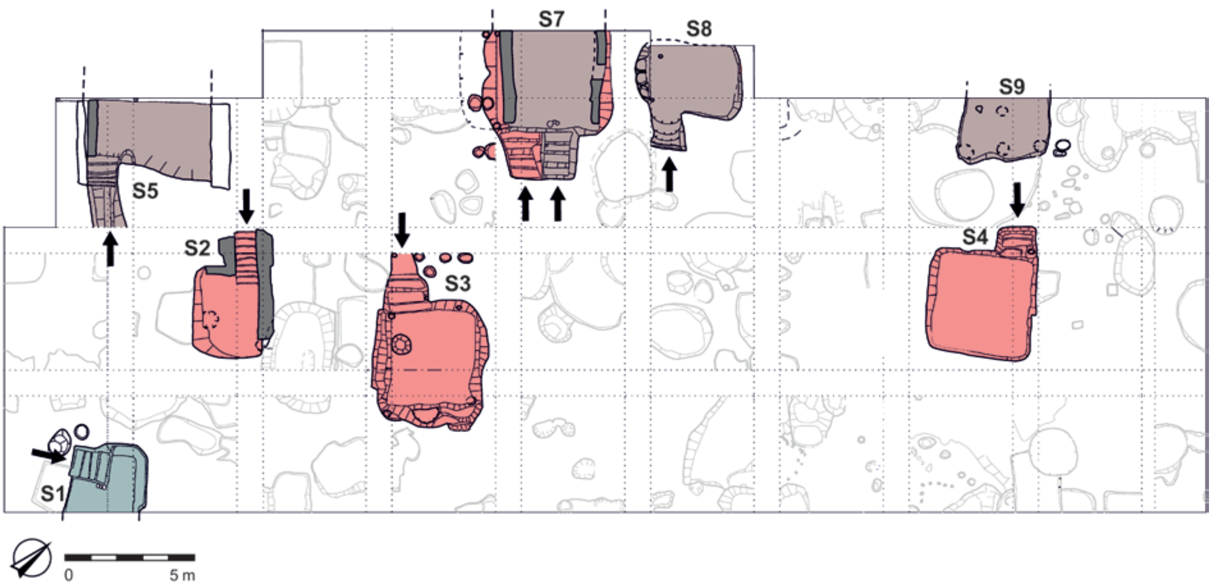


Fig. 217. Osoblaha. Excavated area with marked remains of former basements of wood-and-clay buildings. Red – defunct basements at the turn and during the 14th century; brown – defunct basements at the turn and during the 15th century; green – small Cellar S1 from the 17th century. Authors V. Dudková, M. Peška.

Basement	Orientation	Dimensions	Documented depth	Area	Entrance neck direction	Destruction
Basement S1	SW–NE	3 × > 2.6 m	1.6 m	> 7.8 m^2	to the street front	17th c.
Basement S2	SE–NW	3.5 × 3.1 m	1.2–1.4 m	10.8 m^2	to the street front	14th c.
Basement S3	SE–NW	4.8 × 4.2 m	1.1 m	20.2 m^2	to the street front	13th/14th – mid-14th c.
Basement S4	SE–NW	4.2 × 4.1 m	0.7–0.8 m	17.2 m^2	to the street front	13th/14th – mid-14th c.
Basement S5	SE–NW	5.9 × > 2.4–3.0 m	1.7 m	> 17.7 m^2	to the rear of the plot	15th c.
Basement S6	SE–NW	4.2 × > 3.9 m	1.3 m	> 16.4 m^2	to the rear of the plot	13th/14th – mid-14th c.
Basement S7	SE–NW	4.2 × > 3.9 m	1.3 m	> 16.4 m^2	to the rear of the plot	15th c.
Basement S8	SE–NW	3.5 × > 2.6 m	1.5 m	> 9.1 m^2	to the rear of the plot	15th c.
Basement S9	SE–NW	3.6 × > 2.4	0.75 m	> 8.7 m^2	?	14th/15th c.

Tab. 8. Dating of the defunct wood-and-clay basements.

reconstructions and adaptations, especially from the 15th century, which regrettably remain concealed from us. The basement floors were mostly simple, without more considerable stratigraphies; a more distinctive walking layer was documented for Basement S3 and yellow-orange soil with small pebbles as the flooring of Basement S5. All the basements were infilled, partially by the destruction of former perimeter walls and partially by relocated neighbouring layers in which earlier ceramic material occurred, sometimes including 13th-century sherds. None of the basements ceased to exist due to fire. Dating is very difficult due to the occurrence of later abandoned stratigraphies and that the pottery from earlier infills is influenced by frequent post-depositional processes. Basements S3, S4 and S6 ceased to exist probably sometime between the turn of the 13th and 14th centuries and the mid-14th century and might have originated shortly after the foundation of Osoblaha. The destruction of Basement S2 can be generally dated to the 14th century, and Basements S5, S7, S8 (Fig. 216, 217) and S9 probably ceased to exist during the following century.

3. Conclusion

Recessed parts of the wood-and-clay houses excavated in Osoblaha do not differ in shape, dimension or character from most of the already numerous and rather variable assemblage of these recessed structures in the immediate or further neighbourhood and generally in the Czech lands (e.g. Cymbalak, Musílek 2017, 133, 134, Fig. 9, 138, Fig. 12, 139, Fig. 13; Čapek, Netolický 2014; Holub et al. 2005a; Kiecoň, Zezula 2005; Kováčik et al. 2021; Michna 1988) or abroad (e.g. Piekalski 2004b; Plate 1996). Even the occurrence of masonry foundation walls in these basements is not unusual (e.g. Frolík, Musil 2014, 60). A fundamental question that remains concerns the course of medieval parcelling; its resolution is complicated by the non-existence of buildings in the direction of present-day Hlavní Street and the impossibility of precise geodetic surveying. However, it appears that the wood-and-clay houses whose remains were detected by the excavation were built on plots oriented towards the predecessor of present-day Slunečná Street. The rear boundary of these plots halved the block of houses into southeast and northwest parts with lengths in intervals of 34.5–36.5 m (cf. Procházka 2007b). This interpretation is corroborated by the preserved rear boundaries of some of the plots neighbouring Hlavní Street, which are visible in the Stable Cadastre map from 1836. The width of the original plots will be the subject of further research in connection with the detailed evaluation of the whole survey. The non-violent end of the last medieval wood-and-clay buildings no later than the 15th century might testify to some regression of the urban community and a more considerable decline in the town's population. The abandoned layers with modern period finds might also indicate that the area was not intensively used for some time, as does the later use as gardens and partial unification with some of the plots in Hlavní Street.

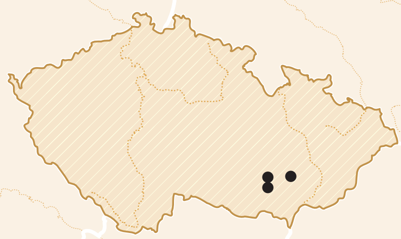
Acknowledgement

The chapter was written as part of the 'Endangered Memory of the Moravian and Silesian Sudetenland' project (No. DG20P02OVV008) undertaken within the 'Programme for the Support of Applied Research and Experimental Development of National and Cultural Identity, 2016–2022 (NAKI II)'.

Chapter 20

A short look at the floor maintenance practices in the rural areas

Lenka Lisá – Václav Kolařík – Marek Peška



1. Introduction

The village house is a phenomenon that provides a wealth of information about our cultural identity. As with other rural architecture, the studies focus almost exclusively on house architecture, with floor sets being neglected as a source of additional information. Medieval village architecture, specifically floor sandwiches, more often provides better information than medieval urban situations. The main reason for this is the relatively greater preservation resulting from the absence of the need for major reconstructions. At the same time, if the village is situated near a river floodplain where there is a natural and partly man-made degradation of the surrounding landscape, the above-ground parts of buildings, including the floors, remain partially buried and preserved under the current, often standing house. This is due to the repeated reconstructions and modifications of the original shape that have survived to this day. This chapter discusses the information potential of floor sequences from two village houses originating from a more or less continuous settlement from around the 13th–14th centuries until recent times. The houses are in Dolní Heršpice, currently in the cadastral area of the City of Brno, and Kučerov near Vyškov. We compare these sets with a macroscopically similarly laminated set of a medieval cellar in the village of Královo Pole, which is currently part of Brno. All three sites are situated in a geological area rich in Quaternary loess soils. This study aims to show what kind of formation processes and especially the anthropogenic methods of surface treatment play a role in creating finely laminated horizons of floor sets, which are more or less typical of medieval and modern rural development.

2. Three case studies – Dolní Heršpice, Kučerov and Královo Pole

In this text, we provide three examples of what the floor stratigraphies of village houses look like when they are preserved under a still-standing house. In each case, the floor bases are dated to the beginning of the 16th century with a thickness of tens of centimetres. As a comparison, we provide an example of a floor of a medieval cellar from the context of the rural environment in the area of Královo Pole. From a relatively large set of micromorphological samples, the samples representing the general characteristics of most active and passive types of layers were selected. In the case of the Královo Pole site, two micromorphological samples capturing the floor set were used for the comparison. More detailed characteristics are published in Lisá, Kolařík (2020).

2.1 Kučerov

Rescue archaeological excavation in House No. 43 in Kučerov (Vyškov District) (Fig. 218, 219) was caused by the complete reconstruction of the building, which began in 2016. The house is a part of a terraced development in the southwestern part of the village square. The existing longitudinally oriented homestead with a hook-shaped layout constructed of unfired bricks dates from the first third of the 19th century (approximately). The house underwent a major reconstruction in the third quarter of the 19th century, and the last major alterations to its residential area took place in the early 1920s. It is designed as a double-wing with an adjacent passage to the yard.

Fig. 218. Kučerov. A trench in the sitting room with the cleaned-up post-built structure of the medieval building phase of the house overlaid by the later floors of the sitting room. A view from the north towards the village square. Photo Archive of Archaia Brno, Inv. No. 07667-2016.

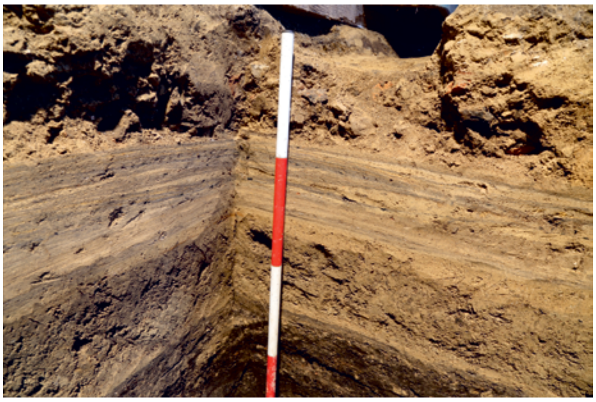


Fig. 219. Kučerov. A view of the floor laminated set of the sitting room. Photo Archive of Archaia Brno, Inv. No. 13486-2016.

Under the floors of the current house, archaeological research has succeeded in uncovering rare traces of evidence of village settlements from the 13th and 14th centuries and, above all, the continuous development of the older house dating from the 15th to the turn of the 18th and 19th centuries. While in the initial development phase of the house (15th century), a column structure was used with the columns placed in the subsoil of the excavated gutters (a hall and a sitting room in the front part, a chamber behind the hall towards the courtyard), there has been a significant construction change since the 16th century. Of a similar layout is a house very probably made of unfired bricks on stone foundations, to the front of which a 'žudro' (a vestibule with a granary on the first floor) was added to the facade. This clay house has two distinct horizons (sequences, sets) of clay floors, which created powerful stratigraphies of different microlayers, proving relatively long and continuous maintenance of the building without major structural changes. Micromorphological samples of the floors were taken from the area of the original room and the entrance hall with a separate kitchenette from the second half of the 17th century.

2.2 Dolní Heršpice

In 2014, excavation was carried out on part of two village estates in Dolní Heršpice, a village situated south within a distance of about 4.5 km from the city centre of Brno (Fig. 220, 221). In particular, small traces of House No. 10 and 11 near the street,

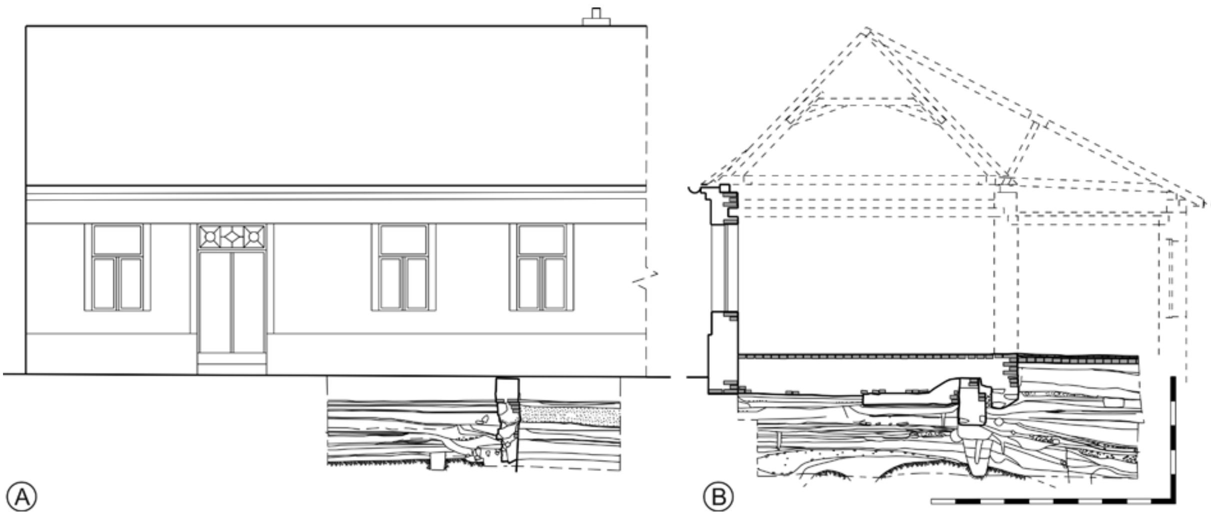


Fig. 220. Dolní Heršpice. A – A view of the front of House No. 10 with the documented section of the earlier floor adjustments; B – a section of House No. 11 with the earlier documented floor adjustments. Drawing by V. Kolařík.

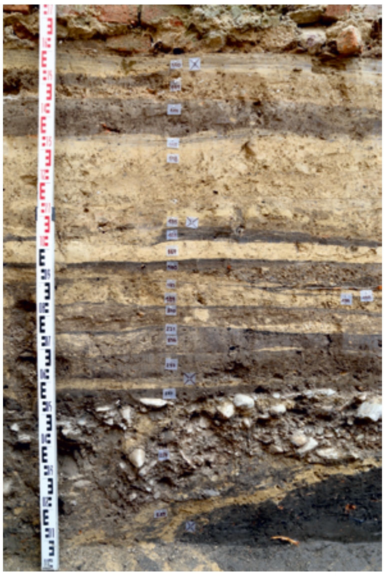


Fig. 221. Dolní Heršpice. A view from the east of the section of the floor adjustments from the 14th to 17th centuries. Photo Archive of Archaia Brno, Inv. No. 04343-2014.

Fig. 222. Brno, Královo Pole. An overall view from the north of the context featuring the uncovered small cellar s. u. 607. Photo Archive of Archaia Brno, Inv. No. 06586-2009.

probably the hall or entrance corridors to the halls of the ground floor, were sampled for micromorphology. The thickness of the floor sandwiches, which reached almost 1.5 m and the continuity of both houses from the 14th century until the present day were notable. The layouts of both houses remained approximately the same up to the 18th century; the post-built structure of the walls was completely renovated several times. In the mid-17th century, the stone foundations for the present-day building were laid within their line. Until the mid-17th century, both were constructed as wood-and-clay buildings and later replaced by brick houses. Samples for micromorphological analysis were taken from the floor sandwiches, which originated continuously from the 14th to the 18th centuries.

2.3 Královo Pole

Rescue archaeological excavation was caused by the preparation of 'Residence Mojmírovo náměstí'. The area of study is located in the cadastral area of Královo Pole (currently part of Brno), at the eastern front of Mojmírovo Square (Fig. 222–224). Mojmírovo Square still preserves in its floor plan the medieval village square of the important Brno suburban village, Královo Pole. The documented settlement of Královo Pole begins in the first half of the 13th century. In the front part of the plots, the remains of columnar above-ground buildings, fragments of their clay floors, excavations of wood-and-clay basements and a large number of loess-carved underground lots were documented. It can be found in this settlement phase at the street front and in the background of the

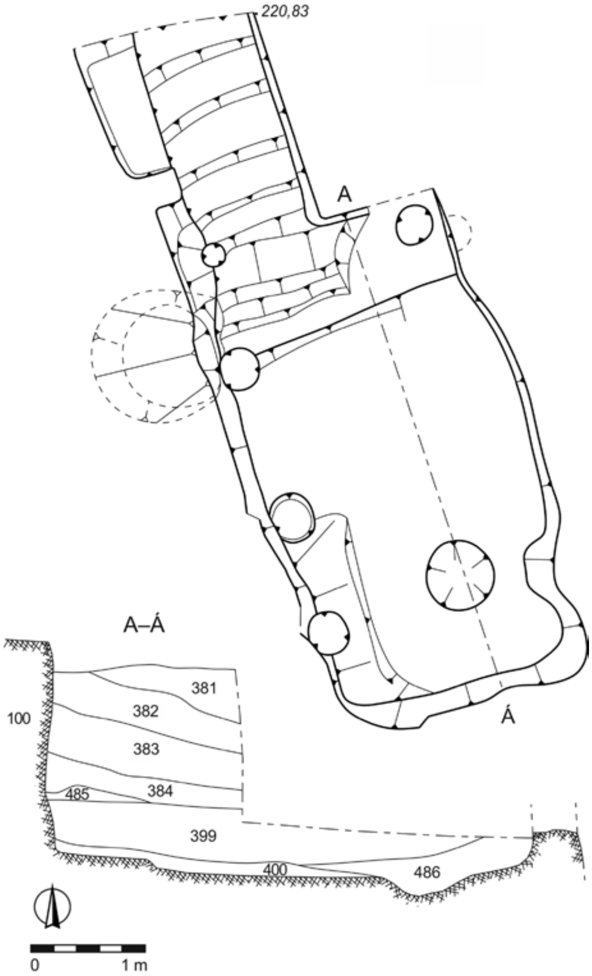


Fig. 223. Brno, Královo Pole. Layout and the section of the small cellar s. u. 607. Floor layer s. u. 400 by the floor – a sampling spot. Drawing by M. Peška.

Fig. 224. Brno, Královo Pole. A view of the west of the infilled cellar and the floor layers. Photo Archive of Archaia Brno, Inv. No. 06619-2009.

storage pit plots. Evidence of wood-and-clay buildings of a similar nature continued in the 14th and 15th centuries. The feature presented by us, more precisely its finely laminated floor sandwich (see below a detailed micromorphological study of Královo Pole), is dated to the second half of the 13th to the first half of the 14th century and we interpret it as a small cellar used to store food and beverages for daily consumption. We also assume that in its original layout it formed the above-ground part of the kitchen, or rather, a space for cooking at that time.

3. Micromorphological characteristics of floor sets and interpretation of their formation processes

Floor sets in a rural environment usually have a preserved amount of passive and active layers reflecting their persistent use and thus the need for repairs (Lisá et al. 2020a). Due to the long-term undisturbed development, the floor sandwiches in the case of Dolní Heršpice increased to a thickness of almost two meters. Their structure mainly consists of passive and active layers several centimetres thick, which shows a perfect horizontal arrangement of mineral, organic and organomineral components and bears typical signs of surface treatment in the form of sweeping or plastering (Stoops et al. 2017).

3.1 Kučerov

A typical example of a village house is the Kučerov site (Fig. 225). The passive layer is homogeneous without the presence of inclusions and exclusively represents floating clay or loess (Fig. 225a). No horizontal pores are formed in this layer, which indicates insufficient pressure from the overburden. If repeated intense pressure from the overburden occurred, significant horizontal cracks or vertical cracks would form in the passive underlying layer (Lisá et al. 2020a; Karkanas 2007; Rentzel et al. 2017). The active layers, which comprise microlaminated sets situated on passive layers, were formed by gradual and repeated degradation in the form of repeated floor coatings. They contain a minimal amount of anthropogenic inclusions, which are isolated charcoals or remnants of calcareous plasters probably fallen from the walls (Fig. 225c). Similar coatings were described in detail in the work of Lisá et al. (2020a) from the Na Mlýně Museum in Dolní Němčí near Uherské Hradiště. Their application began by smearing the surface with water, applying a mixture of float clay and cow dung, covered with straw or chaff, which was swept after drying. The application took place every week, always on Sundays. The floor sets in Dolní Němčí did not show such a detailed microlayer (Fig. 225b) and were heavily contaminated by kitchen waste and microcharcoal residues. This is probably because of a much higher concentration of people in the environment described in Dolní Němčí. On the one hand, they contaminated the floor, while on the other, they essentially mechanically damaged the freshly painted layers. As mentioned above, the low (insufficient) pressure from the overburden is documented by the absence of horizontal pores. However, another aspect favours the preservation of microlamines. The floors in Dolní Němčí are made of float clay from Neogene sediments and are primarily sandy dusty, while the floor horizons in Kučerov are made of much finer dusty loess and sometimes even more clayey material, which is formed using a hematite matrix. In prehistory, the red colour was applied due to its symbolism (Gage 1999; Erdogu, Ulubey 2011). The finely ground hematite for red floors is not a rare feature as it was observed and micromorphologically studied in, for example, Babylonian buildings (Stoops, G. Sr., Stoops, G. Jr. 1994).

The question is why such passive layers are created from time to time in such an application. In addition, the passive layers captured in the Kučerov site are not intentionally constructive, i.e. they were not specially prepared, as is documented, for example, in Dolní Němčí and other historical sources. The passive floor layer constructed as the preparation layer for the final plaster was usually formed by mixing float clay or loess with horse dung. In some cases even bioturbation of passive layer was observed (Fig. 225d). It is possible that in the case of

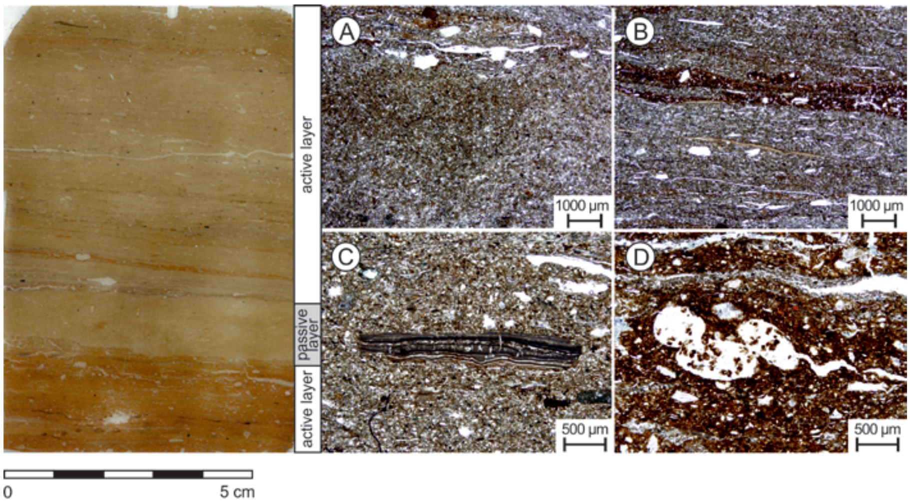


Fig. 225. Kučerov. A thin section sampled from the floor set and catching the passive layer as well as two active layers with the number of microlaminae. A – The nature of a clearly stratified passive layer with the presence of horizontal pores; B – horizontally oriented organic tissue and mainly mineral matrix in an active layer (note the number of thin sublayers); C – fragment of wall plaster incorporated into the floor; D – bioturbation inside the passive layer. Author L. Lisá.

Kučerov, there was a need for repeated aggradation of the surface for some reason related to the need for structural repairs of the house. If that were the case, it is possible that the structural modifications of the house could at least partially correlate with the phases of the house modifications (replacement of beams, change of layout).

3.2 Dolní Heršpice

The second case study from a similar environment is the Dolní Heršpice site. This is an almost two-metre set of passive and active floor horizons. Even though the two studies are macroscopically relatively similar (Fig. 226), it is clear from the micromorphological study that the methods of surface treatment and the preparation phase for the active layer are fundamentally different from those described on the Kučerov site. In the case of the Dolní Heršpice site, it was necessary, at least in some phases of the formation of the floor horizons, to set aside passive constructive layers in addition to the passive non-constructive layers. As mentioned above, this is an actively prepared passive layer (substrate) on which the activities in the house then took place. While the passive non-structural layer (Fig. 226a) is formed by homogeneous loess without signs of the development of horizontal pores, the passive constructive layer is formed by a 0.5–1 cm thick coating of float clay or loess mixed with cow or horse dung. The result is mineral-homogeneous sediment with the amount of horizontally deposited organic matter, or horizontal pores, which remained there primarily after the oxidation of organic matter, i.e. they were not created by post-deposition (upper parts of the Fig. 226a, b).

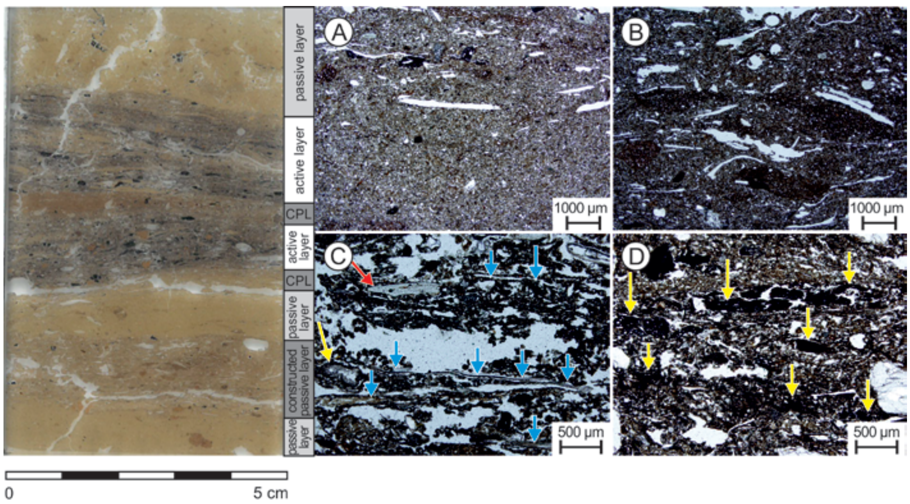


Fig. 226. Dolní Heršpice. A thin section sampled from the floor set showing the repeated application of passive non-constructive, passive constructive (CPL) and newly formed active layers. A, B – Mineralogically homogeneous sediment with the amount of horizontally deposited organic matter, or horizontal pores, which remained primarily after the oxidation of the organic matter, i.e. not created post-deposition; C – the amount of horizontally but also non-oriented organic matter in various stages of decomposition, with visible articulated phytolites (blue arrows), which can, for example, represent straw scattered on the floor. There are remnants of kitchen waste represented by bone fragments (red arrow); D – charcoal. Author L. Lisá.

The constructive passive layer can be partially imprinted (trod) into the active layer, as was the case, for example, in Dolní Němčí (Lisá et al. 2020a). In the case of the shown cut-out, it can be seen that the base of the cut-out is formed by a passive non-constructive layer, which abuts a passive constructive layer. However, for some reason, it is again covered with loess with another constructive passive layer adhered to it. It is apparent that it is preserved only in the fragment because the constructive passive layer was probably imprinted onto the newly emerging active layer.

Active layers at the Dolní Heršpice site have a different character than those at the Kučerov site, probably due to more intensive use of the living space or insufficient surface treatment. These are characterised by the amount of horizontally but also non-oriented organic matter in various stages of decomposition (Fig. 226c), with visible articulated phytolites (Fig. 226c, blue arrows), which can represent, for example, straw scattered on the floor. There are remnants of kitchen waste represented by bone fragments (Fig. 226c, red arrow) and local microcharcoal (Fig. 226d). This is approached by greater comparability and more frequent bioturbation of the floor set.

3.3 Královo Pole

The third case study included in this chapter is the laminated floor of a medieval cellar in the medieval village of Královo Pole. The lamination is macroscopically obvious and clearly visible even on the thin section (Fig. 227). However, it is clear from the micromorphological study that the transitions between the individual laminae, or rather elongated lenses, have a slightly different character than in Kučerov or Dolní Heršpice. As with Kučerov, the absence of a passive constructive layer is obvious, and the laminated set mounts directly onto the passive layer (geological substrate), which does not show signs of horizontal pore development. It is clear from this that the degradation of the tread layers of the active layer proceeded relatively slowly, while the pressure on the subsoil was low. This would correspond to the occasional passing. Individual laminae or elongated lenses are often formed by a soil matrix (Fig. 227a, b – upper part of the sample – dark layer) or by the deposition of charcoal (Fig. 227c, d) or by decomposing organic matter (Fig. 227d). Kitchen waste is present in the tread, but often only as isolated fragments of bones (Fig. 227b) or slightly more numerous charcoals. Overall, the horizontal alignment of the matrix is interesting. Macroscopic interpretation in the field emphasises the possibility of rectification due to more intense walking. However, this hypothesis is not supported by the absence of horizontal pores, which are predisposed by the pressure from the overburden. Therefore, another interpretation is offered, namely that the surface of the cellar would be occasionally swept and thus rectified (Lisá, Kolařík 2020).

4. Conclusions

In the presented chapter, the floor sets in a rural environment are discussed. At first glance, it is clear that they differ in both conservation and intensity of development. On the one hand, preservation is conditioned by the continuity of development and minimal interventions into the structure of the

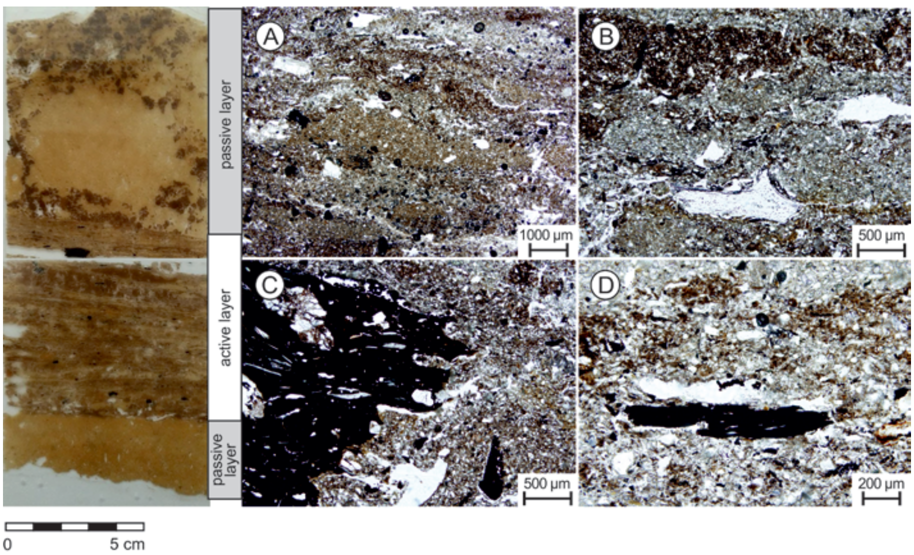


Fig. 227. Královo Pole. A thin section documenting the active layer together with the passive layer located beneath it. The whole set is completed by dumping in the area of the medieval cellar. A – The lenses composed of a soil matrix; B – bone fragments; C – charcoal; D – decomposed organic matter. Author L. Lisá.

house, which obviously occurred much more often in the urban environment. Another fact is that the mentioned floor sets have evolved to the present day using more or less the same practices. Thus, there must have been an intensive transfer of knowledge about floor treatment across at least several (up to ten) generations.

The differences between the village house in Kučerov and the one in Dolní Heršpice are quite obvious. There are other documented practices in the preparation and modification of floors. Although the floor set in Kučerov does not have a base layer in the form of a constructive passive layer, it was thoroughly cleaned with repeated coatings of the floor layers and with the consistency of selecting a more clayey matrix for their stability. Floor sets in Dolní Heršpice were created much less precisely. Despite having a constructive passive layer, the treatment of the active layer in terms of cleanliness and surface strength is insufficient. Residues of kitchen waste entered the floor surface and were then trod into it and possibly decomposed by the action of microorganisms.

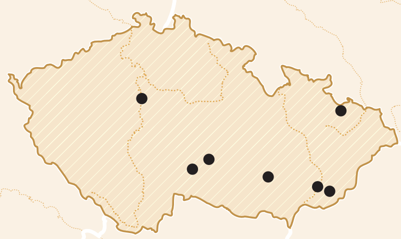
Only two floor sets are compared in this study and, therefore, the conclusions in the differences in the modifications cannot be authoritative. However, it must be mentioned that the house in Kučerov was inhabited by the German ethnic group unlike the one in Dolní Heršpice and it can be assumed that the practices related to modifying the surface of the house have a different cultural basis. The method of creating and modifying floor sets in Dolní Heršpice is very similar to the practices documented in the area of Uherské Hradiště region (Lisá et al. 2020a).

The third case study from the Královo Pole site does not represent a classic floor set of a village house although it serves as a link to the issue of floor sets in medieval village cellars or lochs. The use of these spaces creates laminated active layers, but it is possible to find a number of differences that are not macroscopically apparent at first glance. There was almost no targeted application of organic matter or other articulated surface strengthening. Lamination could have taken place by pressing. Another possibility is that lamination of such horizons, although unusual for the given context, was caused by sweeping.

Chapter 21

Geology of the immediate surroundings of selected medieval towns and sources of raw construction materials

David Buriánek



1. Introduction

Geological conditions have been a basic prerequisite for house-building techniques since prehistoric times. During the Middle Ages, the natural conditions in our country determined the areas with, for instance, stone, clay or half-timbered houses. The availability of individual raw materials was also important for the fulfilment of large construction projects. Settlers from Western Europe came to the first urban agglomerations in the Czech lands in the 13th century. Although they brought different building traditions with them, they had to adapt to the local environment. Those arriving from lowland areas typical of, for example, clay architecture had to adapt to different approaches in stony areas and *vice versa*. For this reason, it is appropriate to present the sources of raw materials in the studied towns and the immediate surroundings.

2. Characteristics of building materials in medieval towns

2.1 Prague

The geological structure of the territory of Prague is quite variable (Kovanda et al. 2001). The oldest rocks are Proterozoic sediments represented by shales, siltstones, greywacke and conglomerates. At the same time, sedimentation led to underwater volcanic eruptions (basalts, andesites, rhyolites), and locally to the sedimentation of fine-grained silicites (black cherts; Fig. 228). The Barrandian Proterozoic rock complex occurs in the northwest and southeast parts of Prague. These rocks were folded and weakly regionally metamorphosed prior to the onset of Paleozoic sedimentation so that older Paleozoic sediments (Fig. 229, 230; Ordovician, Silurian, and Devonian) rest discordantly on them. The older Paleozoic is represented by an alternation of shales, sandstones, quartzites, conglomerates and limestones. In some periods, sedimentation was accompanied by basic volcanism (diabase). The total thickness is reported to be around 2 km, and these rocks are found in a belt stretching from Starý Plzenec in the southwest through the territory of Prague to Brandýs nad Labem. The older Paleozoic was subsequently folded during the Variscan orogeny. Southeast of Prague, these rocks are intruded by deep-seated igneous rocks of the Central Bohemian Pluton (granitoids of the Říčany and Sázava type). Northwest of Prague, the Carboniferous siltstones, sandstones and conglomerates belonging to the Kladno Basin emerge.

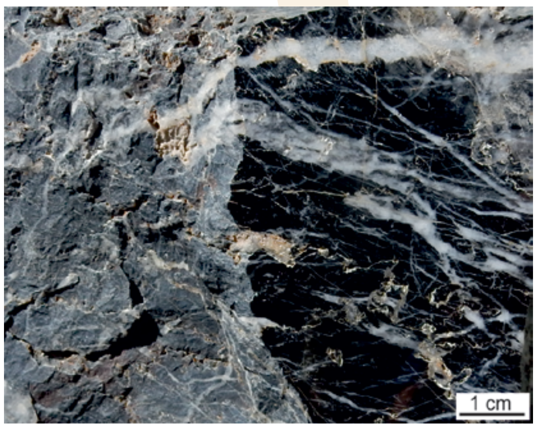


Fig. 228. Proterozoic black chert (Barrandien, exact location not given). Photo by D. Buriánek.

Other sediments (currently horizontal, or slightly inclined to the northeast and east) were only deposited in the territory of Prague during the Mesozoic. At first, these were freshwater claystones to

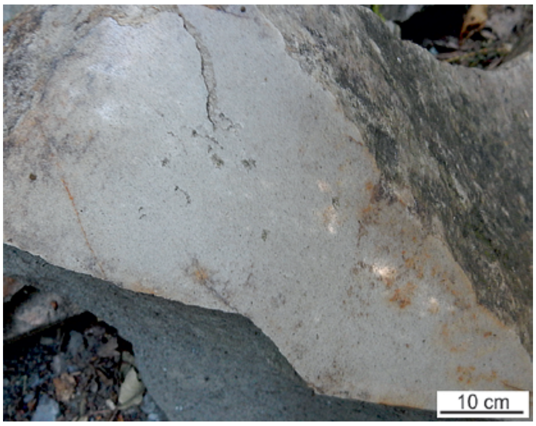


Fig. 229. Ordovician quartzite from the Krušná hora site near Beroun (Barrandien). Photo by D. Buriánek.

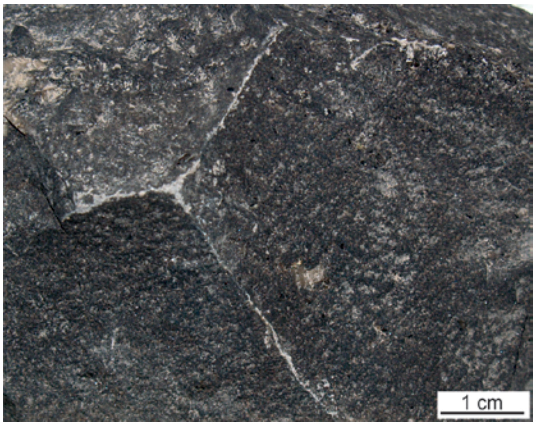


Fig. 230. Silurian black-grey tabular bituminous limestone from the Budňanská skála site near Karlštejn (Barrandien). Photo by D. Buriánek.

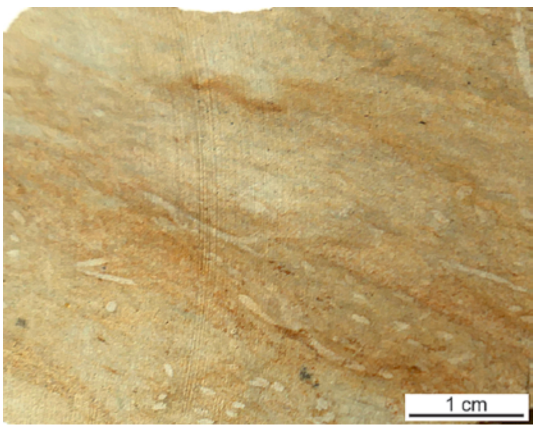


Fig. 231. Marlstone from the Praha-Klíčov site. Photo by D. Buriánek.

sandstones, later marine Upper Cretaceous claystones, siltstones, sandstones, calcareous siltstones (marlstones; Fig. 231) and locally limestones with a total thickness of several tens of metres. Another hiatus and the erosion of the Mesozoic layers were followed by the sedimentation of Neogene sands and gravels, which are preserved only as relics on the plateaus around the Vltava Valley. The latest sediments are Quaternary sandy gravels with river terrace sands, loess and loess-like deposits, blown sands and slopes. The thickness of the Quaternary sediments reaches up to 30 m. Various types of anthropogenic sediments, which are from the Middle Ages to the modern era (fills and landfills of municipal or industrial waste) are also significant. Building stones in the vicinity of Prague are represented by a number of igneous, sedimentary and metamorphic rock types, which have been mined since the beginning of local settlement although with varying intensity in their individual periods (Kovanda et al. 2001). Unworked stone was first used for the foundations of buildings, then worked as masonry or paving stone. These were mainly granitoids of the Central Bohemian Pluton, Proterozoic rocks (basalts, slates, siltstones and cherts), Ordovician quartzite (Fig. 229; e.g. from the quarry at Žižkov), Cretaceous sandstone and marlstone (Fig. 231; e.g. from tectonic fractures of quarries between Petřín and Bílá hora). Among the useful stones, Upper Silurian (Fig. 230) to Lower Devonian limestones are of particular importance, as they were an important raw material used to produce lime or were used for architectural purposes. Powerful loess accumulations were formed on the leeward side of the hills (on slopes exposed to the southeast and east) and were used as high-quality raw material for brickmaking (becoming more important from the 13th century). Cenomanian sandstones, Neogene sands, fluvial gravels and aeolian sands were used for construction purposes (mainly for mortar production).

2.2 Brno

The territory of the central part of Brno is built mainly with highly fractured rocks of the Neoproterozoic Brno Massif (Fig. 232; metabasites, metadiorites and granodiorites). Paleozoic clastic sediments are tectonically inserted between these crystalline rocks (Fig. 233; these are mainly quartz conglomerates, arkoses and arkose sandstones). Small relics of Jurassic limestones (Fig. 234) lie on this foundation. A large part of this territory is covered by Cenozoic sediments. Locally, Neogene clays, sands and gravels occur there. However, these are mainly Quaternary, loess and loess-like deposits. In the valleys of the Svratka and Svitava rivers, gravel sands and alluvial clays dominate (Buriánek et al. 2020). To the west of Brno, Carboniferous to Permian conglomerates, sandstones and siltstones crop out in the area of the Boskovice Basin. To the northeast and east of Brno, the outcrops of Paleozoic limestones (Devonian to Carboniferous) and Carboniferous (Culmian) conglomerates, greywackes and slates (e.g. around Vyškov) can be found.

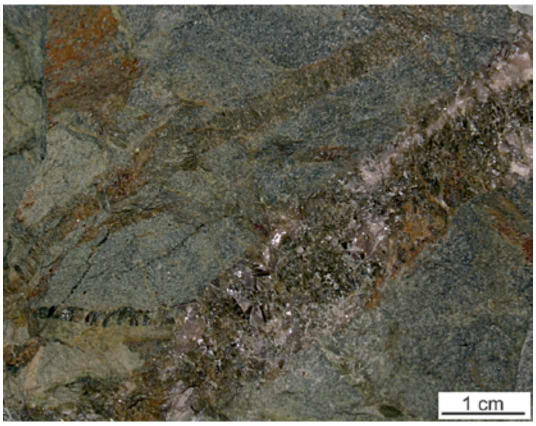


Fig. 232. Metabasite from the Petrov hill in the central part of Brno. Photo by D. Buriánek.

Fig. 233. Paleozoic conglomerate with well-rounded quartz clasts in an arkose groundmass from the Babí lom site. Photo by D. Buriánek.

Stone mining in this area already took place in the distant past. For example, in the Neolithic, material for the polished stone industry was mined south of Brno around Želešice (Přichystal 1988; 2009). In the Middle Ages, local materials were mainly used for house constructions (crystalline rocks of the Brno Massif, Paleozoic conglomerates; Fig. 232, 233). However, the majority of architectural elements in Brno from the late Romanesque to the late Gothic period were made of crinoid limestones from the Jurassic Period (Fig. 234), quarried at Stránská skála (Dvořák 1966) and Bílá hora near Brno. As a building material, lithothamnium limestones and calcareous sandstones (Fig. 235) of the Neogene Period, which were quarried south and southeast of Brno (e.g. on the Výhon hill near Židlochovice), were used significantly. Limestones were quarried not only for building stone but also for lime production. Quaternary loess and loess-like deposits have been mined for a long time in a number of small brickworks close to Staré Brno. Quaternary gravel sands were widely used mainly in the first half of the 20th century (several sand pits were opened in the area between Juliánov and Chrlice). Arkosic non-calcareous sandstones to conglomerates of the Permian Period quarried in the southern part of the Boskovice Basin were exported to Brno. During the later reconstructions of Brno (mainly in the modern age), Paleozoic greywacke and limestone were also widely used.

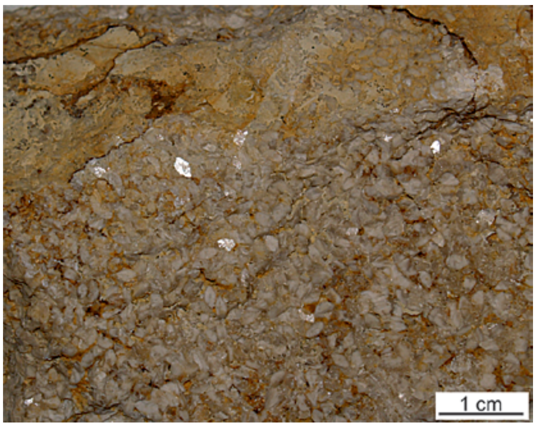


Fig. 234. Crinoid limestone from the Jurassic Period from the quarry in the cadastral area of the City of Brno. Photo by D. Buriánek.

Fig. 235. Lithothamnium limestone from the Rousínov-Kroužek site. Photo by D. Buriánek.

2.3 Jihlava

Jihlava is located in an area that, from a regional-geological point of view, is built with metamorphic and plutonic rocks of the Moldanubian Composite Batholith rocks (Malý 1999). Moldanubicum is characterised by the presence of moderate to highly metamorphosed rocks interspersed with granitoid plutons. The migmatites are mainly medium-grained, sillimanite-biotitic to cordierite-biotitic and often contain up to several centimetres thick positions of pale leucosome. Small amphibolite bodies and fine-grained to fine-grained grey-black graphitic paragneiss with transitions to graphitic quartzite rarely occur in this complex. The stretching direction of these inserts is consistent with the direction of the prevailing metamorphic foliation. Two-mica granites of the Moldanubian Composite Batholith crop out west of Jihlava. In contrast, biotite-pyroxene melanosyenites (Fig. 236) of the Jihlava Massif appear to the southeast of the city. The immediate surroundings of the city are mainly made up of cordierite-biotite migmatites. The Moldanubian metamorphic complex is locally intruded by two-mica granites of the Moldanubian Composite Batholith (Fig. 237). Some granite bodies are located directly under the historical core of the city of Jihlava. The mentioned intrusions are stretched along the direction of the Jihlava fault system (structure parallel to the Přibyslav mylonite zone). The Jihlava fault system is oriented in the northeast–southwest to north-northeast–south-southwest direction and is accompanied by intense mylonitisation. In some places, pegmatite veins, aplite and quartz hydrothermal veins occur in the metamorphic complex. Another characteristic feature is the negligible sedimentary cover. In the central part of the city, relics of Neogene sediments have been preserved, which are dominated by unconsolidated gravel and sand. Metamorphosed rocks weather quite easily due to the presence of biotite and cordierite. Therefore, the crystalline unit is often covered by a thick layer of stony to sandy eluvia for several metres (thickness is usually around 2 m). On the slopes, thin clay-stone sediments are locally developed. There are alluvial sediments in the valleys, and these are the most abundant in the Jihlava River Valley. In the northern part of the city, there are mainly loess-like deposits and eolian-colluvial sediments. Due to its long mining history (Malý 1999), there are numerous small and larger occurrences of tailings, heaps and dumps around the city.

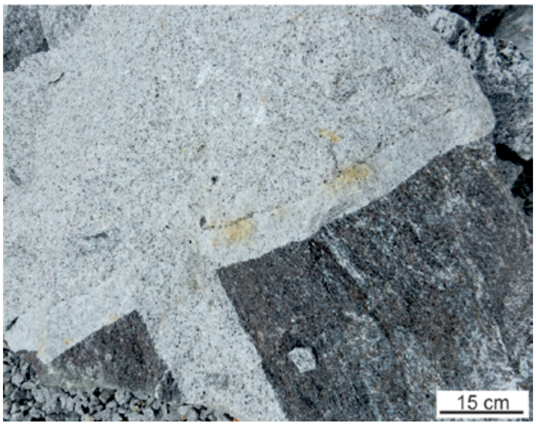


Fig. 236. A vein of two-mica granite intruding biotite-orthopyroxene-clinopyroxene melanosyenite in the Kosov Quarry near Jihlava. Photo by D. Buriánek.

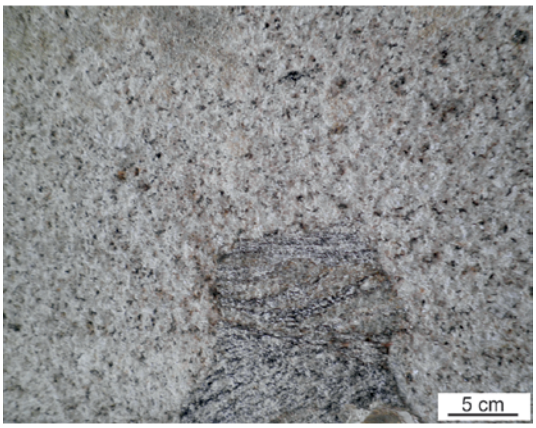


Fig. 237. Two-mica granite with a xenolith of migmatites (a stone building element on the outskirts of the town of Počátky). Photo by D. Buriánek.

The granites of the Moldanubian Composite Batholith (Fig. 237) were popular materials used for the construction of churches and townhouses. For example, during the archaeological research of the early Gothic Dominican Church of the Exaltation of the Holy Cross in Jihlava, I managed to prove that the granite was transported to the construction site in the form of unworked blocks and only then processed according to templates into appropriate forms (Dvořák 1996). To a lesser extent, local sources of inclusion rocks, such as marble, were used (e.g. the Church of St James the Greater).

2.4 Počátky

The town of Počátky is situated on a geological bedrock dominantly built by high-grade metamorphic complex of the Moldanubicum and two-mica granites of the Moldanubian Composite Batholith (Pertoldová et al. 2016). In some places, Cenozoic clastic sediments lie on top of these crystalline rocks.

The Moldanubicum around Počátky consists of biotite to sillimanite-biotite, stromatic migmatites and migmatitised paragneiss. These highly metamorphic rocks are intruded by fine to medium-grained two-mica (muscovite-biotite) granites (Mrákotín type). Quaternary fluvial clays, clays, sands and gravels fill the valley floodplains of the Počátecký Stream and a number of other smaller streams. Unsorted colluvial sediments occur in some places. Anthropogenic activity affects the character and area distribution of other genetic types of Quaternary sediments (e.g. fine-grained sediments in water reservoirs were created by the modification of water courses and the establishment of ponds). In the Middle Ages, between the villages of Žirovnice and Počátky, polymetallic and silver ores (mainly silver-bearing galena) bound to hydrothermal veins in Mrákotín type granites were mined (Luna, Veselý 2001).

Given the geological situation, granites of the Moldanubian Composite Batholith (Fig. 237) and metamorphic rocks from local sources (migmatites) were used as suitable building materials. These rocks were extensively quarried in the past in small quarries. In small sand pits, the weathered eluvia of the mentioned rocks were mined for building sand. Raw brick material was mainly mined in the south and north of the town of Žirovnice, the most famous location was Malinka brickyard (Pertoldová et al. 2016).

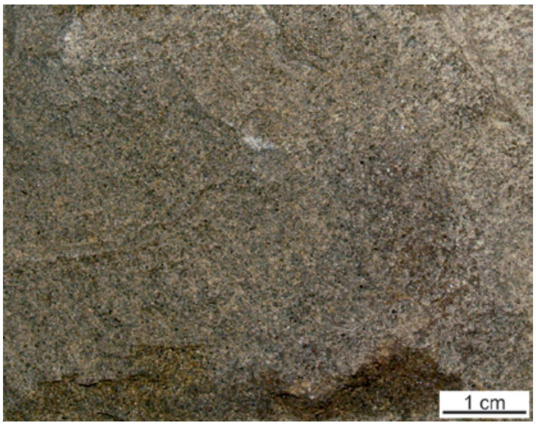


Fig. 238. Sample of Paleozoic greywacke (Opava region, exact location not specified). Photo by D. Buriánek.

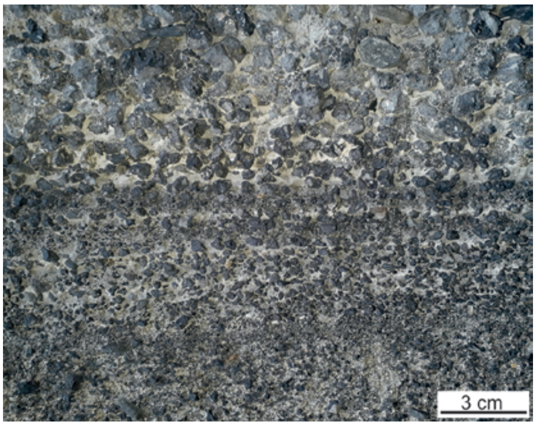


Fig. 239. Sample of the 'Razov tuffite' of volcano-sedimentary origin from the Rázová Quarry. Photo by D. Buriánek.

2.5 Opava

From a geological point of view, Opava is situated on the sediments of the Carpathian Foredeep of the Neogene Period (the Opava Basin), which are largely overlain by eolian, fluvial and glacigenic sediments of the Quaternary age. Sedimentation in the Opava basin began in the Lower Baden, when clayey sands, sandy claystones and sandstones began to settle on folded Paleozoic clastic sediments (cobbles and conglomerates). Later, gypsum layers about 35 m thick sedimented (Fajkus, Mátl 1976). Marine sedimentation ended with a complex of clays, sandy clays and sands with limestone inserts (Chlupáč et al. 2002). This formation was followed by the sedimentation of fluvial, fluvio-lacustrine and limnic deposits in the late Pliocene-Pleistocene (Macoun 1980). In the Quaternary, almost the entire area was covered with glacigenic sediments (gravels, sands, clays). Aeolian sediments represented mainly by loess and loess-like deposits (formed from loess by secondary decalcification) are also abundantly represented. Accumulations of fluvial sediments of the River Opava (gravel, sand, clay) are significant.

Local gravels, sands, clays and loess-like deposits were widely used for construction purposes, but building stone was transported from greater distances. A petrographic study of the historical buildings in Opava conservation zone indicates that a wide range of materials was used for the construction of medieval houses. Greywackes (Fig. 238), fine sandstones, glauconitic sandstones, schists and limestones mostly came from sites in the Osoblaha region, in the vicinity of Krnov, Hradec nad Moravicí and the adjacent part of Poland (Dvořák 1996; Havlíková 2007). Pleistocene basic tuffites (Fig. 239), which were mined in the vicinity of Rázová, south-east of Bruntál (Barth, Zapletal 1978), were also used relatively abundantly.

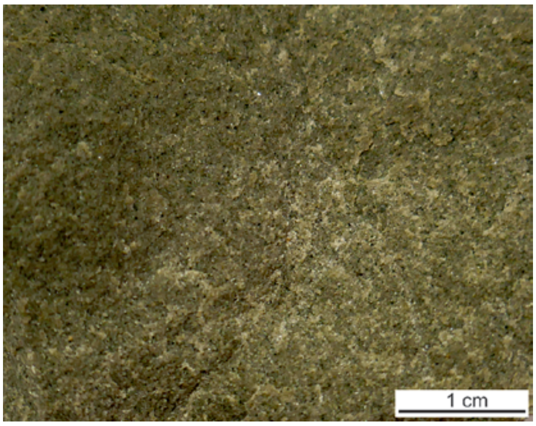


Fig. 240. Sandstone sample from the Rača Unit (Horní Lideč). Photo by D. Buriánek.

2.6 Uherský Brod

The town of Uherský Brod is situated in the Olšava Valley, which is partially filled with quaternary fluvial sediments. The surrounding hills are built of alternating layers of sandstones (Fig. 240) and claystones of the Račany and Bělokarpatská units (Magura group of nappes). These sediments from the Paleogene Period belong to the Carpathian Flysch Belt. To the south and west of the city, loess and loess-like deposits emerge. Accumulations of colluvial deposits with different grain sizes are locally developed on the slopes.

Natural outcrops of the previously mentioned flysch sediments are rare in the city. However, these sediments, mainly sandstone, were widely used to build a number of houses, city walls and local churches. Loess was mined in the past for the production of bricks (Havířice).

2.7 Uherské Hradiště

From a geological point of view, Uherské Hradiště is situated in the Lower Morava Valley, which is formed in the Neogene sediments of the Vienna Basin (clays, silty clays, silts, siltstones, sands). The city is largely located on the floodplain of the River Morava, which is why fluvial sediments dominate the subsoil of the urban development (Fig. 241; gravel, sand and flood clay), while the city centre lies on anthropogenic sediments. The surrounding hills are built of Paleogene sandstones and claystones of the Rača Unit (Magura group of nappes). In some places, the slopes of the hills are covered with loess (Fig. 242), loess-like deposits and colluvial sediments.

In the vicinity of Uherské Hradiště, there are numerous sources of raw brickmaking materials. The relatively abundant building material in this area is fine-grained flysch sandstones (Bartík et al. 2016c).

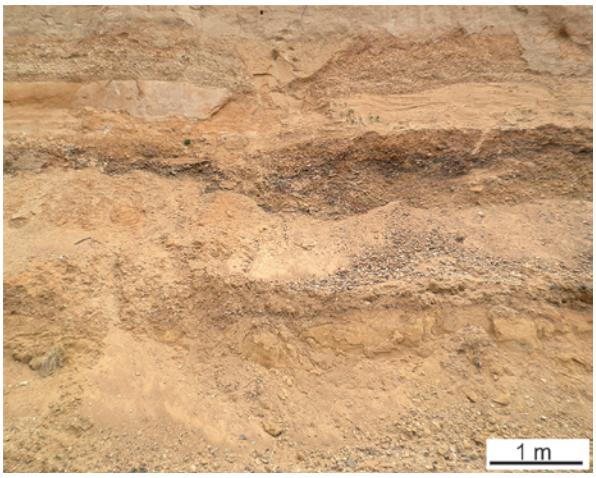


Fig. 241. Gravel and sand from the River Morava in the Polešovice sand pit southwest of Uherské Hradiště. Photo by D. Buriánek.

Fig. 242. Outcrop of loess near the village of Ježov, west of Uherské Hradiště. Photo by D. Buriánek.

3. Discussion and conclusion

The Czech Republic has a very rich geodiversity (Ložek et al. 2020). As a result, in certain areas, the possibilities of building materials are highly variable although are very limited in others. For construction purposes, greater variability of a suitable material is always more advantageous. For example, the variability of building materials is the greatest for the territory of Prague. Sedimentary rocks of the Barrandien and Czech Cretaceous Basins, igneous and metamorphic rocks provided a wealth of readily available material. Due to the thick loess accumulations, there was sufficient material for the construction of wood-and-clay buildings, and later for brick production. Thick gravel deposits may have been used for landscaping. The situation is similar to Brno where there is no shortage of sedimentary rocks from limestone areas and igneous and metamorphic rocks of the Brno Massif. At the same time, much material for the construction of wood-and-clay houses is available in the vicinity, both in the form of loess and possibly Neogene calcareous sediments. As in the case of Prague, in Brno, there are a number of locations available for gravel mining. Uherský Brod and Uherské Hradiště are in a similar situation, even though they do not lie on a magmatic or metamorphic substrate but the sediments of the Western Carpathian Flysch Belt. These sedimentary rocks (sandstones, conglomerates) no longer reach the surface there although they had to be mined in the vicinity of towns as they were widely used to build a number of houses, town walls and local churches. At the same time, these two cities are situated in an area with a thick layer of loess, which in the past provided sufficient material for the construction of wood-and-clay buildings and brick production.

The situation is more complicated for the other discussed locations. While sites in the Bohemian-Moravian Highlands such as Jihlava and Počátky have a diverse range of metamorphic or igneous rocks, the amount of sediments suitable for the construction of wood- and-clay buildings or buildings made of bricks is minimal. The reason is the absence of loess. The opposite of this situation is the city of Opava. Thick deposits of loess and glacigenic sediments in the past provided enough material for wood-and-clay buildings while the igneous, metamorphic or sedimentary rocks suitable for the construction of larger structures were rare, as the city is geologically situated on the sediments of the Carpathian Foredeep of the Neogene Period. Therefore, building resources came from a greater distance and were quite variable. The sources were, for example, sites in the Osoblaha region, in the vicinity of Krnov, Hradec nad Moravicí and Poland, which mainly provided sandstone, limestone and schists material. Other relatively used but also imported material was basic tuffites (imported from the vicinity of Bruntál).

Conclusion

The beginnings of burgher construction in Moravia

Marek Peška

1. Existing research of the earliest burgher houses in the Central European context

Along with research into deserted villages, castles and religious buildings, the study of medieval towns is one of the essential subjects of medieval archaeology. In contrast to other areas, however, it has a clear advantage in the acquisition of new information, which is usually connected with rescue excavations. Research into towns and cities started to attract the attention of Central European archaeologists and building historians relatively late, with the main stimulus being the post-war restoration of German towns and cities that also involved interest in medieval burgher houses (see, for example, the series of proceedings *Jahrbuch für Hausforschung*; *Das Deutsche Bürgerhaus*). This trend arrived in the Czech lands in the late 1960s in connection with archaeological investigations in Prague, whereas urban archaeology only came to the fore at the national level after 1989. Although research into standing historical buildings in the Czech Republic goes back to the 1950s (cf. Mencl 1953; recently journals like *Průzkumy památek*, *Dějiny staveb, Svorník*), it had not been possible to reliably date their earliest phases from the 13th century without archaeology. Despite the fact that the issue of the earliest burgher buildings is one of the most interesting in this area, it has attracted little interest in this country, unlike the situation in the German milieu. Due to the absence of written sources and the wood-and-clay character of the earliest burgher constructions, the buildings in early towns are not easy to access and reconstruct. While collaboration with building historians has become commonplace over the last two decades, discussions with ethnologists have only taken place at the level of medieval village houses (e.g. Frolec 1982). The reason might be sporadically preserved timber and wood-and-clay village houses that are now dated by dendrochronology to the 15th century. Earlier structures have not been preserved in this country, in contrast to the situation in German-speaking lands (cf. Bedal 2006). The intersection of the two disciplines in this area was undoubtedly caused by the minor changes that village houses had undergone since the Middle Ages. In contrast, burgher houses originated gradually, and only fragments of medieval timber constructions (tie beams – 'Strahlspannzange', timber framing – 'Fachwerk', log chambers – 'Blockbau' etc.) have survived on a limited basis. And yet, building technologies, procedures and layouts identified with village houses can also be sought with the earliest wood-and-clay houses. Surprisingly, this interpretation has not been applied in this country, nor has it gained much attraction abroad thus far. Traditional building technologies documented in the mid-20th century (cf. Syrová, Syrový 2012; 2014) should be understood and studied as part of 'the long Middle Ages' as defined by Jacques Le Goff.

With only a few exceptions, neither Czech nor international archaeological literature has any summaries of information about wood-and-clay structures in early medieval towns, including more general analyses of specific topics such as framework, layout, above-ground parts, chronology etc. (cf. Gläser ed. 2001; Untermann ed. 2012; Klápště 2002). In addition, a number of field findings have been published insufficiently or not at all. On the basis of published results, the issue was addressed by Jerzy Piekalski's monograph from 2004 (Piekalski 2004b) which, owing to a lack of suitable examples, only touches upon the territory of East Central Europe. The majority of available works are only studies presenting general contexts in a positivistic manner without further interpretations and comments, usually within individual summarising excavation reports. The subject is addressed, in general terms, by publications summing up information for particular towns or cities, regions and areas (e.g. some studies in the journal *Mitteilungsblatt*, further, for instance, Altwasser, Klein 1993; Caune 1993; Donat 2000; Klápště et al. 1996; Piekalski 1996a; Procházka, Snášil 1984; Schalies 2012; Scheftel 1990). Typical examples of wood-and-clay structures on archaeological sites are right-angled subsurface features characteristic of the early urban milieu throughout Central Europe, from the 12th century onwards. Above-ground structures west of the Czech Republic are either anticipated or their finds are unique (e.g. Braunschweig, Minden, Warburg) and geographically conditioned (i.e. Holland; see, for example, Gläser ed. 2001). In the Czech lands, these cases are exceptional and have only been published sporadically, for example, from Uherské Hradiště, České Budějovice (Procházka, Snášil 1984; Čapek, Militký 2021). This state might be the result of uncertainty and a lack of experience in the interpretation of archaeological contexts. Generally speaking, the earliest wood-and-clay structures currently attract little interest among medieval archaeologists and are largely presented within broader studies devoted to urbanism. An important discussion was only triggered by a long-term dispute over the interpretation of the recessed parts of wood-and-clay houses. These were, especially in the Czech lands, long considered provisional dwellings (pit houses – 'Erdkeller'), while now it seems that cellars ('Kellerräume') would be a more appropriate interpretation (see, for example, Baumhauer 2001; Donat 2000; Goš 1984; Holub et al. 2005a; Klápště, Velímský 1978; Loskotová, Procházka 1995; Michna 1988; Schwabenicky 1997; Vařeka 2002).

This was particularly evident in the first comprehensive work written for the Moravian milieu by Pavel Michna (1988), who directly mentions the term 'recessed dwellings' with patterns in Slavic territory.

For a relatively long time and with only a few exceptions, the discussion was limited to the interpretation of the function of these spaces, which was still heavily manifested in the articles of the anthology from 1996 (Brachmann, Klápště eds. 1996). In yet another attempt to revive the subject, a conference was organised in 2002 on wood-and-clay buildings in medieval towns (FUMA II proceedings), which to this date was the last larger contribution to this debate (Merta, Peška eds. 2005).

The largest assemblage of wood-and-clay buildings in the Czech Republic comes from Brno and Prague and is the result of years of systematic rescue archaeological excavations (cf. Holub et al. 2005a). However, many of these structures, represented primarily by basements, are also known from the majority of former royal towns in Bohemia and Moravia (cf. Vařeka 2002; Michna 1988; Merta, Peška eds. 2005). These single-space structures are characterised by considerable variability in both size and construction (post and beam – 'Ständerbau'; timber-framed – 'Holzrahmenbau' etc.). Yet, regional syntheses from the perspective of their typology are missing. The number of finds is usually directly proportional to the number of excavations conducted in a given location. The quality of excavations and their documentation varies considerably and their further usefulness is at least questionable. Based on the examples of long-term archaeological research in episcopal Kroměříž (Chybová 2009) and Znojmo (mostly unpublished), it is quite obvious that without archaeological specialisation and deeper interest it is not possible to obtain relevant information about historical buildings. Surprisingly, in spite of dozens of excavations, we have no significant knowledge of the oldest wood-and-clay buildings from the two towns mentioned above. In neighbouring Slovakia, remnants of wood-and-clay buildings are known primarily from Trnava, Bratislava and Košice (Doležel ed. 2006; Žuffová ed. 2009; Hoššo 2008; Rusnák 2012). In nearby Silesia, the largest collection of wood-and-clay buildings comes from Wrocław, which, along with Prague and Brno, is one of the best-investigated cities in Central Europe. These types have not been adequately published in Austria, which is the result of the state of processing (Gaisbauer et al. 2007). A separate category to a certain extent is dwellings from deserted market settlements in Hradišťko near Davle and Žďár nad Sázavou, as is the precisely elaborated issue of mining settlements (e.g. Hrubý 2011; Crkal et al. 2019). Probably the most significant and inspiring findings in the Czech Republic were made during the extensive and long-term excavations of the suburb of Sezimovo Ústí, where entire farmsteads burnt by the Hussites in 1420 were uncovered and their earlier development up to the 13th century is described. But from the perspective of detailed construction development, even this excavation could deserve a more comprehensive analysis (Richter, Krajíc 2001).

Finally, a comparison of urban and rural buildings, which were very similar during the 13th century, is also very important when considering the form of the first burgher buildings, as mentioned above. Moreover, the study of deserted villages has a tradition in Central Europe dating back to the 1960s, during which time a relatively large inventory of finds has been assembled. However, the use of the results from older excavations of deserted settlements from Bohemia, Moravia, Lower Austria, Slovakia and Hungary is problematic due to the quality of these earlier investigations and it is necessary to work with their results very carefully (summarised in Vařeka 2004; Nekuda 2007). The majority of these excavations would fall short of today's research standards (e.g. Pffafenschlag) and are not even published in quality form (e.g. Svídna), which presents a problem especially for the interpretation and dating of construction phases and especially the spatial layouts of farmsteads. Several new excavations of Moravian wood-and-clay rural buildings can also be used for a general comparison (Dolní Heršpice, Knínice u Boskovic, Sebranice u Kunštátu; Kolařík et al. 2015; see Chapter 20).

2. The use of geoarchaeology and other natural sciences in the study of the oldest burgher buildings

From a natural science perspective, dendrochronology has a truly exceptional standing in medieval archaeology; along with find assemblages, it provides crucial support in the establishment of chronology. Two unique examples from recent years are the excavation of the bailey at the castle in Veselí nad Moravou with several phases of log structures from the 13th century, and the excavation of the 12th-century pre-urban 'wooden' farmstead on Masarykovo Square in Třebíč (Dejmal 2015, 50–79; Hoch 2022, 28–47). Dendrochronology is heavily employed especially in the investigation of the earliest wood-and-clay buildings in Brno (see Chapter 9), despite the fact that Brno is not an ideal location due to moisture conditions. In the case of Uherské Hradiště, very rich in finds of wooden elements and the entire floor plans of above-ground buildings thanks to the high groundwater level, modern excavations with complete natural science analyses have unfortunately not been conducted in recent decades (see Chapter 15). The dendrochronological determination of carbonised samples of wooden structures marked a certain breakthrough in the collection of dendrochronological samples around the turn of the new millennium. Today, thanks to these absolute dates, we have a far better image of the more detailed construction development of selected Brno land plots, e.g. 4 Kobližná Street, 4 and 17 Svobody Square, and are able to more precisely determine the lifespan of buildings and the emergence of masonry development at the end of the 13th and beginning of the 14th century (see Chapter 7). A large number of palaeobotanical samples have been collected in recent decades from the fills of wood-and-clay buildings – mostly wet-sieved but undetermined macroremains. While their determination or subsequent publication is rare (see, for example, Chapter 10), future analyses of the backfills of selected basements from Veselá Street in Brno hold potential. Whereas plant seeds and fruits in the floors point to standard operation and the storage function of spaces, extinction horizons with a large amount of ruderal vegetation testify to the waste characters and the gradual and long-term filling of pits from former buildings (see Chapter 10). Nevertheless, archaeological observations have shown that a majority of the basements were filled immediately after they no longer served their purpose. Again, very interesting analogies are known from Veselí nad Moravou and Třebíč (Kočár, Kočárová 2015; 2022). Since 2006, floor samples in particular have been collected for micromorphological analysis to improve our understanding of the interiors of houses and for the interpretation of the function of individual spaces (Lisá et al. 2009). In general, it can be said that the sedimentary environment of archaeological layers is a type of environmental archive which, with the properly chosen methodological approach, can provide invaluable information on the relevant archaeological context (see Chapter 1). In this way, the floor sandwiches (layers) of above-ground and basement spaces in Prague, Brno, Opava and the Jihlava region (Chapter 3, 8, 12, 14, 17, 18; Lisá et al. 2020b; 2021) have been studied in various intensities, and the analyses have also recently extended into the rural environment (Chapter 20). This has especially created a better understanding of the formation processes that led to formation of the floor sandwiches. While above-ground spaces typically featured mats and wooden elements that were maintained by sweeping, the basement floors were often created by simply trampling down charcoal and remnants of organic matter. However, in both cases a 'passive' (structural) layer was intentionally prepared, in some cases even repeatedly after a certain amount of time (Chapter 3, 12, 14, 18). The sanitary purposes and frequent use of these layers was very easy to observe mainly in later floor contexts created in the rural environment (Chapter 20). Another finding from the contexts published in this book is the influence of the environment on the formation of floor layers. Common practices cannot be generalised in environments with higher groundwater levels (Chapter 14) or in areas with an insufficient amount of loess (Chapter 12, 17, 18). Finally, of key importance for the application of micromorphology is close communication between the geologist and the archaeologist in creating the strategy for collecting samples and the method by which they are processed. In the future, paleobotany and micromorphology are the fields that can in particular shed more light on life on the medieval burgher plot and the surrounding environment.

3. The appearance of the oldest burgher buildings in Moravian towns

Moravia takes its name from the eponymous (and longest) river that flows through a large part of the land and empties into the Danube. The southern part of the River Morava opens up into the Danube region, from where it assumed the majority of cultural impulses which arrived in prehistoric times. Olomouc region is connected with the lowlands of Upper Silesia. The main long-distance route ran through the Moravian Gate, between the Nízký Jeseník Mountains and Beskydy foothills before continuing through the River Oder basin to the Opole Lowlands. The south of Moravia is separated from Bohemia by the impenetrable Bohemian-Moravian Highlands, the occupation of which did not begin until the 12th century. For the entire Early Middle Ages, the main long-distance route bypassed these highlands through the Boskovice Furrow and the valleys of the Svitava and Loučná rivers and into east Bohemia. These were also accessible from the Middle Morava along the smaller Třebůvka and Moravská Sázava streams. The areas immediately to the north of the Hrubý and Nízký Jeseník mountains historically belonged to Silesia. For millennia, the described geomorphological conditions and long-distance routes have fundamentally influenced cultural exchange with neighbouring lands, a situation that did not change significantly until gold and silver were discovered in the mountainous parts of the Bohemian-Moravian Highlands around Jihlava and the Hrubý Jeseník Mountains in the space between the towns of Bruntál and Zlaté Hory (Zuckmantel). These circumstances connected with the arrival of the German-speaking population at the end of the 12th century and the first half of the 13th century fundamentally altered the cultural orientation of these areas.

Historically, Moravia was a permanent part of the Duchy of Bohemia beginning in the 11th century and the main outposts of royal power – Brno, Znojmo and episcopal Olomouc – naturally became a genesis of the most important Moravian towns. The urbanisation process in these centres began as early as the end of the 12th century and culminated with the laying out of new town plans in the first decades of the 13th century. However, from a legal perspective they were overtaken by the less important north Moravian royal towns of Uničov (Mährisch Neustadt; 1223), Bruntál (Freudenthal) and the Silesian Opava (Troppau) with Krnov (Jägerndorf; 1221). All of these towns (including Olomouc – Olmütz) were governed by Magdeburg Law administered through towns in the more culturally advanced Lower Silesia. Moreover, the gold-bearing area of the Jeseníky Mountains was the subject of a property dispute between the margrave of Moravia and the bishop of Wrocław, who colonised the area in the first half of the 13th century. In south Moravia, Znojmo (Znaim; 1226) was the first town to be granted privileges, with Jemnice following a year later; Brno gained town rights relatively late – only in 1243. It is noteworthy that unlike Silesian and north Moravian towns, those in south Moravia were founded based on the south German municipal law, thus confirming the cultural orientation of the southern part of the land towards the Danube region. The network of the most important towns in the 1240s also included Jihlava as the only one of the four largest Moravian royal towns built on greenfield sites in the silver-bearing central part of the Bohemian-Moravian Highlands as the main mining and trade centre. The new long-distance route from south Moravia to Bohemia also ran trough here in the future. Settlers and merchants from Western European countries, whose presence is mentioned in privileges and other documents, contributed to the founding of nearly all Moravian royal towns in the first half of the 13th century. Key information produced by archaeology on the urbanisation process in Moravia is that the legal status of a town was typically not in line with its actual urbanisation. For example, the measuring out of the town plans of, say, Brno, Znojmo and Olomouc undoubtedly occurred several decades before they were granted town rights. According to existing archaeological knowledge, the largest royal towns in particular underwent rapid development over the course of three or four generations and changed beyond recognition by the beginning of the 14th century. And yet, this process occurred roughly a century later than in the advanced Western European regions. In any case, around 1300 there was a network of more than twenty royal towns and other smaller feudal towns in Moravia and the adjacent part of Czech Silesia, which, however, had different development dynamics depending mainly on their geographical location and the importance of nearby trade routes. Knowledge of the diverse origins of these towns and their form has only fundamentally shifted in the final decades of the 20th century, especially thanks to numerous archaeological excavations (Fig. 243).

In the words of historian Josef Žemlička, the entire Kingdom of Bohemia was 'in motion' in the late 12th and early 13th century (Žemlička 2014). One of the features accompanying the changes and transformations was the arrival of the German population and the associated settlement of hitherto 'untouched' parts of the country, the establishment of new villages and market and craft centres, which, granted legal privileges, soon became towns, or new ones were founded for a specific purpose (Klápště 2012, 325–458; 2016, 123–145). Gaining an understanding of the origins of their construction form is very difficult, because apart from monasteries, churches and a few very exceptional royal buildings, the whole country was built of wood and clay. The only real city that copied the development of communal life in Western Europe at this time was Prague, with its many stone Romanesque sacred and

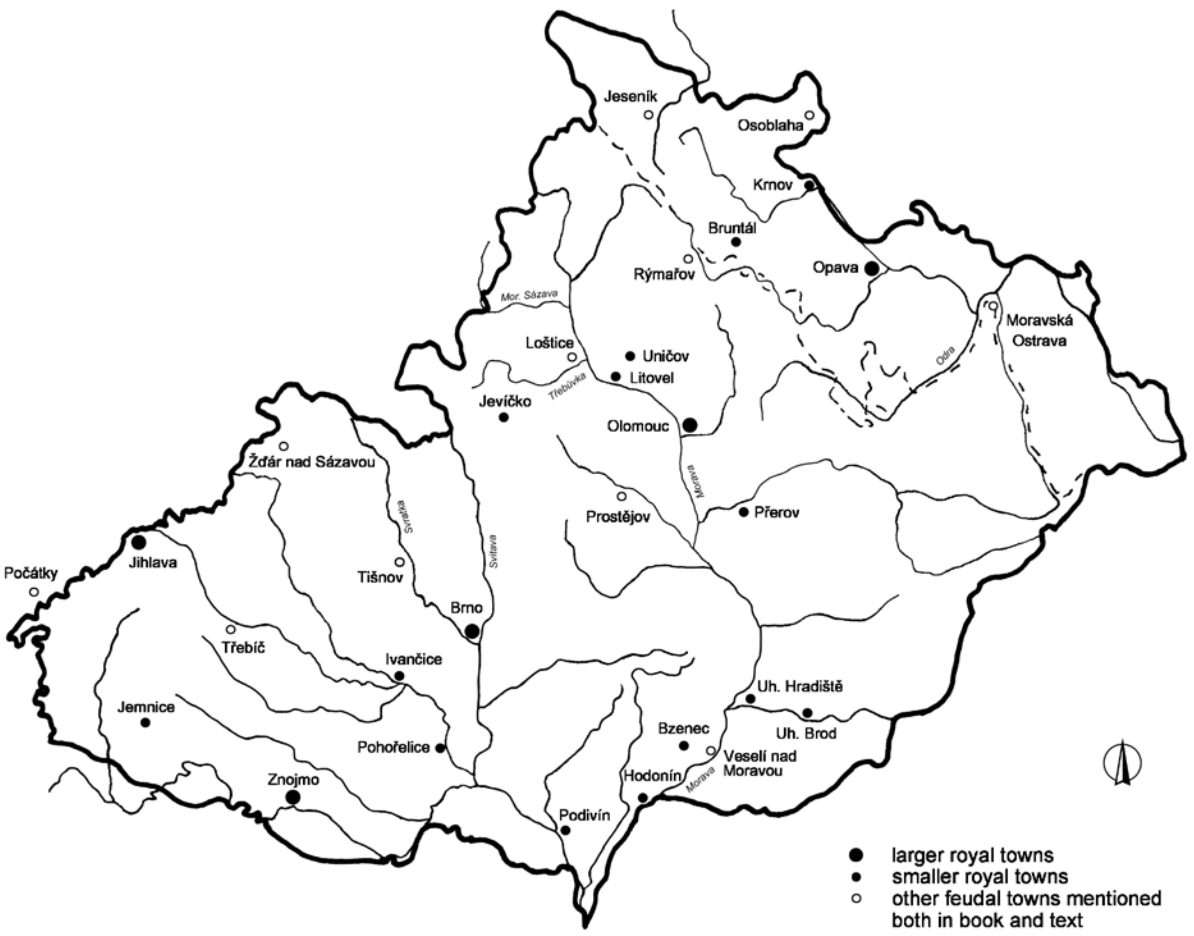


Fig. 243. Plan of historical Moravia and Czech Silesia featuring the network of royal and feudal towns and smaller feudal towns around the year 1300 mentioned in both book and text. Author L. Sedláčková.

secular buildings (Dragoun 2002b). Nevertheless, Fynes Moryson (born 1566), who travelled through Central Europe from 1591 to 1593, noted that in Prague '*certain buildings are from brick, though most are from wood and clay, built with little grace or craftsmanship, with walls made from whole trees as they were brought from the forest, with remnants of bark visible on both sides here and there*' (Vařeka, Frolec 2007, 44). This observation applied virtually to all Bohemian and Moravian towns, which remained to a large extent wooden until the end of the Thirty Years' War. Here we can turn, for example, to finds of late medieval basements on the outskirts or suburbs of cities such as Brno, Opava and Jihlava; we also have documented cases on the main square of Uherský Brod and in the smaller feudal towns of Jeseník, Loštice, Osoblaha and Tišnov (Chapter 16, 19; Lisá et al. 2009; Kouřil et al. 2007, 251–255).

Despite very intensive archaeological investigations in Bohemian and Moravian towns and cities at the end of the 20th century, the search for early residential above-ground buildings is complicated (cf. the research of Moravian towns in Procházka 2007a). Their former presence was recorded during excavations in practically all investigated towns. The character of this development is difficult to grasp, as most of the earliest archaeological contexts were destroyed by the later post holes, cesspits, foundations and cellars of later houses. In many towns, entire layers that were removed in the past during the levelling of wood-and-clay houses, maintenance and the operation of yards or other construction and craft activities are completely missing, which also makes it possible to speak of the 'archaeology of the unfound'. Examples of such poorly stratified sites include Brno, Osoblaha, Prostějov, Uherský Brod and Znojmo. At the opposite end of the spectrum are highly layered sites (primarily inundation) with documented stratified layers several metres thick, where earlier contexts, in contrast, are difficult to reach, e.g. Litovel, Olomouc, Uherské Hradiště and Uničov, though the best-known example in the country is Prague (Chapter 2; Klápště 2016, 100–123). Above-ground wood-and-clay buildings are present in all towns throughout the entire 13th century and are mostly predominant all the way up to the post-Hussite period in the second half of the 15th century. This type of construction is represented primarily by post holes, trenches or foundation beams for timber-framed and log construction, with a wide variety of heating and cooking facilities and floor layers also being common (cf. Chapter 4, 6, 15; Procházka 2007a, 52–56; Bláha 1999, 200–201). The remains of foundation walls for the threshold beams of timber-framed or half-timbered structures are also documented in rare instances, e.g. at a house built at the end of the 13th century on Přemysl Otakar Square in Litovel (Šlézar 2008, 173–175; Faltýnek et al., in print) and at another house that succumbed to fire around the year 1400 at 26–30 Hrnčířská Street in Olomouc (Bláha 1999, 210). An absolutely unique example in this sense is the preserved half-timbered house from the middle of the 15th century at 8 Mečová Street in Brno (see Chapter 6). While this type of building was undoubtedly widespread in medieval Moravia, in the absence of a preserved impression of the threshold beam in plaster or the above-ground parts, its existence is difficult to confirm. Whole ground plans of surface buildings are more of an exception in the Moravian milieu, with the set of buildings from Uherské Hradiště clearly being the most significant example. Several excavations that have only been published in preliminary form but which are nevertheless extraordinarily interesting come from the centre of Olomouc. These include a three-compartment house from the 14th century with a room that was over 9.2 m long and 5 m wide (5 Pekařská Street) and a multi-compartment house abandoned around 1300 with a timbered room with dimensions of 5.5 × 5.5 m, a plank floor and the foundation plinth of a heating device (2 and 4 Třída Svobody; Bláha 1999, 206–209). Uncovered in the historical suburb of Brno are the remains of an unusually large house (ca 15 × 15 m) with a post-built structure (Zůbek 2016, 351–352). The long 5 × 13 m hall house completely uncovered in Wrocław's Nowy Targ Square serves as a perfect comparison (Chapter 4). Yet another example is a smaller residential building in the centre of Prostějov covering an area of 5 × 5 m (Čižmář, Šmíd 2000, 85), and many unpublished cases are known from other towns, even if the majority of these are not processed and their overall spatial layout cannot be interpreted. An excellent guide in this respect is the archaeological excavations from the aforementioned Uherské Hradiště (Chapter 15), where we observe considerable variability among buildings, always with multi-compartment ground plans like in Olomouc (Bláha 1999, 209). The author of the chapter on Uherské Hradiště, Rudolf Procházka, believes that the specific geological conditions and the absence of recessed parts may have been the reasons for the multi-space houses, though this is not entirely true for Olomouc. Nevertheless, Procházka also looks for analogies in the rural milieu. The form of the above-ground wood-and-clay buildings in relation to the recessed parts of the houses (basements; Fig. 244) may be made clearer in the future by recent large-scale archaeological excavations in Ostrava (corner of Muzejní and Velká streets; Kaniová et al. 2019), Brno (Veselá Street; see Chapter 6) and in Olomouc (vacant lot in Denisova Street; Zatloukal 2017), where it would also be very helpful to process older excavations of entire plots from the 1970s to the 1990s (Bláha 1999).

Rectangular buildings with ramped entrances are the most characteristic feature of Bohemian and Moravian towns in the 13th century. Compared to the modest remains of above-ground parts, the recessed parts of the houses are better preserved and besides towns, market and mining settlements, they were also present in rural settings. As such, recessed cellars represent both a cultural change and a certain universality in period construction forms. This uniformity was also initially seen across society and the paths of villages and towns did not diverge until the stronger urbanisation of urban space in the

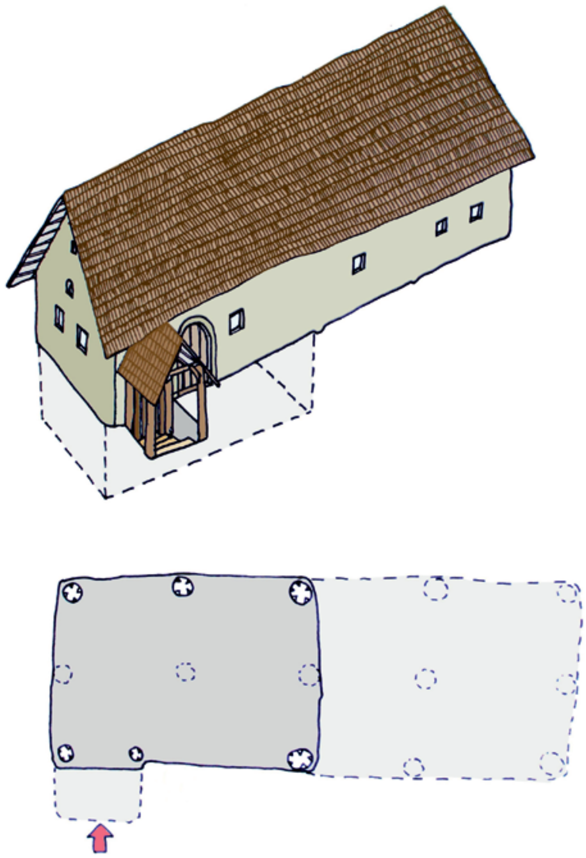


Fig. 244. Brno, Veselá Street. Reconstruction drawing of possible appearance of ground-floor wood-and-clay house with a basement from the 13th century. Drawing by D. Merta.

ensuing centuries. Views on the function and interpretation of these structures are summarised in the introduction to this work and most of the authors of this book comment on them in their chapters. However, over the last two decades, with only a few exceptions (Goš, Halama 2013), it has been accepted in this country that these are indeed the remains of non-domestic (or utilitarian) parts of houses (Vařeka 2002, 268, 270; FUMA II proceedings). We have only inconclusive evidence for an originally intended residential character, in particular the absence of heating devices in most of the uncovered structures (Holub et al. 2003). In contrast, a heating device was a fixed part of semi-recessed dwellings from the Early Middle Ages known from both Slavic and German milieux (Brachmann, Klápště eds. 1996). In 13th-century Bohemian and Moravian cellars, undemarcated burnt places on floors without any structural parts were usually interpreted as hearths or fireplaces, but most of the time these are probably traces of fires or of the tempering of the spaces during the winter months, or perhaps even sanitary smoking (?). And yet, it cannot be ruled out that some of the buildings were in fact used temporarily for residential purposes. Actual heating devices on floors are usually found in mining areas (e.g. Rýmařov, Jihlava – Michna 1988, 240–242; Crkal et al. 2019, 892–904) and in rare cases even in market settlements such as Hradišťko near Davle (Richter 1982, 43–44). On the other hand, documented in urban areas in the last two decades are several exceptional cases of the ruins of heating systems that collapsed into basements from above-ground parts of houses as a result of fires (Brno, Uherský Brod, Wrocław; Chapter 4, 6, 16), thus demonstrating the residential character of the ground floor and bringing us to the second key issue – the overall form of the house. Not even Brno and Prague satisfactorily resolved this issue, despite the largest number of finds of basements of wood-and-clay buildings. The existence of above-ground parts extending beyond the ground plan of the basement is mostly only presumed. In rare cases, various post holes are preserved in their surroundings. And yet, it must be noted that the situation is similar in Western Europe, where there are very few proven cases (Rötting 1996, 49–52). From Moravia we have at least one (unfortunately published thus far only in preliminary form) example of a wood-and-clay single-storey (?) house from Olomouc, where the above-ground and basement parts were uncovered during the construction of the Prior department store (Bláha 1999, 198–199). Frame

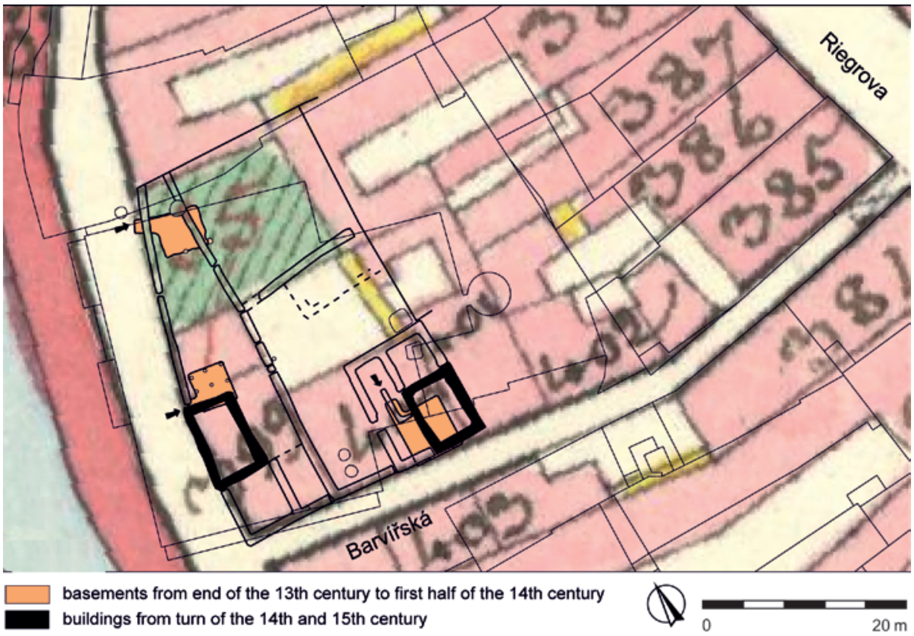


Fig. 245. Olomouc, 19 Třída Svobody. Investigated plots located along Barvířská Street in close proximity to town wall featuring remains of excavated basements and masonry houses. After Michna 1988, 227, Fig. 2, modified by M. Peška.

construction, which is suitable for multi-storey structures, was common in towns. As in Western Europe (Gläser ed. 2001), it is therefore possible to assume that a number of houses were built only on the ground plan of the basement, as was the case, for example, in Wrocław's Nowy Targ Square (Chapter 4). It was apparently similar in Radniční Street in Opava, where a few years ago three adjacent basements were captured along the street line of one of the defunct narrow gaps between houses (Chapter 13). In this respect, the multi-storey house with a frame construction at 17 Svobody Square in Brno was undoubtedly an extraordinary building whose imposing 7 × 17 m ground plan almost reached the town square (Chapter 6). Similar buildings undoubtedly also stood in Wrocław and perhaps the written reference to 'beautiful houses of clay' dating from the 1270s is related to them (Chapter 5).

While we have many examples of the regular placement of cellars in short-lived and deserted settlements (Hradišťko near Davle, Rýmařov, Staré Mýto, Žďár nad Sázavou etc.), we are deprived of this information in living urban organisms that developed over centuries. Above all, there is a lack of large-scale excavations that would shed greater light on the building history of these plots, forcing us to rely mostly on a number of small findings and, to a large extent, on analogous situations. Exceptions that reveal the diverse and to some extent disordered development of some sites are archaeological excavations in Panenská and Veselá streets in Brno (Chapter 6, Fig. 103 and 106), in Barvířská Street in Olomouc (Fig. 245), on Masarykovo Square and in Hradišťská Street in Uherský Brod (Chapter 16), in Otakarova and Masarykova streets and on Mariánské Square in Uherské Hradiště (Chapter 15), and even in the Silesian town of Osoblaha (Chapter 19). And yet, numerous excavations from Prague (e.g. Mikulandská Street – Chapter 2) and Wrocław (Chapter 4) are excellent comparisons. Given the limited dating

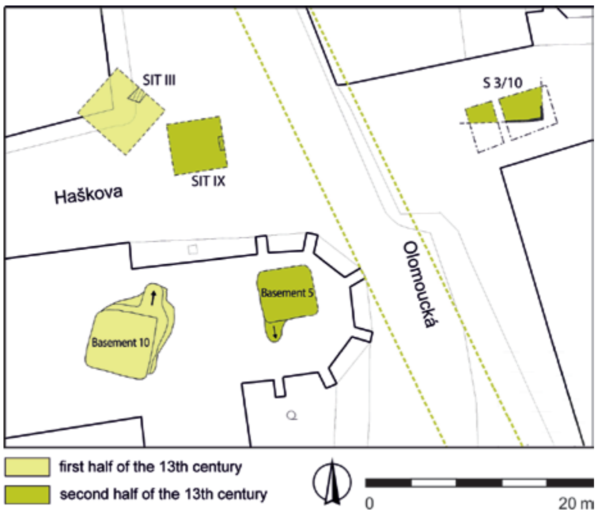


Fig. 246. Uničov, crossroads of Haškova and Olomoucká streets with Church of Exaltation of Holy Cross. The plan shows documented parts of basements of former wood-and-clay houses. After Šlézar 2013, 63, modified by M. Peška.

possibilities and the relatively long lifespan of houses, it is often impossible to precisely establish the contemporaneity of adjacent structures that do not disturb one another and stand apart from their surroundings. Małgorzata Chorowska posits that the need for space during the renovation and repair of the outer walls (Chapter 5) may explain the spacing.

The examples of Brno, Prague and other cities show that basements usually respected the measured lines of the house blocks, and in many cases they were also located at the street lines (Opava – Radniční Street; Olomouc – Barvířská Street etc.). However, this was certainly not the rule and basements are found in any part of the plots. The orientation of entrance ramps exhibits similar variability. Basements in Jihlava, Opava and Uničov even extend beneath public space and sacred buildings (Šlézar 2013, 63; Fig. 246; Chapter 11, 13), though these examples are rarer and indicate a later stabilisation of the street line. In some cases, the uncovered parts of basements beneath streets in superposition with later structures can even reveal a fundamental change or reduction of the town plan in the later period (e.g. the feudal town of Počátky, see Chapter 17).

The dimensions of the majority of investigated basements are for the most part small, square and typically in the range of 10–25 m^2. Other basements of a rectangular character can be up to 50 m^2 long and, with only a few exceptions, are found in the urban areas. Ground plans exceeding 100 m^2 are also found in rare cases, e.g. at 17 Svobody Square in Brno, the site of the former main market in the city. This may be due to the fact that the houses standing in the most exposed places were mostly destroyed by later masonry buildings and often only fragments of them are documented. In the presence of suitable subsoil, the space excavated for the basement was only expanded and masonry houses were built in place of the earlier structures (e.g. Masarykovo Square in Jihlava, see Chapter 11). On the other hand, buildings located in courtyards or poorer quarters of large towns are much better known (e.g. Panenská and Veselá streets in Brno, see Chapter 6; Barvířská Street, Olomouc). The situation is the same in smaller feudal towns (Fig. 247; Ostrava – Kaniová et al. 2019; Zezula 2017; Osoblaha – Chapter 19; Tišnov – Doležel 2013, 237, Fig. 2). There are also cases of royal towns in which the character of the buildings is one proof of economic regression. Despite their legal status and size, they did not surpass the character of a small town until the end of the Middle Ages (e.g. Uherský Brod – Chapter 16).

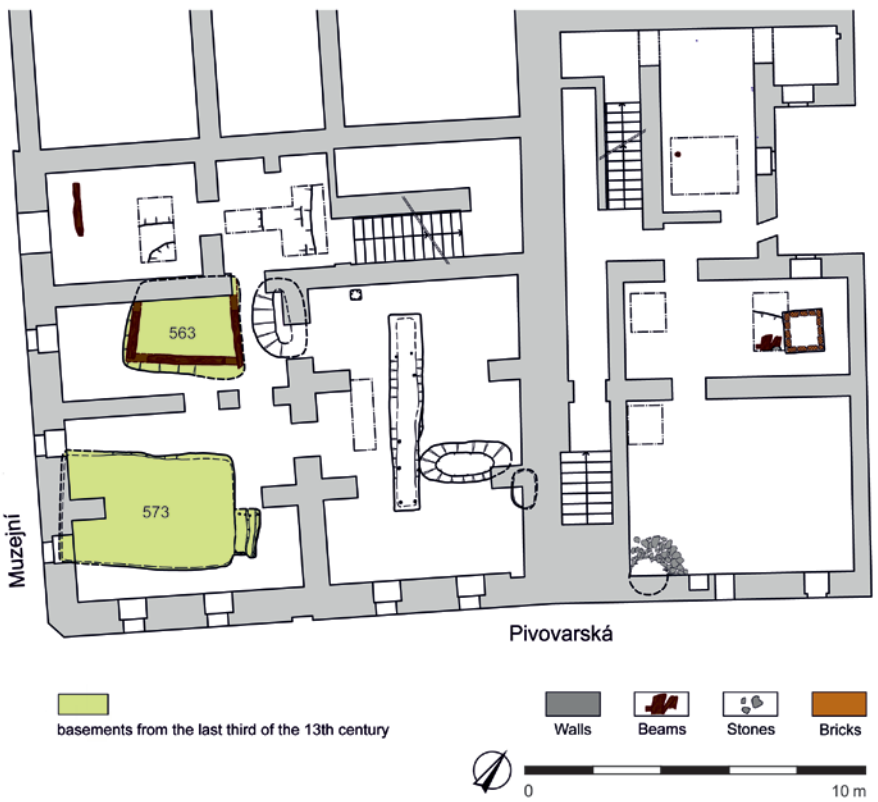


Fig. 247. Ostrava, 14 Pivovarská Street. Investigated plot featuring remains of basements of former wood-and-clay houses. After Zezula 2017, 88, modified by M. Peška.

Interesting contexts are new buildings built on the ground plans of older basements; in many cases the building has multiple phases and its area was often even reduced (Hradišťko near Davle, Rýmařov). In the former Prague suburban settlement of Nebovidy, we even have evidence of the continuity of one of the basements in three building phases from the 12th to the 14th century (Havrda, Tryml 2013, 142–147; Fig. 248). There are significantly fewer of these examples in Brno (Fig. 249), which could be the result of easy access to inexpensive building material (loess) for new construction (see Chapter 6). Often appearing in later construction phases are stone wall linings intended to secure the strength of the building against the inhomogeneous fill of earlier basements (e.g. Brno – Chapter 6; Osoblaha – Chapter 19; Jihlava – Crkal et al. 2019, 896–902). An important issue is the durability of wood-and-clay houses, which current knowledge suggests ranged from several decades (one generation?; see, for instance, Opava – Chapter 13) to more than 50 years (17 Svobody Square in Brno – Chapter 6).

Wood-and-clay basements were built in the Czech lands using two basic techniques: the classic post technique with vertical elements, and the post-built structure combined with recessed foundation beams. The second of these is well known as frame construction, from which the half-timbered construction used in the upper parts of the building is also derived. Nevertheless, post holes could also be remnants of

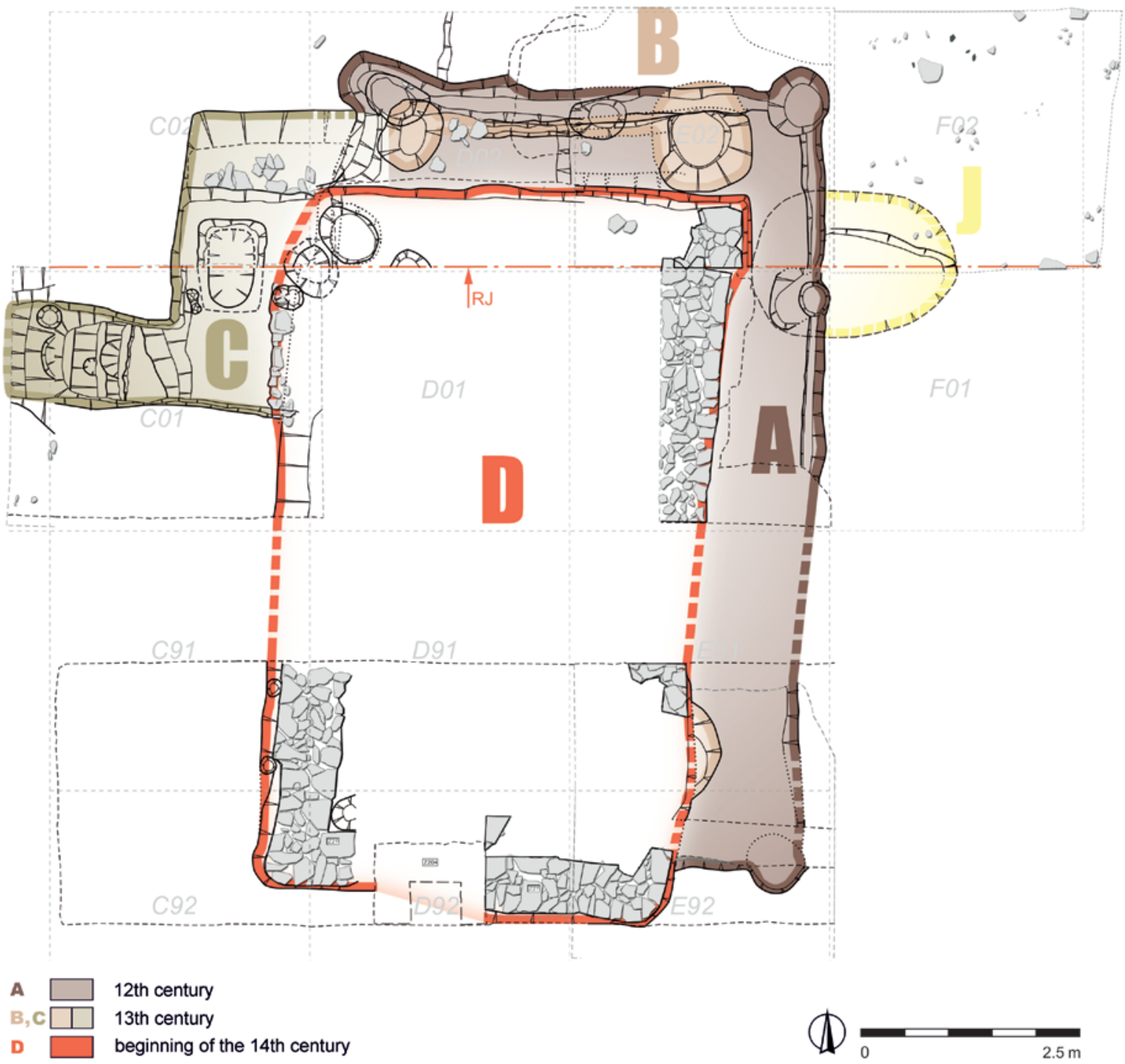


Fig. 248. Prague, 8 Nebovidská Street. Quadruple superposition of basements of former wood-and-clay houses (A–D). After Havrda, Tryml 2013, 146, Fig. 169, modified by M. Peška.

a frame construction, albeit without a foundation beam. This generally concerns techniques also used in above-ground buildings, where only greater attention is paid to filling in the space between the posts. Underground, boards are often merely tucked between the wooden frame and the walls of the trench, while in some cases grooves in the foundation beam are also used for this purpose. The lining of one or more walls or the entrance neck appears to be an exception. In general, it can be said that frame construction is a completely foreign element in Moravia, and in the area from the Baltics to the Austrian lands it was an indicator of cultural change, the bearers of which were the Western population present in all major cities of East Central Europe (Gläser ed. 2001). In any case, frame construction did not catch on to any great extent in Moravia, and in the rural setting all the way up to modern period we find post-built techniques, which were then replaced by adobe brick. The adoption of new construction techniques and the abandonment of older wattle and post traditions and log buildings is very nicely demonstrated in the case of Wrocław (Chapter 4). While similar development can also be expected in the majority of our larger royal towns, it should be noted that although all types of construction are represented in Prague and Brno (see Chapter 2, 6), foundation beams or trenches for frame construction occur almost exclusively in Opava and Jihlava (Chapter 11, 13). Interesting details documented in Brno basements are a wide range of small bored cellars accessible from the interior of the basements which could have served as hiding places or for the extraction of soil for repairing older walls. The design of the outer wall is not known in these cases (Chapter 6).

The emergence of masonry houses in Moravian and Bohemian towns followed sacred buildings, which were the first to be made from stone and brick. Apart from Prague (Klápště 2016, 97–123), an exceptional case in many respects (even from a Central European perspective), there were no masonry houses in any of the large Moravian towns until the second third of the 13th century. In fact, only two rare sets of masonry buildings from Brno and Jihlava (Chapter 7, 11) are available. Dendrochronological dates indicate that the construction of houses commenced in Jihlava soon after the founding of the town, a result of the immense wealth connected with the local extraction of silver ore. Nevertheless, existing excavations have made clear that this involved only a small group of houses located near the main town square in Jihlava. Their earliest representatives are 'kamenate' – single-space

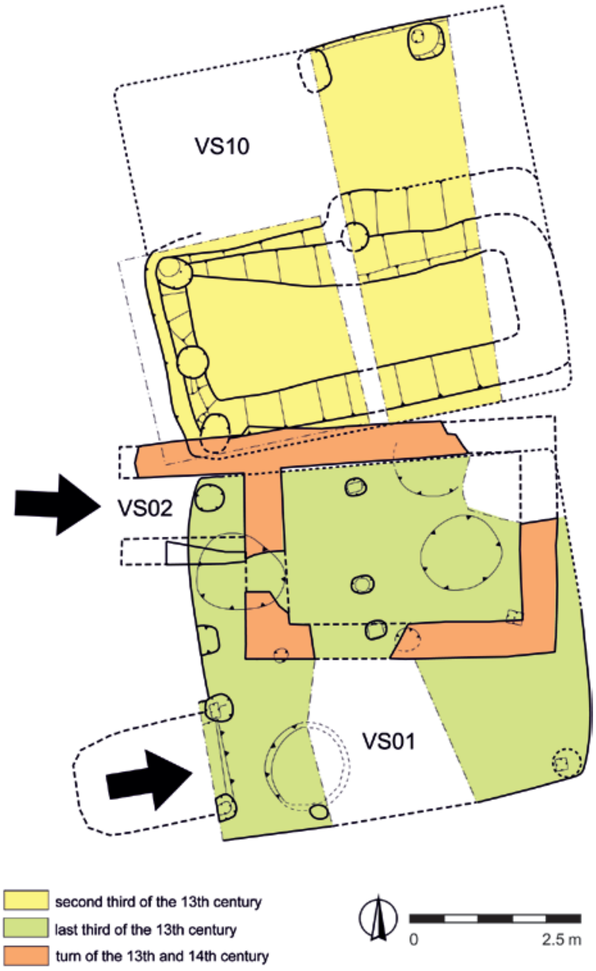


Fig. 249. Brno, 7 Dominikánská Street. Superposition of three basements of former wood-and-clay houses (VS01, 10) and masonry small cellar (VS02). After Holub et al. 2005a, 76, Fig. 33, modified by M. Peška.

stone chambers situated at the rear of the plot, where an above-ground part along the street is also expected (already assumed by Radová-Štiková 1991a; 1991b; Fig. 250). In the case of one of these houses at 16 Masarykovo Square with an impressive length of 29.5 m, it was even possible to trace the genesis of the three-compartment house in our country to around 1260. Other representatives of the oldest buildings are houses with an arcade and multi-space buildings along the street line. And yet, such small numbers do not allow the creation of any significant chronology (Chapter 11). The most important Brno early Gothic building is the storied former Brno Old Town Hall with an imposing 15 × 15 m floor plan, which could have originally served as a merchant house or was perhaps built around 1243 to mark Brno's new town privileges. Another phenomenon is several tower houses that are documented archaeologically or in iconographical sources. In the Czech lands, tower houses are known only from Prague. In the 13th century, these types of buildings also spread to south Moravia and to the territory of today's Slovakia, especially Bratislava. Finally, as in Jihlava, 'kamenate' stone chambers (Chapter 6) are also preserved in Brno. It appears that this is the only type of building that we can also expect in Olomouc and Znojmo for the second half of the 13th century (or at its end), though we are currently lacking the relevant evidence for this conjecture. The last town with documented 'kamenate' from the turn of the 14th century is Opava.[1] Uherské Hradiště also perhaps had a lone masonry house in the second half of the 13th century (Procházka, Snášil 1984; Procházka, Sulitková 1984, 59–62). Overall, it can be stated that Brno and Jihlava were the only Moravian towns that kept pace with Świdnica and Wrocław in the 13th century, even despite the fact that the number of masonry buildings here was lower (Chapter 5). The presence of Gothic houses clearly shows the different dynamics of prosperity and development of Moravian towns, only a few of which were at least partially 'petrified' during the 13th and 14th centuries.

The aim of this short summary, if not the book as a whole, was to introduce and reflect on all the known aspects and pitfalls that research of the oldest burgher buildings in Moravia entails. It should be noted that construction techniques, the placement of buildings on plots and the lifespan of wood-and-clay houses are already well known. However, we are left to constantly ponder the form of their above-ground parts. In the last two decades, our knowledge in this respect has advanced somewhat further, but we are still waiting for some ideal or dream archaeological excavation that could reveal everything clearly and distinctly. But perhaps the time has come to accept the reality that certain facts from the early days of towns will remain hidden from us forever.

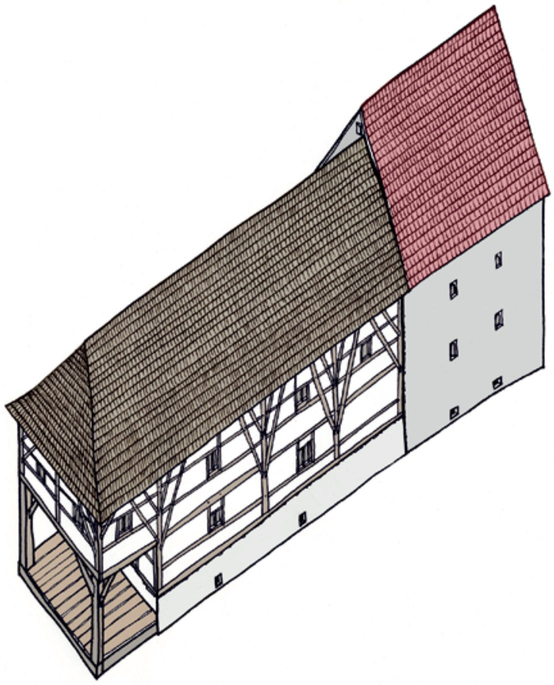


Fig. 250. Jihlava, 16 Masarykovo Square. Reconstruction drawing of possible appearance of house featuring a stone chamber ('kamenate') after first half of the 13th century. Drawing by D. Merta.

1 I thank Petra Kaniová and František Kolář (both from the National Heritage Institute, Regional Office in Ostrava) for this information.

References

Altwasser, E., Klein, U. 1993: Bemerkungen zu den Fachwerkbauten des 13. Jahrhunderts. In: M. Gläser (ed.): *Archäologie des Mittelalters und Bauforschung im Hanseraum. Eine Festschrift für Günther P. Fehring*. Schriften des Kulturhistorischen Museums Rostock 1. Rostock: Reich, 429–447.

Anderberg, A.-L. 1994: *Atlas of Seeds and Small Fruits of Northwest-European Plant Species (Sweden, Norway, Denmark, East Fennoscandia, and Iceland) with Morphological Descriptions. Part 4, Resedaceae – Umbelliferae*. Stockholm: Swedish Museum of Natural History.

ATLAS 2001: Buśko, C. et al.: *Atlas historyczny miast polskich/ The Historical Atlas of Polish Towns. Volume 4, Śląsk; book 1. Wrocław*. Wrocław: Wydawnictwo Via Nova.

ATLAS 2003a: Eysymontt, R. et al.: *Atlas historyczny miast polskich/ The Historical Atlas of Polish Towns. Volume 4, Śląsk; book 2. Środa Śląska*. Acta Universitatis Wratislaviensis 2612. Wrocław: Wydawnictwo Uniwersytetu Wrocławskiego.

ATLAS 2003b: Eysymontt, R. et al.: *Atlas historyczny miast polskich/ The Historical Atlas of Polish Towns. Volume 4, Śląsk; book 4. Niemcza*. Acta Universitatis Wratislaviensis 2614. Wrocław: Wydawnictwo Uniwersytetu Wrocławskiego.

ATLAS 2014: Eysymontt, R. et al.: *Atlas historyczny miast polskich/ The Historical Atlas of Polish Towns. Volume 4, Śląsk; book 4. Ziębice*. Toruń: Uniwersytet Mikołaja Kopernika.

ATLAS 2016: Eysymontt, R. et al.: *Atlas historyczny miast polskich/ The Historical Atlas of Polish Towns. Volume 4, Śląsk; book 17. Ząbkowice Śląskie* [online]. Toruń: Uniwersytet Mikołaja Kopernika. [accessed 2022-12-05]. Available from: atlasmiast.umk.pl/atlasy/ziebice/.

ATLAS 2017a: Adamska, D. et al.: *Atlas historyczny miast polskich/ The Historical Atlas of Polish Towns. Volume 4, Śląsk; book 10. Strzelin*. Wrocław: Instytut Archeologii i Etnologii PAN.

ATLAS 2017b: Adamska, D., Eysymontt, R. et al.: *Atlas historyczny miast polskich/ The Historical Atlas of Polish Towns. Volume 4, Śląsk; book 14. Jelenia Góra*. Wrocław: Instytut Archeologii i Etnologii PAN.

Badura, J. 2010: Geomorfologiczne uwarunkowania lokalizacji lewobrzeżnego osadnictwa Wrocławia [online]. In: J. Piekalski, K. Wachowski (eds.): *Ulice średniowiecznego Wrocławia*. Wratislavia Antiqua. Studia z dziejów Wrocławia 11. Wrocław: Uniwersytet Wrocławski, Instytut Archeologii, 15–45. [accessed 2022-07-20]. Available from: wratislavia.archeo.uni.wroc.pl/11-tom/II.pdf.

Baillie, M. G. L., Pilcher, J. R. 1973: A Simple Crossdating Program for Tree-Ring Research [online]. *Tree-Ring Bulletin* 33, 7–14. [accessed 2022-10-10]. Available from: https://repository.arizona.edu/bitstream/handle/10150/260029/trb-33-007-014.pdf?sequence=1&isAllowed=y.

Bakala, J. 1974a: Počátky města Opavy. *Časopis Slezského muzea – Zvláštní číslo k 750. výročí města Opavy*, 3–24.

Bakala, J. 1974b: Příspěvek o vývoji měšťanského patriciátu v Opavě (opavské domy s právem k výčepu piva). *Časopis Slezského muzea. B. Vědy historické* 23, 20–37.

Bakala, J. 1977: Zrod městského zřízení na středověkém Opavsku. *Časopis Slezského muzea. B. Vědy historické* 26, 97–122.

Barth, V., Zapletal, J. 1978: Geologie razovského paroklastického komplexu v Nízkém Jeseníku. *Sborník geologických věd. Řada G, Geologie* 32, 97–122.

Bartík et al. 2016a: Bartík, J., Běhounková, L., Chrástek, T., Nohálová, H., Břečková, K. 2016a: Barokní sklípek se stavební obětinou z archeologického výzkumu na ulici Komenského v Uherském Brodě [online]. *Acta musealia: Muzea jihovýchodní Moravy ve Zlíně a Muzea regionu Valašsko, Vsetín* XIV(1–2), 6–32. [accessed 2022-11-01]. Available from: www.muzeumvalassko.cz/acta-musealia/acta-musealia-2016-1-2-1.

Bartík et al. 2016b: Bartík, J., Běhounková, L., Novotný, J., Nohálová, H. 2016b: Záchranný archeologický výzkum na Hradním náměstí v Uherském Brodě. *Slovácko: společenskovědní recenzovaný časopis pro moravsko-slovenské pomezí* LVII, 133–149.

Bartík et al. 2016c: Bartík, J., Chrástek, T., Běhounková, L., Rašticová, B., Nohálová, H., Novotný, J., Vavrčík, H. 2016c: Středověké opevnění Uherského Hradiště ve světle archeologického výzkumu v ulici Dlouhá. *Slovácko: společenskovědní recenzovaný časopis pro moravsko-slovenské pomezí* LVII, 79–118.

Bartík et al. 2016d: Bartík, J., Chrástek, T., Novotný, J. 2016d: Uherský Brod (okr. Uherské Hradiště). *Přehled výzkumů* 57(2), 319–320. [accessed 2022-09-11]. Available also from: https://www.arub.cz/prehled-vydanych-cisel/PV-57_2_stredovek-a-novovek.pdf.

Bartík, J., Běhounková, L., Chrástek, T., Novotný, J., Nohálová, H., Žižlavský, M. 2018: Archeologický průzkum studny ve dvorním traktu domu čp. 135 na Masarykově náměstí v Uherském Brodě. *Slovácko: společenskovědní recenzovaný časopis pro moravsko-slovenské pomezí* LIX, 175–193.

Bartík, J., Chrástek, T. 2019: Uherský Brod (okr. Uherské Hradiště). *Přehled výzkumů* 60(2), 305–306. [accessed 2022-09-27]. Available also from: https://www.arub.cz/prehled-vydanych-cisel/pv_60_2__stredovek_novovek.pdf.

Bartík, J., Novotný, J. 2016: Uherský Brod (okr. Uherské Hradiště). *Přehled výzkumů* 57(2), 317–318. [accessed 2022-09-11]. Available also from: https://www.arub.cz/prehled-vydanych-cisel/PV-57_2_stredovek-a-novovek.pdf.

Bartíková, L., Bartík, J. 2019: Středověká hrnčířská pec z Uherského Brodu – Komenského ulice [online]. *Studia archaeologica Brunensia* 24(2), 5–28. [accessed 2022-09-27]. DOI: 10.5817/SAB2019-2-1. Available from: https://digilib.phil.muni.cz/en/handle/11222.digilib/142688.

Baťková, R. (ed.) et al. 1998: *Umělecké památky Prahy. Nové Město, Vyšehrad, Vinohrady (Praha 1)*. Praha: Academia.

Baumhauer, M. 2001: "Grubenhaus" oder "Keller"? Bemerkungen zu ihrer Unterscheidbarkeit anhand ausgewählter mittelalterlicher Befunde. In: J. Pfrommer, R. Schreg (eds.): *Zwischen den Zeiten. Archäologische Beiträge zur Geschichte des Mittelalters in Mitteleuropa. Festschrift für Barbara Scholkmann*. Internationale Archäologie. Studia honoraria 15. Rahden: Marie Leidorf, 349–362.

BCM: Benno Beyer, H., Zeiser, H. J.: *Obležení Brna Švédy (3. května – 20. srpna 1645). Pohled na město od jihovýchodu z ptačí perspektivy, 1645–1646* [vedute]. Oil on canvas, 158 × 245 cm. Stored in: Brno City Museum, Inv. No. 2284.

Bedal, K. 2002: Spätmittelalterlicher bäuerlicher Hausbau in Süddeutschland. Versuch eines Überblicks - Bestand, Formen und Befunde [online]. In: J. Klápště (ed.): *Ruralia IV. The rural house from the migration period to the oldest still standing buildings. 8.-13. September 2001 Bad Bederkesa, Lower Saxony, Germany*. Památky archeologické. Supplementum 15. Prague: Institute of Archaeology, Academy of Sciences of the Czech Republic, Prague, 240–256. [accessed 2022-09-11]. Available from: ruralia2.ff.cuni.cz/wp-content/uploads/2018/04/240-256.pdf.

Bedal, K. 2006: *Fachwerk vor 1600 in Franken. Eine Bestandsaufnahme*. Quellen und Materialien zur Hausforschung in Bayern 2. Schriften und Kataloge des Fränkischen Freilandmuseums des Bezirks Mittelfranken 49. Petersberg, Bad Windsheim: Imhof, Verl. Fränkisches Freilandmuseum Bad Windsheim.

Beijerinck, W. 1947: *Zadenatlas der Nederlandsche Flora, ten behoeve van de botanie, paleontologie, bodemcultuur en warenkennis, omvattende, naast de inheemsche flora, onze belangrijkste cultuurgewassen en verschillende adventiefsoorten*. Mededeeling van het Biologisch Station te Wijster 30. Wageningen: H. Veenman and Zonen.

Belcredi, L. 2006: *Bystřec. O založení, životě a zániku středověké vsi. Archeologický výzkum zaniklé středověké vsi na Drahanské vrchovině 1975–2005*. Brno: Muzejní a vlastivědná společnost v Brně ve spolupráci s Moravským zemským muzeem.

Berger, L. 1963: *Die Ausgrabungen am Petersberg in Basel. Ein Beitrag zur Frühgeschichte Basels*. Basel: Kommission bei Helbing und Lichtenhahn.

Berggren, G. 1969: *Atlas of Seeds and Small Fruits of Northwest-European Plant Species (Sweden, Norway, Denmark, East Fennoscandia, and Iceland) with Morphological Descriptions. Part 2, Cyperaceae*. Stockholm: Swedish Natural Science Research Council.

Berggren, G. 1981: *Atlas of Seeds and Small Fruits of Northwest-European Plant Species (Sweden, Norway, Denmark, East Fennoscandia, and Iceland) with Morphological Descriptions. Part 3, Salicaceae – Cruciferae*. Stockholm: Swedish Museum of Natural History.

Beroušek, J., Kováčik, P. 1998: Příspěvek k historické topografii Uherského Hradiště [online]. *Sborník prací Filozofické fakulty brněnské univerzity* M 3, 63–76. [accessed 2022-09-11]. Available from: https://digilib.phil.muni.cz/node/21167.

Bertsch, K. 1941: *Früchte und Samen. Ein Bestimmungsbuch zur Pflanzenkunde der vorgeschichtlichen Zeit*. Handbücher der praktischen Vorgeschichtsforschung 1. Stuttgart: Verlag von Ferdinand Enke.

Binding, G. 1970: Die Ausgrabungen 1964/65. Baugeschichtliche Auswertung. In: G. Binding, W. Janssen, F. K. Jungklaass (eds.): *Burg und Stift elten am Niederrhein. Archäologische Untersuchungen der Jahre 1964/65*. Rheinische Ausgrabungen 8. Düsseldorf: Rheinland Verlag, 1–234.

Binding, G., Mainzer, U., Wiedenau, A. 1989: *Kleine Kunstgeschichte des deutschen Fachwerkbaus*. 4. überarb. u. erw. Auflage. Darmstadt: Wissenschaftliche Buchgesellschaft.

Bláha, J. 1999: Archeologické poznatky ke stavební konstrukci nejstarších měšťanských domů v Olomouci [online]. *Archaeologia historica* 24, 189–213. [accessed 2022-12-06]. Available from: https://digilib.phil.muni.cz/cs/handle/11222.digilib/140332.

Bláha, R. 2005: „Zemnice" v Hradci Králové. Dosavadní stav poznání [online]. *Forum urbes medii aevi* II, 118–125. [accessed 2022-09-11]. Available from: https://www.archaiabrno.org/media/doc/06_fuma_ii_blaha.pdf.

Bláha, R., Sigl, J. 2014: Počátky Pražského předměstí v Hradci Králové z pohledu archeologie. *Forum urbes medii aevi* VIII(1–2), 132–151.

Boháčová, I., Podliska, J. (eds.) 2018: *Průvodce pražskou archeologií. Památky známé, neznámé i skryté*. 2., upravené vydání. Praha: Archeologický ústav Akademie věd České republiky, Praha, v. v. i.

Boivin, N. 2000: Life rhytms and floor sequences: excavating time in rural Rajasthan and Neolithic Çatalhöyük. *World Archaeology* 31(3), 367–388. DOI: 10.1080/00438240009696927.

Borský, P., Merta, D., Peška, M., Zůbek, A. 2016: Bývalý kanovnický dům Biskupská č. 7 v Brně. In: J. Anderle et al. (eds.): *Dějiny staveb 2016. Sborník vybraných referátů z konference v Plasích konané ve dnech 18. 3. – 20. 3. 2016*. Plzeň: Klub Augusta Sedláčka ve spolupráci se Sdružením pro stavebněhistorický průzkum, 209–219.

Brachmann, H., Klápště, J. (eds.) 1996: *Hausbau und Raumstruktur früher Städte in Ostmitteleuropa*. Památky archeologické. Supplementum 6. Prague: Institute of Archaeology, Prague.

Brather, S. 2001: *Archäologie der westlichen Slawen. Siedlung, Wirtschaft und Gesellschaft im früh- und hochmittelalterlichen Ostmitteleuropa*. Ergänzungsbände zum Reallexion der germanischen Altertumskunde 30. Berlin, New York: De Gruyter.

Bresch, J., Buśko, C., Lasota, C. 2001: Zachodnia pierzeja Rynku [online]. In: C. Buśko (ed.): *Rynek Wrocławski w świetle badań archeologicznych, cz. I*. Wratislavia Antiqua. Studia z dziejów Wrocławia 3. Wrocław: Uniwersytet Wrocławski, 15–72. [accessed 2022-07-20]. Available from: wratislavia.archeo.uni.wroc.pl/3-tom/III.pdf.

Bullock, P., Fedoroff, N., Jongerius, A., Stoops, G., Tursina, T., Babel, U. 1985: *Handbook for Soil Thin Section Description*. Wolverhampton: Waine Research.

Bunke, W. 1935: *Das Brauwesen der Stadt Schweidnitz* [online]. Darstellungen und Quellen zur schlesischen Geschichte 35. Breslau: Trewendt & Granier. [accessed 2022-12-25]. Available from: https://sbc.org.pl/dlibra/publication/70757/edition/80921/content.

Bureš, M., Finková, K., Kašpar, V., Petříčková, J., Vařeka, P. 1998: Výzkum parcely domu U Sixtů čp. 553/I na Starém Městě pražském [online]. *Archeologické rozhledy* L(3), 603–618. [accessed 2022-07-30]. Available from: https://1url.cz/6rCaC.

Bureš, M., Kašpar, V., Špaček, L., Vareka, P. 1997: The 13th century pre-urban settlement complex near the St. Peter's church in Prague. In: G. De Boe, F. Verhaeghe (eds.): *Urbanism in Medieval Europe. Papers of the 'Medieval Europe Brugge 1997' Conference*. I.A.P. Rapporten 1. Zellik: Instituut voor het archeologisch patrimonium, 7–17.

Buriánek, D., Bubík, M., Franců, J., Fürychová, P., Havlíček, P., Havlín, A., Gilíková, H., Janderková, J., Kašperáková, D., Kociánová, L., Konečný, F., Krejčí, O., Krumlová, H., Kryštofová, E., Müller, P., Otava, J., Paleček, M., Pecina, V., Pecka, T., Sedláček, J., Šrámek, J., Tomanová Petrová, P., Večeřa, J., Verner, K., Vít, J. 2020: *Vysvětlivky k Základní geologické mapě České republiky 1 : 25 000. 24-342 Brno-jih*. Praha: Česká geologická služba.

Büttner, H., Meissner, G. 1980: *Bürgerhäuser in Europa*. Leipzig: Edition Leipzig.

Čapek, L., Militký, J. 2021: Dřevěná konstrukce domu z Českých Budějovic z první poloviny 14. století [online]. *Archaeologia historica* 46(1), 129–146. [accessed 2022-12-05]. DOI: 10.5817/AH2021-1-6. Available from: https://digilib.phil.muni.cz/cs/handle/11222.digilib/144241.

Čapek, L., Netolický, P. 2014: Vyhodnocení zahloubených staveb (tzv. „zemnic" a „suterénů") z počátků měst v Čechách a na Moravě na základě studia jejich formální a prostorové struktury. *Forum urbes medii aevi* VIII(1–2), 80–99.

Caune, A. 1993: Die als Keller eingetieften Holzständerbauten des 13. Jahrhunderts in Riga. In: *Beitrage zur Archäologie von Slawen und Deustschen*. Lübecker Schriften zur Archäologie und Kulturgeschichte 23. Bonn: Rudolf Habelt, 203–218.

Caune, A. V. 1984: *Žilišča Rigi XII-XIV vv. Po dannym archeologičeskich raskopok*. Riga: Zinatne.

Caune, A. V. 1990: Gebäude und Topographische Strukturen in Riga vom 12. bis 14. Jahrhundert aufgrund der archäologischen Ausgrabungen. In: *Topographie und Hausbau der Frühzeit in Städten des hansischen Wirtschaftsraumes*. Lübecker Schriften zur Archäologie und Kulturgeschichte 20. Bonn: Habelt, 173–186.

CDB II: *Codex diplomaticus et epistolaris regni Bohemiae. Tomus II. Inde ab a. MCXCVIII. usque ad a. MCCXXX*. Ed. G. Friedrich. Pragae MCMXII. [accessed 2022-12-03]. Available also from: https://sources.cms.flu.cas.cz/src/index.php?s=v&cat=2&bookid=1243.

CDB V/1: *Codex diplomaticus et epistolarius regni Bohemiae. Tomi V. Fasciculus primus. Inde ab. A. MCCLIII usque ad A. MCCLXVI*. Eds. J. Šebánek, S. Dušková. Pragae MCMLXXIV.

CDB V/2: *Codex diplomaticus et epistolarius regni Bohemiae. Tomi V. Fasciculus secundus. Inde ab. A. MCCLXVII usque ad A. MCCLXXVIII*. Eds. J. Šebánek, S. Dušková. Pragae MCMLXXXI.

CDS 1875: Grünhagen, C. (ed.): *Regesten zur schlesischen Geschichte. Zweiter Theil. Bis zum Jahre 1280*. Codex diplomaticus Silesiae, Bd. 7/2. Breslau: Josef Max & Comp. [accessed 2022-05-10]. Available also from: https://www.wbc.poznan.pl/dlibra/publication/11888/edition/19343/content.

Černoš, Š. 2012: *Rekonstrukce ČOV a kanalizace Vesce a Palackého náměstí*. Manuscript of the excavation report, No. A062/2010. Stored in: Archaia Brno.

Čiháková, J. 1995: Praha 1-Malá Strana, d) Čp. 258/III–Lichtenštejnský palác. In: Z. Dragoun et al.: Archeologický výzkum v Praze v letech 1992–1994. *Pražský sborník historický* XXVIII, 226–227.

Čiháková, J. 1999: Malá Strana od pravěku do vrcholného středověku. In: P. Vlček et al.: *Umělecké památky Prahy. Malá Strana*. Praha: Academia, 11–27.

Čiháková, J. 2004: Záchranný archeologický výzkum v domě čp. 211/III v Nerudově ulici na Malé Straně. *Výroční zpráva NPÚ ÚOP v hl. m. Praze 2003, 2004*, 29–33.

Čiháková, J. 2005: Sklep hrázděného domu 14. století v Nerudově ulici č. p. 211 na Malé Straně [online]. *Forum urbes medii aevi* II, 158–164. [accessed 2022-07-31]. Available from: https://www.archaiabrno.org/media/doc/09_fuma_ii_cihakova.pdf.

Čiháková, J. 2008: *Raně středověké obytné domy v Josefské čp. 626/III. Archeologický výzkum NPÚ Praha č. 33/99 na Malé Straně*. Archeologické prameny k dějinám Prahy 4. Praha: Národní památkový ústav, územní odborné pracoviště v hlavním městě Praze.

Čiháková, J., Dragoun, Z., Podliska, J. 2000: Pražská sídelní aglomerace v 10. a 11. století. In: L. Polanský, J. Sláma, D. Třeštík (eds.): *Přemyslovský stát kolem roku 1000. Na paměť knížete Boleslava II. († 7. února 999)*. Praha: Nakladatelství Lidové noviny, 127–146.

Čižmář, Z., Šmíd, M. 2000: Vývoj Prostějova v archeologických a historických pramenech v období 10.–16. století [online]. *Archaeologia historica* 25, 77–102. [accessed 2022-12-18]. Available from: https://digilib.phil.muni.cz/cs/handle/11222.digilib/140367.

Chlupáč, I. et al. 2002: *Geologická minulost České republiky*. Praha: Academia.

Chorowska, M. 1994: *Średniowieczna kamienica mieszczańska we Wrocławiu*. Wrocław: Oficyna Wydawnicza Politechniki Wrocławskiej.

Chorowska, M. 2003: *Rezydencje średniowieczne na Śląsku. Zamki, pałace, wieże mieszkalne*. Wrocław: Oficyna Wydawnicza Politechniki Wrocławskiej.

Chorowska, M. 2010: Regularna sieć ulic. Powstanie i przemiany do początku XIV w. [online]. In: J. Piekalski, K. Wachowski (eds.): *Ulice średniowiecznego Wrocławia*. Wratislavia Antiqua. Studia z dziejów Wrocławia 11. Wrocław: Uniwersytet Wrocławski, Instytut Archeologii, 67–89. [accessed 2022-12-05]. Available from: wratislavia.archeo.uni.wroc.pl/11-tom/V.pdf.

Chorowska, M., Caban, M. 2015: The Origins of the Brick Architecture in Silesia. Brick: Size, Composition, Chronology. *Forum urbes medii aevi* IX(1–2), 8–19.

Chorowska, M., Caban, M., Duma, P., Piekalski, J., Gomułka, I. 2018: W cieniu pałacu Hatzfeldtów i kościoła św. Wojciecha. Wstępne wyniki badań kwartału między pl. Nowy Targ a ul. Wita Stwosza we Wrocławiu [online]. *Śląskie Sprawozdania Archeologiczne* 60(2), 241–263. [accessed 2022-07-17]. DOI: 10.34616/ssa.2018.60.2.241.263. Available from: http://www.ssa.archeo.uni.wroc.pl/60.2/10_SSA60_2_241263_Chorowska.pdf.

Chorowska, M., Karst, D., Lasota, C. 1998: Organizacja przestrzenna produkcji i sprzedaży piwa w średniowiecznej Świdnicy [online]. In: J. Olczak, A. Sosnowska (eds.): *Materiały z IV Sesji Naukowej Uniwersyteckiego Centrum Archeologii Średniowiecza i Nowożytności. „Życie codzienne w średniowiecznym mieście." Sobótka-Górka, 22-25 października 1996 roku*. Archaeologia Historica Polona 7. Toruń: Uniwersytet Mikołaja Kopernika, 157–180. [accessed 2022-07-31]. Available from: https://kpbc.umk.pl/dlibra/publication/14102/edition/23466/content.

Chorowska, M., Konczewski, P., Lasota, C., Piekalski, J. 2012: Parcela Rynek 6 – ul. Kiełbaśnicza 5 we Wrocławiu. Rozwój zabudowy i infrastruktury elitarnej działki mieszczańskiej w XIII–XIV wieku. *Śląskie Sprawozdania Archeologiczne* LIV, 49–77.

Chorowska, M., Lasota, C. 1995: O średniowiecznej kamienicy wrocławskiej na tle socjotopografii Starego Miasta. In: J. Rozpędowski (ed.): *Architektura Wrocławia. Tom 1. Dom*. Wrocław: Werk, 51–73.

Chorowska, M., Lasota, C. 2010: O zabudowie murowanej w pierzejach Rynku i ulic [online]. In: J. Piekalski, K. Wachowski (eds.): *Ulice średniowiecznego Wrocławia*. Wratislavia Antiqua. Studia z dziejów Wrocławia 11. Wrocław: Uniwersytet Wrocławski, Instytut Archeologii, 159–177. [accessed 2022-07-17]. Available from: wratislavia.archeo.uni.wroc.pl/11-tom/VII.pdf.

Chorowska, M., Lasota, C. 2013: *Kamienica mieszczańska w Świdnicy. Karczma i mieszkanie w XIII–XVIII w*. Wrocław: Oficyna Wydawnicza Politechniki Wrocławskiej.

Chorowska, M., Lasota, C., Skarbek, J. 2015: Początki kamienicy mieszczańskiej w Brzegu [online]. *Opolski Informator Konserwatorski* 12, 122–138. [accessed 2022-07-20]. Available from: https://wuozopole.pl/download/attachment/240/oik-2015.pdf.

Chorowska, M., Różycka-Rozpędowska, E., Rozpędowski, J. 2017: The Burgher house and plot. In: D. Adamska et al.: *Atlas historyczny miast polskich/ The Historical Atlas of Polish Towns. Volume 4, Śląsk; book 10. Strzelin*. Wrocław: Instytut Archeologii i Etnologii PAN, 43–44.

Chrástek, T., Bartík, J., Novotný, J. 2017: Záchranné archeologické výzkumy Slováckého muzea v roce 2016. *Slovácko: společenskovědní recenzovaný časopis pro moravsko--slovenské pomezí* LVIII, 187–190.

Chrástek, T., Bartík, J., Novotný, J. 2019: Záchranné archeologické výzkumy Slováckého muzea v roce 2018. *Slovácko: společenskovědní recenzovaný časopis pro moravsko--slovenské pomezí* LX, 167–170.

Chybová, H. 2009: *Kroměříž zmizelá a znovu objevená, aneb, Historie ukrytá pod dlažbou města*. Kroměříž: Muzeum Kroměřížska.

Čoupková, J. 1995: Seznam obcí, platících mostné do Uherského Hradiště, z roku 1362. *Slovácko: společenskovědní sborník pro moravsko-slovenské pomezí* XXXVI, 129–136.

Čoupková, M. (ed.) 2001: *Nejstarší uherskohradišťská městská kniha Liber negotiorum civitatis Hradisch - edice*. Uherské Hradiště: Slovácké muzeum, Státní okresní archiv Uherské Hradiště.

Courty, M.-A., Goldberg, P., Macphail, R. I. 1989: *Soils and micromorphology in archaeology*. Cambridge Manuals in Archaeology. Cambridge (U.K.): Cambridge University Press.

Crkal, J., Derner, K., Hrubý, P., Milo, P. 2019: Architektura hornických sídlišť na sklonku přemyslovské doby [online]. *Archaeologia historica* 44(2), 887–923. [accessed 2022-09-26]. DOI: 10.5817/AH2019-2-17. Available from: https://digilib.phil.muni.cz/cs/handle/11222.digilib/141404.

CUZK Jihlava: Imperial Obligatory Imprints of the Stable Cadastre 1 : 2 880. Jihlava - Inner City, Tax Collection District Jihlava 1835. Inv. No. 1101, sheets 4, 5 [accessed 2022-12-14]. Available also from: https://uazk.cuzk.cz/vademecum_mapy/permalink?xid=e83c43f36a33495aa25632d1c594a5fb.

CUZK Jinonice: Imperial Obligatory Imprints of the Stable Cadastre 1 : 2 880. Jinonice, Tax Collection District Smíchov 1840. Inv. No. 2596, sheet 8 [accessed 2022-12-01]. Available also from: https://uazk.cuzk.cz/vademecum_mapy/permalink?xid=c1cd64e3694342ebb883696f689755de.

CUZK Osoblaha: Imperial Obligatory Imprints of the Stable Cadastre 1 : 2 880. Osoblaha, Tax Collection District Osoblaha 1836. Inv. No. 2180, sheets 5, 8. [accessed 2022-11-30]. Available also from: https://uazk.cuzk.cz/vademecum_mapy/permalink?xid=21098343842c47a2a2a4080517a90ade.

CUZK Počátky: Imperial Obligatory Imprints of the Stable Cadastre 1 : 2 880. Počátky, Tax Collection District Počátky 1829. Inv. No. 5868, sheets 5, 7. [accessed 2022-11-30]. Available also from: https://uazk.cuzk.cz/vademecum_mapy/permalink?xid=a4fb15f24d964b60add349be4e55c288.

CUZK Uherské Hradiště: Imperial Obligatory Imprints of the Stable Cadastre 1 : 2 880. Uherské Hradiště, Tax Collection District Uherské Hradiště 1827. Inv. No. 3196, sheet 2. [accessed 2022-12-06]. Available also from: https://uazk.cuzk.cz/vademecum_mapy/permalink?xid=650c358d3f0b406aaeb02666d6a40336.

Cymbalak, T. 2007a: Praha 1 – Nové Město, Pštrossova ulice 203/II. In: Z. Dragoun et al.: Archeologický výzkum v Praze v letech 2005–2006. *Pražský sborník historický* XXXV, 353.

Cymbalak, T. 2007b: Výzkum v Pštrossově ulici čp. 203 na Novém Městě, Praha 1. In: *Archeologické výzkumy v Čechách 2006. Sborník referátů z informačního kolokvia*. Zprávy České archeologické společnosti. Supplément 68. Praha: Česká archeologická společnost – Sdružení archeologů Čech, Moravy a Slezska, 42.

Cymbalak, T. 2008: *Praha 1 – Nové Město, Pštrossova čp. 203/II*. Manuscript of the excavation report, CTX200803859 [accessed 2022-08-21]. Stored in: Archive of the Institute of Archaeology, Czech Academy of Sciences, Prague. Available also from: Digital Archive of the Archaeological Map of the Czech Republic https://digiarchiv.aiscr.cz/id/C-TX-200803859.

Cymbalak, T. 2013: *Zjišťovací archeologický výzkum, Praha 1 – Nové Město, Opatovická čp. 160/II, ppč. 784*. Manuscript of the excavation report, CTX202100354 [accessed 2022-08-21]. Stored in: Archive of the Institute of Archaeology, Czech Academy of Sciences, Prague. Available also from: Digital Archive of the Archaeological Map of the Czech Republic http://digiarchiv.amapa.cz/id/C-TX-202100354.

Cymbalak, T., Kašpar, V. 2019: Praha 5 – Jinonice, Havelská čp. 510/I. In: Z. Dragoun et al.: Archeologický výzkum v Praze v letech 2017–2018. *Pražský sborník historický* XLVII, 638–641.

Cymbalak, T., Kočár, P., Matějková, K., Sůvová, Z. 2013: Nález pivovarského sladu v kontextu předlokačního sídelního horizontu v prostoru Spálené ulice na Novém Městě pražském. Výsledky mezioborové spolupráce [online]. *Archaeologia historica* 38(2), 675–704. [accessed 2022-07-30]. Available from: https://digilib.phil.muni.cz/cs/handle/11222.digilib/128346.

Cymbalak, T., Musílek, M. 2017: Národní–Mikulandská, výzkum jednoho domovního bloku. Nástin transformace středověkého osídlení na rozmezí Starého a Nového Města pražského ve světle aktuálních archeologických pramenů. *Forum urbes medii aevi* X(1–2), 125–148.

Cymbalak, T., Musílek, M. 2021: „Čí chleba jíš, toho píseň zpívej." Bohatí a chudí ve středověké Praze. In: I. Loskotová et al. (eds.): *Rudolfovo číslo. Rudolfu Procházkovi k 65. narozeninám kolegové a přátelé*. Praha: NLN, 150–178.

Cymbalak, T., Podliska, J. 2008: Nové poznatky k raně středověkému osídlení v oblasti tzv. vyšehradské cesty v Praze (rekonstrukce procesu osídlování na základě výpovědi archeologických pramenů). *Archaeologica Pragensia* 19, 309–332.

Cymbalak, T., Rykl, M. 2018: Nové poznatky k počátkům organizované zástavby na pražském pravobřeží. *Archaeologica Pragensia* 24, 409–453.

Cymbalak, T., Rykl, M., Semerád, M. 2011: Nejstarší pozůstatky měšťanské gotické zástavby na Novém Městě v Praze. Aktuální pohled na základě výsledků posledních archeologických výzkumů [online]. *Staletá Praha* XXVII(2), 14–44. [accessed 2022-07-30]. Available from: http://www.staletapraha.cz/media/2011_2/copa-2011-2.pdf.

Cymbalak, T., Semerád, M. 2013: Roubená světnice novoměstského řemeslníka v Ostrovní ulici čp. 131 (Praha 1 – Nové Město, p. č. 848). In: K. Sklenář (ed.): *Archeologické výzkumy v Čechách 2012. Sborník referátů z informačního kolokvia*. Zprávy České archeologické společnosti. Supplément 89. Praha: Česká archeologická společnost – Sdružení archeologů Čech, Moravy a Slezska, 31–32.

Cymbalak, T., Staňková, V. 2014: Středověké osídlení v jižním předpolí staroměstských hradeb v Praze. Nový pohled na základě archeologických výzkumů na ploše novostavby Quadrio. *Forum urbes medii aevi* VIII(1–2), 152–173.

Dejmal, M. 2015: Archeologický výzkum v letech 2008–2010. In: M. Plaček, M. Dejmal et al.: *Veselí nad Moravou: středověký hrad v říční nivě*. Brno: Archaia Brno o. p. s., 50–79.

Dejmal, M., Lisá, L., Nývltová Fišáková, M., Bajer, A., Petr, L., Kočár, P., Kočárová, R., Nejman, L., Rybníček, M., Sůvová, Z., Culp, R., Vavrčík, H. 2014: Medieval Horse Stable; The Results of Multi Proxy Interdisciplinary Research [online]. *PLoS ONE* 9(3), 1–12. [accessed 2022-07-12]. DOI: 10.1371/journal.pone.0089273. Available from: https://journals.plos.org/plosone/article/file?id=10.1371/journal.pone.0089273&type=printable.

Derner, K., Hrubý, P. 2018: Otázka zemědělství a potravinářské produkce středověkých hornických komunit [online]. *Archaeologia historica* 43(1), 213–245. [accessed 2022-09-26]. DOI: 10.5817/AH2018-1-12. Available from: https://digilib.phil.muni.cz/cs/handle/11222.digilib/138130.

Doležel, J. 2013: Tišnov ve středověku a na počátku novověku (od slovanského osídlení do roku 1554). In: J. Doležel, J. Lacina, J. Zacpal (eds.): *Tišnov. Příroda, dějiny, památky, lidé*. Tišnov: Město Tišnov, 224–292.

Doležel, J. (ed.) 2006: *Forum urbes medii aevi III. Vrcholně středověká zděná měšťanská architektura ve střední Evropě. Sborník příspěvků z konference FUMA konané 14.–16. 4. 2004 v Jihlavě*. Brno: Archaia Brno o. p. s.

Donat, P. 1993: Zehn Keller von Gebesee, Lkr. Erfurt. Studien zu hochmittelalterlichen Kelleranlagen [online]. *Alt-Thüringen* 27, 207–264. [accessed 2022-07-17]. Available from: https://zs.thulb.uni-jena.de/rsc/viewer/jportal_derivate_00203667/alt-_129513253_1993_27_%200207.tif.

Donat, P. 1995: Neuere archäologische und bauhistorische Forschungsergebnisse zum ländlichen Hausbau des 11.–13. Jahrhunderts in Mittel- und Süddeutschland [online]. *Germania* 73(2), 421–439. [accessed 2022-09-23]. DOI: 10.11588/ger.1995.2. Available from: https://journals.ub.uni-heidelberg.de/index.php/germania/article/view/57501.

Donat, P. 1996: Zum städtischen Hausbau des Hochmittelalters in Mittel- und Süddeutschland. In: H. Brachmann, J. Klápště (eds.): *Hausbau und Raumstruktur früher Städte in Ostmitteleuropa*. Památky archeologické. Supplementum 6. Prague: Institute of Archaeology, Prague, 28–39.

Donat, P. 2000: Zum städtischen Hausbau des 13. Jhs. im östlichen Mitteleuropa. *Slavia Antiqua* XLI, 129–172.

Donat, P. 2005: Zum städtischen und ländlichen Hausbau des 12. bis 15. Jhs. in Deutschland – Forschungsprobleme regionaler Entwicklung. In: F. Biermann, G. Mangelsdorf (eds.): *Die bäuerliche Ostsiedlung des Mittelalters in Nordostdeutschland. Untersuchungen zum Landesausbau des 12. bis 14. Jahrhunderts im ländlichen Raum*. Greifswalder Mitteilungen. Beiträge zur Ur- und Frühgeschichte und Mittelalterarchäologie 7. Frankfurt am Main: Lang, 39–67.

Dragoun, Z. 1984: K otázce vztahu středověkých zahloubených obytných objektů a románských domů. *Documenta Pragensia* IV, 73–83.

Dragoun, Z. 2002a: Praha: Archeologie katastrof a katastrofy archeologie. *Documenta Pragensia* XX, 299–305.

Dragoun, Z. 2002b: *Praha 885–1310: kapitoly o románské a raně gotické architektuře*. Praha: Libri.

Dragoun, Z. 2018: Pražské románské domy. In: I. Boháčová, J. Podliska (eds.): *Průvodce pražskou archeologií. Památky známé, neznámé i skryté*. 2., upravené vydání. Praha: Archeologický ústav Akademie věd České republiky, Praha, v. v. i., 181–184.

Dragoun, Z., Rakušan, D. 2004: Výsledky záchranného archeologického výzkumu při rekonstrukci domu čp. 436/I v Jilské ulici na Starém Městě pražském. *Výroční zpráva NPÚ ÚOP v hl. m. Praze 2003, 2004*, 35–39.

Dragoun, Z., Rakušan, D. 2006: Praha 1-Staré Město, Michalská ulice čp. 436/I. In: Z. Dragoun et al.: Archeologický výzkum v Praze v letech 2003–2004. *Pražský sborník historický* XXXIV, 347–349.

Dragoun, Z., Škabrada, J., Tryml, M. 2002: *Románské domy v Praze*. Praha: Paseka.

Dragoun, Z., Škabrada, J., Tryml, M. 2003: *Romanesque houses in Prague*. Prague: Paseka.

Duffek, P., Těsnohlídek, J., Těsnohlídková, K., Prachařová, M., Skořepová, M. 2017: *Stavební úpravy Palackého náměstí Počátky*. Manuscript of the excavation report, No. A020/2014. Stored in: Archaia Brno.

Dvořák, J. 1996: Kámen středověkých staveb na Moravě [online]. *Archaeologia historica* 21, 509–512. [accessed 2022-09-26]. Available from: https://digilib.phil.muni.cz/cs/handle/11222.digilib/140219.

Eckstein, D., Bauch, J. 1969: Beitrag zur Rationalisierung eines dendrochronologischen Verfahrens und zur Analyse seiner Aussagesicherheit. *Forstwissenschaftliches Centralblatt* 88, 230–250.

Elsner, H. 1994: *Wikinger Museum Haithabu: Schaufenster einer frühen Stadt*. 2. Auflage. Neumünster: Karl Wachholtz Verlag.

Ennen, E. 1988: Stadtrechtsorte und Freiheiten im mittelalterlichen Europa. In: N.-A. Bringéus et al. (eds.): *Wandel der Volkskultur in Europa. Festschrift für Günter Wiegelmann zum 60. Geburtstag. Band 2*. Beiträge zur Volkskultur in Nordwestdeutschland 60. Münster: F. Coppenrath, 637–650.

Enzenberger, P. 2007: *Handwerk im mittelalterlichen Greifswald. Ein Beiträg zur Darstellung der Siedlungs- und Produktionsweise in einem spätmittelalterlichen Handwerkerviertel am Übergang vom 13. zum 14. Jahrhundert*. Beiträge zur Ur- und Frühgeschichte Mecklenburg-Vorpommerns 47. Schwerin: Landesamt für Kultur und Denkmalpflege.

Erdogu, B., Ulubey, A. 2011: Colour symbolism in the prehistoric architecture of Central Anatolia and Raman spectroscopic investigation of red ochre in Chalcolithic Çatalhöyük. *Oxford Journal of Archaeology* 30(1), 1–11. DOI: 10.1111/j.1468-0092.2010.00356.x.

Fajkus, O., Mátl, V. 1976: Ložiska sádrovce na Opavsku a jejich průmyslové využívání. *Sborník GPO (Geologický průzkum Ostrava)* 12, 77–86.

Faltýnek, K., Novák, J., Šlézar, P. in print: Podoba, funkce a provoz městských parcel v době lokace města Litovle na příkladu archeologického výzkumu na náměstí Přemysla Otakara čp. 777. *Zprávy Vlastivědného muzea v Olomouci* 324.

Fehring, G. P. 1986: Städtischer Hausbau in Norddeutschland von 1150 bis 1250. In: H. Steuer (ed.): *Zur Lebensweise in der Stadt 1200. Ergebnisse der Mittelalter-Archäologie. Bericht über die Kolloquium in Köln vom 31. Januar bis 2. Februar 1984*. Zeitschrift für Archäologie des Mittelalters. Beiheft 4. Köln, Bonn: Rheinland-Verlag, In Kommission bei Dr. Rudolf Habelt, 43–61.

Fehring, G. P. 1997: Plot layout and building structures of medieval towns in Central Europe. In: P. Michna, R. Nekuda, J. Unger (eds.): *Z pravěku do středověku. Sborník k 70. narozeninám Vladimíra Nekudy*. Brno: Muzejní a vlastivědná společnost, Moravské zemské muzeum, 148–155.

Felgenhauer-Schmiedt, S. 2002: Die Bauernhäuser der Wüstung Hard, Niederösterreich. Überlegungen zum dreiteiligen Haus [online]. In: J. Klápště (ed.): *Ruralia IV. The rural house from the migration period to the oldest still standing buildings. 8.-13. September 2001 Bad Bederkesa, Lower Saxony, Germany*. Památky archeologické. Supplementum 15. Prague: Institute of Archaeology, Academy of Sciences of the Czech Republic, Prague, 257–263. [accessed 2022-09-11]. Available from: ruralia2.ff.cuni.cz/wp-content/uploads/2018/04/257-263.pdf.

Felgenhauer-Schmiedt, S. 2008: *Hard. Ein Wüstungskomplex bei Thaya im niederösterreichischen Waldviertel*. Archäologische Forschungen in Niederösterreich 6. St. Pölten: Niederösterreichische Instituts für Landeskünde.

Ferus, V., Baxa, P. 2006: Meštiansky dom v Bratislave v druhej polovine 13. storočia. *Forum urbes medii aevi* III, 88–101.

Fiala, Z. (ed.) 1976: *Zbraslavská kronika = Chronicon aulae regiae*. Vydání II, opravené (ve Svobodě I). Členská knižnice. Praha: Svoboda.

Fišer, B. 1921: *Uherské Hradiště. I. Topografie* [online]. Uherské Hradiště: Karel Novotný. [accessed 2022-12-04]. Available from: https://archive.org/details/uherske_hradiste-fiser.

Frolec, V. 1982: K interpretaci geneze trojdílného komorového domu (Ve světle archeologických výzkumů na jihozápadní Moravě) [online]. *Archaeologia historica* 7, 67–78. [accessed 2022-09-11]. Available from: https://digilib.phil.muni.cz/handle/11222.digilib/139387.

Frolík, J., Musil, J. 2014: Nejstarší zástavba Chrudimi po založení města ve 2. polovině 13. století. *Forum urbes medii aevi* VIII(1–2), 46–67.

Frolíková-Kaliszová, D. 2007: Der Fluss Morava und der großmährische Burgwall Uherské Hradiště. In: F. Biermann, T. Kersting (eds.): *Siedlung, Kommunikation und Wirtschaft im westslawischen Raum*. Beiträge zur Ur- und Frühgeschichte Mitteleuropas 46. Langenweissbach: Beier & Beran, 299–306.

Frolíková-Kaliszová, D. 2009: Bronzový křížek z Uherského Hradiště [online]. *Archaeologia historica* 34, 563–574. [accessed 2022-12-04]. Available from: https://digilib.phil.muni.cz/handle/11222.digilib/140827.

Gage, J. 1999: What Meaning had Colour in Early Societies? *Cambridge Archaeological Journal* 9(1), 109–126. DOI: 10.1017/S0959774300015237.

Gaisbauer, I., Reichhalter, G., Sakl-Oberthaler, S. 2007: Mittelalterliche Befunde der Grabungen Wien 1, Michaelerplatz (1990/1991) [online]. In: *Fundort Wien. Berichte zur Archäologie* 10, 44–65. [accessed 2022-12-18]. Available from: https://stadtarchaeologie.at/wp-content/uploads/2020/03/FWien_10-2007_Gesamtband.pdf.

Galuška, L. 2003: Zaniklá hrnčířská pec středověkého Veligradu-Starého Města – důsledek vpádu Matouše Čáka Trenčanského na Moravu roku 1315? [online]. *Archaeologia historica* 28, 591–609. [accessed 2022-12-04]. Available from: https://digilib.phil.muni.cz/handle/11222.digilib/140541.

Gawlas, S. 2003: Znaczenie kolonizacji niemieckiej dla rozwoju gospodarczego Śląska. In: A. Barciak (ed.): *Korzenie środkowoeuropejskiej i górnośląskiej kultury gospodarczej*. Katowice: Instytut Górnośląski, Urzad Miejski w Zabrzu: Polskie Towarzystwo Historyczne. Oddział w Katowicach, 22–46.

Gawlas, S. 2005: Przełom lokacyjny w dziejach miast środkowoeuropejskich. In: Z. Kurnatowska, T. Jurek (eds.): *Civitas Posnaniensis. Studia z dziejów średniowiecznego Poznania*. Prace Komisji Historycznej / Poznańskie Towarzystwo Przyjaciół Nauk, Wydział Historii i Nauk Społecznych 62. Poznań: Wydawnictwo Poznańskiego Towarzystwa Przyjaciół Nauk, 134–162.

Gerner, M. 2007: *Fachwerk. Entwicklung, Instandsetzung, Neubau*. München: Deutsche Verlags-Anstalt.

Gé, T., Courty, M.-A., Matthews, W., Wattez, J. 1993: Sedimentary Formation Processes of Occupation Deposits. In: P. Goldberg, D. T. Nash, M. D. Petraglia (eds.): *Formation Processes in Archaeological Context*. Monographs in World Archaeology 17. Madison: Prehistory Press, 149–163.

Geisler, M. 1994: *Uherské Hradiště. Hotel Inpost – ulice Františkánská*. Manuscript of the excavation report, No. MTX201701636. Stored in: Archive of the Institute of Archaeology, Czech Academy of Sciences, Brno.

Geisler, M. 1997: Uherské Hradiště (okr. Uherské Hradiště). *Přehled výzkumů* 1993-1994, 250. [accessed 2022-09-11]. Available also from: https://arub.cz/wp-content/uploads/07_pv_38_1993-1994_stredovek_a_novovek.pdf.

Gläser, M. (ed.) 2001: *Lübecker Kolloquium zur Stadtarchäologie im Hanseraum III. Der Hausbau*. Lübeck: Schmidt-Römhild.

Gliński, R. 2017: Medieval and early modern burgher houses in Jelenia Góra in the light of archaeological studies. In: D. Adamska, R. Eysymontt: *Atlas historyczny miast polskich/ The Historical Atlas of Polish Towns. Volume 4, Śląsk; book 14. Jelenia Góra*. Wrocław: Instytut Archeologii i Etnologii PAN, 33–34.

Goldberg, P., Macphail, R. I. 2006: *Practical and Theoretical Geoarchaeology.* Oxford: Wiley, Blackwell. DOI: 10.1002/9781118688182.

Goliński, M. 2000: *Wokół socjotopografii późnośredniowiecznej Świdnicy. Część 1* [online]. Acta Universitatis Wratislaviensis 2203. Historia CXLI. Wrocław: Wydawnictwo Uniwersytetu Wrocławskiego. [accessed 2022-07-21]. Available from: https://www.repozytorium.uni.wroc.pl/dlibra/publication/119731/edition/116382/content.

Goliński, M. 2003: *Wokół socjotopografii późnośredniowiecznej Świdnicy. Część 2* [online]. Acta Universitatis Wratislaviensis 2529. Historia CLXV. Wrocław: Wydawnictwo Uniwersytetu Wrocławskiego. [accessed 2022-07-21]. Available from: https://www.repozytorium.uni.wroc.pl/dlibra/publication/119737/edition/116383/content.

Goš, V. 1984: K otázce zahloubených obydlí ve 13. století na severní Moravě (zemnice č. 16 z Loštic-náměstí) [online]. *Vlastivědný věstník moravský* XXXVI(2), 171–178. [accessed 2022-10-12]. Available from: https://1url.cz/crCag.

Goš, V., Halama, J. 2013: Šumperk, ulice Na Hradbách. Provizorium či lehká dřevohliněná stavba ze 13. století, malé zamyšlení nad velkým problémem [online]. *Archaeologia historica* 38(1), 203–217. [accessed 2022-12-05]. Available from: https://digilib.phil.muni.cz/en/handle/11222.digilib/128316.

Grimm, P. 1939: *Hohenrode. Eine mittelalterliche Siedlung im Südharz*. Veröffentlichungen der Landesanstalt für Volkheitskunde zu Halle 11. Halle: Gebauer-Schwetschke.

Gutscher, D. 1984: Karolingische Holzbauten im Norden der Frauenmünsterabtei. Bericht über die Rettungsgrabungen 1981–83 auf dem Zürcher Münsterhof [online]. *Zeitschrift für Schweizerische Archäologie und Kunstgeschichte* 41(2), 207–224. [accessed 2022-07-17]. Available from: https://www.e-periodica.ch/digbib/view?pid=zak-003%3A1984%3A41%3A%3A76#222.

Hardmeier, S. 2018: *Altreu im Mittelalter. Eine Stadtwüstung im Kanton Solothurn*. Schweizer Beiträge zur Kulturgeschichte und Archäologie des Mittelalters 46. Basel: Schweizerischer Burgenverein.

Hauserová, M. 1995: Středověký městský dům na široké parcele se středním vjezdem (Příspěvek k poznání dispozičního typu) [online]. *Archaeologia historica* 20, 35–52. [accessed 2022-09-23]. Available from: https://digilib.phil.muni.cz/en/handle/11222.digilib/140121.

Hauserová, M., Rykl, M. 2003: Dům čp. 150 - 151 na Starém Městě pražském. In: J. Anderle et al. (eds.): *Dějiny staveb 2002. Sborník příspěvků z konference Dějiny staveb*. Plzeň: Klub Augusta Sedláčka ve spolupráci se Sdružením pro stavebněhistorický průzkum, 57–72.

Hauserová, M., Rykl, M. 2011: Die Häuser Nr. 150, 151 und 153/I in der Prager Altstadt. In: M. Goer et al. (eds.): *Wandel im Wohnbau zwischen Gotik und Barock. Die sächsisch-böhmische Entwicklung im überregionalen Vergleich*. Jahrbuch für Hausforschung 53. Marburg: Jonas Verlag, 109–137.

Havlíková, L. 2007: *Stavební kámen v historické zástavbě městské památkové zóny Opava* [online]. Manuscript of the master's thesis. Masarykova univerzita. Přírodovědecká fakulta. [accessed 2022-09-26]. Available from: https://is.muni.cz/th/w6p0v/.

Havrda, J. 2021: Praha 1 – Staré Město, Husova ulice před čp. 236/I. In: Z. Dragoun et al.: Archeologický výzkum v Praze v letech 2019–2020. *Pražský sborník historický* XLIX, 631–632.

Havrda, J. 2022: Archeologický výzkum v suterénu domu čp. 919, ul. V Kolkovně, Praha – Staré Město (1. etapa). In: *Archeologické výzkumy v Čechách 2021 (sborník referátů z informačního kolokvia)*. Zprávy České archeologické společnosti, Supplément 122. Praha: Česká archaeologická společnost – Spolek archeologů Čech, Moravy a Slezska, 34.

Havrda, J., Matějková, K. 2014: Hrnčíři ve středověké Praze. Výsledky výzkumu výrobních zařízení z Malé Strany v kontextu dosavadních poznatků [online]. *Archaeologia historica* 39(1), 23–51. [accessed 2022-07-31]. Available from: https://digilib.phil.muni.cz/cs/handle/11222.digilib/130279.

Havrda, J., Semerád, M., Musílek, M. 2014: K proměně předlokačního osídlení Prahy v raně gotické město na příkladu románského domu v objektu čp. 309 v Bartolomějské ulici [online]. *Staletá Praha* XXX(2), 65–85. [accessed 2022-07-31]. Available from: www.staletapraha.cz/media/2014_2/sp-2014-2-cl-04-havrda-bartolomejska-72dpi.pdf.

Havrda, J., Tryml, M. 2013: *Nebovidy. Středověká osada v pražském podhradí*. Archeologické prameny k dějinám Prahy 6. Praha: Národní památkový ústav, územní odborné pracoviště v hlavním městě Praze.

Hejhal, P., Holub, P., Hrubý, P., Merta, D. 2004: Měšťanská zděná zástavba středověké Jihlavy (k současnému stavu poznání). *Forum urbes medii aevi* III, 190–229.

Hejhal, P., Hrubý, P. 2005: Dřevěná architektura 13. století v Jihlavě, Pelhřimově a Humpolci. *Forum urbes medii aevi* II, 126–147.

Herrnbrodt, A. 1958: *Der Husterknupp: Eine niederrheinische Burganlage des frühen Mittelalters*. Bonner Jahrbücher. Beiheft 6. Köln: Böhlau Verlag.

Hoch, A. 2022: Předlokační osídlení. In: A. Hoch (ed.): *Zmizelá Třebíč: výpověď archeologie k dějinám města*. Třebíč, Jihlava: Městské kulturní středisko ve spolupráci s Muzeem Vysočiny, 28–47.

Hoffmann, F. 1992: *České město ve středověku. Život a dědictví*. Stopy, fakta, svědectví. Praha: Panorama.

Hoffmann, F., Jaroš, Z., Pisková, R., Svěrák, V. 2000: *Jihlava* [kartografický dokument]. Historický atlas měst České republiky. Svazek 8. Praha, Jihlava: Historický ústav Akademie věd ČR Praha, Muzeum Vysočiny Jihlava, Státní okresní archiv Jihlava.

Hollstein, E. 1980: *Mitteleuropäische Eichenchronologie. Trierer dendrochronologische Forschungen zur Archäologie und Kunstgeschichte*. Trierer Grabungen und Forschungen 11. Mainz am Rhein: Verlag Philipp von Zabern.

Holub, P. 2011: K výrobě a variabilitě stavební keramiky ve středověkém a novověkém Brně. *Forum urbes medii aevi* VI, 98–121.

Holub, P., Kolařík, V., Kováčik, P., Merta, D., Peška, M., Procházka, R., Zapletalová, D., Zůbek, A. 2004: Systematický archeologický výzkum města Brna [online]. *Forum urbes medii aevi* I, 57–97. [accessed 2022-10-12]. Available from: https://www.archaiabrno.org/media/doc/fuma_I_57_97_vyzkum_brna.pdf.

Holub et al. 2005a: Holub, P., Kolařík, V., Merta, D., Peška, M., Zapletalová, D., Zůbek, A. 2005a: Ke stavu poznání nezděné měšťanské architektury vrcholně středověkého Brna. *Forum urbes medii aevi* II, 44–101.

Holub et al. 2005b: Holub, P., Merta, D., Peška, M., Zůbek, A. 2005b: K vývoji pálené střešní krytiny v Brně (na základě archeologických nálezů). In: *Svorník 3. Sborník příspěvků z 3. konference stavebněhistorického průzkumu uspořádané 8.–11. 6. 2004 v Muzeu Vysočiny v Třebíči. Krovy a střechy*. Praha: Unicornis, 251–256.

Holub, P., Kolařík, V., Merta, D., Peška, M., Zůbek, A. 2013: Bürgerliche Architektur des hochmittelalterlichen Brno/Brünn. In: Y. Hoffmann, U. Richter (eds.): *Die Frühgeschichte Freibergs im überregionalen Vergleich. Städtische Frühgeschichte – Bergbau – früher Hausbau*. Halle: Mitteldeutscher Verlag, 457–471.

Holub, P., Kolařík, V., Merta, D., Peška, M., Zůbek, A. 2015: Medieval Brick Architecture in Brno in the Context of South Moravia. *Forum urbes medii aevi* IX(2), 310–337.

Holub, P., Kolařík, V., Zůbek, A. 2019: Středověká cihlářská pec na výrobu střešní krytiny z Rooseveltovy ulice v Brně [online]. *Archeologia technica* 30, 50–57. [accessed 2022-11-12]. Available from: archeologiatechnica.cz/sites/default/files/2020-06/AT_30_2019_48_55_Holub_Kolarik_Zubek.pdf.

Holub, P., Merta, D., Peška, M., Procházka, R. 2007: The origins of burgher architecture in high-medieval Brno (until the mid-14th century) [online]. In: *Medieval Europe Paris 2007. 4e Congrès International d'Archéologie Médiévale et Moderne = 4th International Congress of Medieval and Modern Archaeology*. [accessed 2022-12-01]. Available from: medieval-europe-paris-2007.univ-paris1.fr/P.Holub%20et%20al..pdf.

Holub, P., Merta, D., Peška, M., Zapletalová, D., Zůbek, A. 2003: K otázce topenišť v dřevohliněných domech ze 13. století v Brně, … aneb proč nevěříme na zemnice. In: *Svorník 1. Sborník příspěvků z I. konference stavebně historického průzkumu 4.–6. 6. 2002 v Zahrádkách u České Lípy. Vývoj a funkce topenišť*. Praha: Unicornis, 75–84.

Hosák, L., Šrámek, R. 1980: *Místní jména na Moravě a ve Slezsku. II. M-Ž*. Praha: Academia.

Hosák, L., Zemek, M. 1981: Hradiště po uherských válkách do Bílé Hory. In: J. Čoupek et al. (eds.): *Uherské Hradiště: dějiny města*. Brno: Blok, 141–192.

Hoššo, J. 2008: Komplex stredovekých drevozemných a drevených stavieb v Trnave na Hviezdoslavovej ulici [online]. In: *Pamiatky Trnavy a Trnavského kraja 11. Zborník zo seminára konaného dňa 5. 12. 2007*. Trnava: Krajský pamiatkový úrad Trnava, 3–10. [accessed 2022-12-05]. Available from: https://www.trnava.sk/userfiles/download/attachment/ourak_KPU-Zbornik-pamiatky_11-2008.pdf.

Hrdlička, L. 1972: Předběžné výsledky výzkumu v Praze 1 na Klárově [online]. *Archeologické rozhledy* XXIV(6), 644–663, 693–696. [accessed 2022-07-31]. Available from: https://1url.cz/srCaS.

Hrdlička, L. 1980: Praha 1 – Staré Město, Husova ul. čp. 352/I (dům U Sladkých). In: M. Fridrichová (ed.): Záchranné archeologické výzkumy v Praze v letech 1976 a 1977. *Pražský sborník historický* XII, 239–242.

Hrdlička, L. 1983: Strategie a taktika současného archeologického výzkumu v historickém jádru Prahy [online]. *Archeologické rozhledy* XXXV(6), 609–638. [accessed 2022-07-31]. Available from: https://1url.cz/nrCav.

Hrdlička, L. 2000a: Centrum raně středověké Prahy. In: J. Piekalski, K. Wachowski (eds.): *Średniowieczny Śląsk i Czechy. Centrum średniowiecznego miasta. Wrocław a Europa Środkowa* [online]. Wratislavia Antiqua. Studia z dziejów Wrocławia 2. Wrocław: Uniwersytet Wrocławski, 191–214. [accessed 2022-07-31]. Available from: wratislavia.archeo.uni.wroc.pl/2-tom/12a.pdf.

Hrdlička, L. 2000b: K proměnám středověké Prahy. In: L. Kovaříková, J. Poláková, L. Bezděk (eds.): *Prague. A hub of European culture. International symposium ICOMOS 2000. May 16–19, 2000 Prague-Prague Castle.* Praha: ICOMOS, 48–53.

Hrubý, P. 2011: *Jihlava – Staré Hory. Archeologický výzkum středověkého důlního, úpravnického a obytného areálu v letech 2002–2006. Příspěvek ke studiu středověkého rudného hornictví* [online]. Dissertationes archaeologicae Brunenses/Pragensesque 9. Praha: Univerzita Karlova v Praze. [accessed 2022-11-30]. Available from: https://digilib.phil.muni.cz/handle/11222.digilib/127590.

Huml, V. 1988: Nové objevy v areálu středověké tvrze v Praze 8-Čimicích (Předběžná zpráva) [online]. *Archaeologia historica* 13, 353–368. [accessed 2022-07-31]. Available from: https://digilib.phil.muni.cz/cs/handle/11222.digilib/139771.

Huml, V. 1998: Území Nového Města pražského do poloviny 14. století. In: M. Fiala et al. (eds.): *Nové Město pražské 1348–1784*. Praha: Muzeum hlavního města Prahy, Archiv hlavního města Prahy, 9–12.

Jan, L. (ed.) 2013: *Dějiny Brna 2. Středověké město*. Brno: Statutární město Brno, Archiv města Brna.

Jankuhn, H. 1986: *Haithabu. Ein Handelsplatz der Wikingerzeit*. 8., neubearbeitete und stark erweiterte Auflage. Neumünster: Karl Wachholtz Verlag.

Janská, E. 1979: K nálezům středověkých studní. *Staletá Praha* VIII, 165–196.

Jarošová, M., Lisá, L., Přichystal, A., Parma, D., Petr, L., Kos, P. 2010: Geoarcheologický výzkum halštatské zemnice v Modřicích u Brna [online]. *Geologické výzkumy na Moravě a ve Slezsku* 17(1–2), 39–45. [accessed 2022-05-14]. Available from: https://journals.muni.cz/gvms/article/view/4728/3796.

Jaworski, K. 1999: Późnośredniowieczne budownictwo drewniane we Wrocławiu. In: M. Ježek, J. Klápště (eds.): *Praha – Wrocław*. Mediaevalia archaeologica 1. Praha: Archeologický ústav AV ČR, 57–87.

Ječný, H., Čiháková, J., Kršáková, S., Olmerová, H., Stehlíková, D., Špaček, L., Tryml, M. 1984: Praha v raném středověku. Jeden ze současných pohledů na vývoj přemyslovského města. *Archaeologica Pragensia* 5(2), 211–288.

Jenisch, B. 1999: *Die Entstehung der Stadt Villingen. Archäologische Zeugnisse und Quellenüberlieferung*. Forschungen und Berichte der Archäologie des Mittelalters in Baden-Württemberg 22. Stuttgart: Theiss.

Ježek, M., Chytráček, M., Lojek, T., Prokopová, A. 2009: K pre-historii dvou Měst pražských [online]. *Archeologické rozhledy* LXI(1), 118–138. [accessed 2022-07-31]. Available from: https://1url.cz/hrCa5.

Ježek, M., Klápště, J., Tomášek, M. 2002: The medieval peasant house in Bohemia – continuity and change [online]. In: J. Klápště (ed.): *Ruralia IV. The rural house from the migration period to the oldest still standing buildings. 8.-13. September 2001 Bad Bederkesa, Lower Saxony, Germany.* Památky archeologické. Supplementum 15. Prague: Institute of Archaeology, Academy of Sciences of the Czech Republic, Prague, 347–356. [accessed 2022-09-23]. Available from: ruralia2.ff.cuni.cz/wp-content/uploads/2018/04/347-356.pdf.

Juřina, P. 2005: Předlokační zástavba v Klimentské ulici na Novém Městě Pražském [online]. *Forum urbes medii aevi* II, 148–156. [accessed 2022-07-31]. Available from: https://www.archaiabrno.org/media/doc/08_fuma_ii_jurina.pdf.

Juřina, P. 2009: Výstavba hradeb a vznik náměstí. In: P. Juřina et al.: *Náměstí Republiky. Výzkum století*. Praha: Archaia, 66–71.

Juřina, P., Kašpar, V., Podliska, J. 2009: Paláce z kamene i ze dřeva. In: P. Juřina et al.: *Náměstí Republiky. Výzkum století*. Praha: Archaia, 44–51.

Kaiser, L., Kočár, P., Postránecká, K., Široký, R. 2005: Požárem zaniklý středověký objekt ve Smetanově ulici ve Starém Plzenci. K metodice výzkumu požárových destrukcí. *Forum urbes medii aevi* II, 102–117.

Kaniová, P., Kolář, F., Marethová, B., Moravec, Z. 2019: Ostrava (k. ú. Moravská Ostrava, okr. Ostrava-město). *Přehled výzkumů* 60(2), 296–297. [accessed 2022-09-27]. Available also from: https://www.arub.cz/prehled-vydanych-cisel/pv_60_2__stredovek_novovek.pdf.

Karkanas, P. 2006: Late Neolithic household activities in marginal areas: the micromorphological evidence from the Kouveleiki caves, Peloponnese, Greece. *Journal of Archaeological Science* 33(11), 1628–1641. DOI: 10.1016/j.jas.2006.02.017.

Karkanas, P. 2007: Identification of Lime Plaster in Prehistory Using Petrographic Methods: A Review and Reconsideration of the Data on the Basis of Experimental and Case Studies [online]. *Geoarchaeology: An International Journal* 22(7), 775–796. [accessed 2022-09-03]. DOI: 10.1002/gea.20186. Available from: https://onlinelibrary.wiley.com/doi/epdf/10.1002/gea.20186.

Karkanas, P., Goldberg, P. 2019: *Reconstructing Archaeological Sites. Understanding the Geoarchaeological Matrix*. Hoboken: Wiley. DOI: 10.1002/9781119016427.

Kašák, K., Valkony, J., Militký, J. 2009: Dům mincmistra nebo zloděje střížků? In: P. Juřina et al.: *Náměstí Republiky. Výzkum století*. Praha: Archaia, 37–39.

Kašpar, V. 2018a: Nové Město. In: I. Boháčová, J. Podliska (eds.): *Průvodce pražskou archeologií. Památky známé, neznámé i skryté*. 2., upravené vydání. Praha: Archeologický ústav Akademie věd České republiky, Praha, v. v. i., 201–207.

Kašpar, V. 2018b: Středověká osada u kostela sv. Petra na Poříčí. In: I. Boháčová, J. Podliska (eds.): *Průvodce pražskou archeologií. Památky známé, neznámé i skryté*. 2., upravené vydání. Praha: Archeologický ústav Akademie věd České republiky, Praha, v. v. i., 208–211.

Kašpar, V., Vyšohlíd, M. 2020: Dům U Sixtů po více než 20 letech [online]. In: *Archaia Praha. Obecně prospěšná společnost*. 01. 05. 2020. [accessed 2022-07-31]. Available from: https://www.archaiapraha.cz/praha-cs/?acc=aktuality&id=225.

Katz, N. J., Katz, S. V., Kipiani, M. G. 1965: *Atlas and Keys of Fruits and Seeds Occurring in the Quaternary Deposits of the U.S.S.R.* Moscow: Academy of Sciences of the U.S.S.R., Commission for Investigations of the Quaternary Period, Nauka.

Kavan, J. 1956: Archeologický výzkum v Hradištku u Davle [online]. *Archeologické rozhledy* VIII(3), 371–372, 377–386. [accessed 2022-07-31]. Available from: https://1url.cz/6rCa9.

Kaźmierczyk, J. 1966: *Wrocław lewobrzeżny we wczesnym średniowieczu. Część pierwsza*. Wrocław: Zakład Narodowy imienia Ossolińskich.

Kaźmierczyk, J. 1970: *Wrocław lewobrzeżny we wczesnym średniowieczu. Część druga*. Wrocław: Zakład Narodowy imienia Ossolińskich.

Kaźmierczyk, J. 1991: *Ku początkom Wrocławia. Cz. 1. Warsztat budowlany i kultura mieszkalna Ostrowa Tumskiego od X do połowy XI wieku*. Wrocław, Warszawa: Oficyna Wydawnicza VOLUMEN.

Kaźmierczyk, J. 1993: *Ku początkom Wrocławia. Cz. 2. Warsztat budowlany i kultura mieszkalna Ostrowa Tumskiego od połowy XI do połowy XIII wieku*. Wrocław: Oficyna Wydawnicza SUDETY.

Kaźmierczyk, J. 1995: *Ku początkom Wrocławia. Cz. 3. Gród na Ostrowie Tumskim w X-XIII wieku (uzupełnienie do cz. 1 i 2)*. Wrocław: Oficyna Wydawnicza SUDETY.

Kejř, J. 1998: *Vznik městského zřízení v českých zemích*. Praha: Karolinum.

Kiecoň, M., Skalická, P. 2013: *Opava - Popská ulice*. Manuscript of the excavation report MTX202100471. [accessed 2022-10-31]. Stored in: Archive of the Institute of Archaeology, Czech Academy of Sciences, Brno. Available also from: Digital Archive of the Archaeological Map of the Czech Republic https://digiarchiv.aiscr.cz/id/M-TX-202100471.

Kiecoň, M., Zezula, M. 2004: Počátky a rozvoj města Opavy ve 13. a 14. století ve světle poznatků z archeologických výzkumů v l. 2000-2002. In: D. Abłamowicz, M. Furmanek, M. Michnik (eds.): *Początki i rozwój miast Górnego Śląska: studia interdyscyplinarne*. Seria Monograficzna - Muzeum v Gliwicach 10. Biblioteka Katowicka 18. Gliwice: Muzeum w Gliwicach, 57–58.

Kiecoň, M., Zezula, M. 2005: Dřevohliněná zástavba v Opavě ve středověku (současný stav výzkumu). *Forum urbes medii aevi* II, 26–43.

Klápště, J. 2002: *Archeologie středověkého domu v Mostě (čp. 226)*. Mediaevalia archaeologica 4. Praha, Most: Archeologický ústav AV ČR ve spolupráci s Ústavem archeologické památkové péče severozápadních Čech a Okresním muzeem v Mostě.

Klápště, J. 2005a: Čas hledání otázek. *Forum urbes medii aevi* II, 2–3.

Klápště, J. 2005b: *Proměna českých zemí ve středověku*. Česká historie 15. Praha: Nakladatelství Lidové noviny.

Klápště, J. 2012: *The Czech Lands in Medieval Transformation*. East Central and Eastern Europe in the Middle Ages, 450–1450 17. Leiden: Brill. DOI: 10.1163/9789004226463_001.

Klápště, J. 2016: *The Archaeology of Prague and the Medieval Czech Lands, 1100–1600*. Studies in the Archaeology of Medieval Europe. Sheffield: Equinox.

Klápště, J., Muk, J. 1988: Studie o středověkém domě z Mostu (čp. 226) [online]. *Památky archeologické* LXXIX(1), 199–240. [accessed 2022-07-31]. Available from: https://1url.cz/MrCaP.

Klápště, J., Richter, M., Velímský, T. 1996: Hausbau früher Lokationsstädte in Böhmen. In: H. Brachmann, J. Klápště (eds.): *Hausbau und Raumstruktur früher Städte in Ostmitteleuropa*. Památky archeologické. Supplementum 6. Prague: Institute of Archaeology, Prague, 148–165.

Klápště, J., Velímský, T. 1978: Mostecké zemnice 13. století (zpráva o stavu výzkumu) [online]. *Archaeologia historica* 3, 121–129. [accessed 2022-12-05]. Available from: https://digilib.phil.muni.cz/cs/handle/11222.digilib/139219.

Kneppe, C., Peine, H.-W. 1995: Die Klockenstraße im Siedlungsgefüge der Altstadt. Die Auswertung archivalischer Quellen und archäologischer Untersuchungen. In: B. Trier (ed.): *Mittelalteriches Leben an der Klockenstraße. Eine Dokumentation des Westfälischen Museums für Archäologie zu den Ausgrabungen 1991 in der Warburger Altstadt*. Warburg: Hermes, 5–73.

Kočár, P., Kočárová, R. 2015: Rostlinné zbytky. In: M. Plaček, M. Dejmal et al.: *Veselí nad Moravou: středověký hrad v říční nivě*. Brno: Archaia Brno o. p. s., 122–145.

Kočár, P., Kočárová, R. 2022: Archeobotanika. In: A. Hoch (ed.): *Zmizelá Třebíč: výpověď archeologie k dějinám města*. Třebíč, Jihlava: Městské kulturní středisko ve spolupráci s Muzeem Vysočiny, 92–111.

Kohoutek, J. 1996: Nové poznatky o středověkém vývoji města Uherského Brodu [online]. *Archaeologia historica* 21, 373–384. [accessed 2022-09-27]. Available from: https://digilib.phil.muni.cz/cs/handle/11222.digilib/140207.

Kohoutek, J. 2008: Hrady a tvrze jihovýchodní Moravy ve 13. a 14. století. In: L. Galuška, P. Kouřil, J. Mitáček (eds.): *Východní Morava v 10. až 14. století*. Brno: Moravské zemské muzeum, Archeologický ústav AV ČR Brno, 185–194.

Kohoutek, J., Merta, D. 1999: Uherské Hradiště (okr. Uherské Hradiště). *Přehled výzkumů* 39 (1995-1996), 467. [accessed 2022-09-11]. Available also from: https://arub.cz/wp-content/uploads/07_pv_39-1995-1996_stredovek_a_novovek.pdf.

Kohoutek, J., Procházka, R. 1995: *Uherské Hradiště (kaple sv. Alžběty)*. Manuscript of the excavation report, No. MTX201701496. Stored in: Archive of the Institute of Archaeology, Czech Academy of Sciences, Brno.

Kohoutek, J., Procházka, R. 1997: Uherské Hradiště (okr. Uherské Hradiště). *Přehled výzkumů* 1993-1994, 251–254. [accessed 2022-09-11]. Available also from: https://arub.cz/wp-content/uploads/07_pv_38_1993-1994_stredovek_a_novovek.pdf.

Kolář, F. (ed.) 2013: *Opavské hradby*. Opava, Ostrava: Opavské kulturní centrum, Národní památkový ústav, územní odborné pracoviště v Ostravě.

Kolář, F., Kaniová, P., Kadlubiec, R. 2011: Z labyrintu středověkých měst. In: V. Razím, P. Macek (eds.): *Zkoumání historických staveb*. Praha: Národní památkový ústav, územní odborné pracoviště středních Čech v Praze, 236–239.

Kolář, F., Zezula, M. 2014: Das städtische Grundstück im Opava (Troppau) des 13. und 14. Jahrhunderts aus archäologischer Sicht [online]. *Praehistorica* XXXI(2), 545–566. [accessed 2022-08-21]. Available from: https://karolinum.cz/data/clanek/5495/Praehist_2_31_2014_545-566.pdf.

Kolařík, V., Merta, D., Peška, M. 2015: Archeologie žijící vesnice. Poznámky ke stavu a možnostem výzkumu vesnického domu v roce 2015. In: J. Anderle et al. (eds.): *Dějiny staveb. Sborník vybraných referátů z konference v Nečtinech konané ve dnech 20. 3. – 22. 3. 2015*. Plzeň: Klub Augusta Sedláčka ve spolupráci se Sdružením pro stavebněhistorický průzkum, 196–200.

Kondracki, J. 2002: *Geografia regionalna Polski*. Wyd. 3., uzupełnione. Warszawa: Wydawnictwo Naukowe PWN.

Korn, G. 1870: *Breslauer Urkundenbuch. Erster Theil*. Ed. G. Korn. Breslau: Wilh. Gottl. Korn. [accessed 2023-01-08]. Available also from: https://www.sbc.org.pl/dlibra/show-content/publication/edition/3930?id=3930&dirids=1.

Kos, P., Kala, J. 2021: Jedovnice (okr. Blansko). *Přehled výzkumů* 62(2), 231. [accessed 2022-09-11]. Available also from: https://www.arub.cz/wp-content/uploads/62_2_07.pdf.

Kotyza, O., Cvrk, F., Pažourek, V. 1995: *Historické povodně na dolním Labi a Vltavě*. Děčín: Okresní muzeum.

Kouřil, P. 1988: Polozemnice z 13. století z Opavy-Kateřinek [online]. *Archaeologia historica* 13, 107–116. [accessed 2022-09-17]. Available from: https://digilib.phil.muni.cz/en/handle/11222.digilib/139755.

Kouřil, P. 2000: Opava od pravěku po období vrcholného středověku ve světle archeologických pramenů. 2. *Vlastivědné listy Slezska a Severní Moravy* 26(2), 1–3.

Kouřil, P., Kováčik, P., Prix, D., Wihoda, M. 2007: Tvrz a město Jeseník ve středověku [online]. *Archaeologia historica* 32(1), 239–268. [accessed 2022-12-05]. Available from: https://digilib.phil.muni.cz/cs/handle/11222.digilib/140714.

Kováčik, P. 1997: *Uherské Hradiště – „Reduta"*. Manuscript of the excavation report, No. MTX201602909. Stored in: Archive of the Institute of Archaeology, Czech Academy of Sciences, Brno. [accessed 2022-09-22]. Available also from: Digital Archive of the Archaeological Map of the Czech Republic http://digiarchiv.amapa.cz/id/M-TX-201602909.

Kováčik, P. 1999: Uherské Hradiště (okr. Uherské Hradiště). *Přehled výzkumů* 40 (1997-1998), 374–377. [accessed 2022-09-11]. Available also from: https://arub.cz/wp-content/uploads/pv_40_1997-1998_stredovek_a_novovek.pdf.

Kováčik, P., Dudková, V., Frömelová, S., Hanšut, M., Lafková, H. 2021: Dva lokační dřevohliněné suterény v Mohelnici. *Pravěk*. Nová řada 30, 143–180.

Kováčik, P., Merta, D., Peška, M. 2001: Archeologický výzkum parcely na nám. Svobody č. 8. *Zprávy Státního památkového ústavu v Brně* 5, 36–43. Dům na náměstí Svobody č. 8 v Brně.

Kovanda, J., Balatka, B., Bernard, J. H., Brunnerová, Z., Březinová, D., Bukanovská, M., Cílek, V., Fridrichová, M., Havlíček, V., Holub, V., Hrdlička, L., Chlupáč, I., Kadlecová, R., Kachlík, V., Kaprasová, E., Kleček, M., Král, J., Kříž, J., Lochmann, Z., Lysenko, V., Mašek, J., Šalanský, K., Tomášek, M., Zelenka, P. 2001: *Neživá příroda Prahy a jejího okolí*. Praha: Academia, Český geologický ústav.

Kozaczewski, T. 1975: Przyczyny rozwoju budownictwa murowanego na Śląsku w XIII wieku [online]. *Śląski Kwartalnik Historyczny Sobótka* 30(1), 1–40. [accessed 2022-07-20]. Available from: wtmh.sobotka.uni.wroc.pl/wp-content/uploads/2018/05/Sobotka_30_1975_1_1-40.pdf.

Krajíc, R. 1987: Vesnice husitského období na táborsku ve světle archeologických výzkumů [online]. *Archaeologia historica* 12, 85–95. [accessed 2022-12-04]. Available from: https://digilib.phil.muni.cz/handle/11222.digilib/139686.

Král, J. 1974: Středověké nálezy v Opavě 1973 (okr. Opava). *Přehled výzkumů* 18, 101–102. [accessed 2022-08-21]. Available also from: https://www.arub.cz/wp-content/uploads/pv_18_1973.pdf.

Král, J., Pavelčík, J. 1975: *Opava, Nádražní okruh*. Manuscript of the excavation report, MTX197500751 [accessed 2022-08-21]. Stored in: Archive of the Institute of Archaeology, Czech Academy of Sciences, Brno. Available also from: Digital Archive of the Archaeological Map of the Czech Republic http://digiarchiv.amapa.cz/id/M-TX-197500751.

Krauskopf, C. 2012: Mittelalterliche Holzkonstruktionen in Nordostbrandenburg. Die archäologischen Befunde aus Eberswalde [online]. In. M. Untermann (ed.): *Holzbau in Mittelalter und Neuzeit*. Mitteilungen der Deutschen Gesellschaft für Archäologie des Mittelalters und der Neuzeit 24. Paderborn: Deutsche Gesellschaft für Archäologie des Mittelalters und der Neuzeit e.V., 141–150. [accessed 2022-09-11]. DOI: 10.11588/dgamn.2012.1.17152. Available from: https://journals.ub.uni-heidelberg.de/index.php/mitt-dgamn/article/view/17152.

Krauskopf, C., Wiese, J. 2014: Altholz oder Stapelholz? Wiederverwendung und Lagerung von Bauholz im Mittelalter am Beispiel der Holzbefunde aus Eberswalde [online]. In: U. Klein, M. Untermann (eds.): *Vom Schicksal der Dinge. Spolie – Wiederverwendung – Recycling. Tagung in Brandenburg an der Havel, 13. und 14. Juni 2013*. Mitteilungen der Deutschen Gesellschaft für Archäologie des Mittelalters und der Neuzeit 26. Paderborn: Deutsche Gesellschaft für Archäologie des Mittelalters und der Neuzeit e.V., Arbeitskreis für Hausforschung e.V., 131–142. [accessed 2022-09-11]. DOI: 10.11588/dgamn.2014.1.17062. Available from: https://journals.ub.uni-heidelberg.de/index.php/mitt-dgamn/article/view/17062.

Krenn, M. 2012: *Wüstungsforschung und Denkmalpflege in Niederösterreich. Anforderungen und Aufgaben der archäologischen Denkmalpflege am Beispiel mittelalterlicher Siedlungsstrukturen*. Fundberichte aus Österreich, Materialhefte. Reihe A 20. Horn: Berger.

Kuča, K. 2000: *Města a městečka v Čechách, na Moravě a ve Slezsku. IV. díl. Ml–Pan*. Praha: Libri.

Kuča, K. 2008: *Města a městečka v Čechách, na Moravě a ve Slezsku. VII. díl. Str–U*. Praha: Libri.

Kučera, J. 1903: *Paměti král. města Uh. Brodu* [online]. Brno: Nákladem vlastním. [accessed 2022-09-27]. Available from: https://archive.org/details/pamtikrliekrlov00kugoog/page/n4/mode/2up.

Kuna, M., Hajnalová, M., Kovačiková, L., Lisá, L., Novák, J., Bureš, M., Cílek, V., Hošek, J., Kočár, P., Majer, A., Makowiecki, D., Cummings Scott, L., Sůvová, Z., Světlík, I., Vandenberghe, D., Van Nieuland, J., Yost, C. L., Zabilska-Kunek, M. 2013: Raně středověký areál v Roztokách z pohledu ekofaktů [online]. *Památky archeologické* CIV(1), 59–147. [accessed 2022-07-12]. Available from: https://1url.cz/SrCac.

Kuna, M., Starcová, M., Maříková-Kubková, J. (eds.) 2019: *Sto let v archeologii. Objevy, nálezy a expedice Archeologického ústavu v Praze 1919–2019*. Praha: Archeologický ústav AV ČR, Praha, v. v. i., Academia.

Küntzel, T. 2010: *Die Stadtwüstung Nienover im Solling. Auswertung der Befunde zu Stadttopographie, Hausbau und Stadtbefestigung im 13. Jahrhundert*. Materialhefte zur Ur- und Frühgeschichte Niedersachsens 40. Rahden: Verlag Marie Leidorf GmbH.

Kyncl, J. 2017: *Letokruhy jako kalendář i záznamník: zajímavosti z dendrochronologie*. Praha: Grada Publishing.

Kypta, J. 2007: Domy a usedlosti zaniklé středověké vsi Bystřece (Úvahy o výpovědních schopnostech nálezových situací a způsobu prezentace dokumentace) [online]. *Archeologické rozhledy* LIX(3), 592–624. [accessed 2022-09-11]. Available from: https://1url.cz/1rCaY.

Limisiewicz, A., Mruczek, R. 2010: Fara św. Marii Magdaleny na tle przemian przestrzennych wczesnego Wrocławia. In: B. Czechowicz (ed.): *Śródmiejska katedra. Kościół św. Marii Magdaleny w dziejach i kulturze Wrocławia*. Wrocław: Oficyna Wydawnicza ATUT - Wrocławskie Wydawnictwo Oświatowe, 55–136.

Limisiewicz, A., Piekalski, J., Płonka, T., Wiśniewski, A., Wiśniewski, Z. 2002: Północna strona bloku śródrynkowego [online]. In: J. Piekalski (ed.): *Rynek Wrocławski w świetle badań archeologicznych, cz. II*. Wratislavia Antiqua. Studia z dziejów Wrocławia 5. Wrocław: Uniwersytet Wrocławski, 79–108. [accessed 2022-07-18]. Available from: wratislavia.archeo.uni.wroc.pl/5-tom/III1.pdf.

Lisá, L., Bajer, A., Rejšek, K., Vránová, V., Vejrostová, L., Wisniewski, A., Krištuf, P. 2019: Review of Illuvial Bands Origin; What Might the Presence of Dark Brown Bands in Sandy Infillings of Archaeological Features or Cultural Layers Mean? [online]. *Interdisciplinaria Archaeologica. Natural Sciences in Archaeology* X(1), 19–28. [accessed 2022-09-22]. DOI: 10.24916/iansa.2019.1.2. Available from: iansa.eu/papers/IANSA-2019-01-lisa.pdf.

Lisá, L., Holub, P., Peška, M., Zůbek, A. 2021: Poznámky k problematice interiéru nezděných staveb středověkého Brna (konfrontace archeologických poznatků a mikromorfologické analýzy podlahových úrovní vybraných staveb). *Přehled výzkumů* 62(2), 127–158. [accessed 2022-07-12]. DOI: 10.47382/pv0622-06. Available also from: https://www.arub.cz/wp-content/uploads/62_2_05.pdf.

Lisá et al. 2020a: Lisá, L., Kočár, P., Bajer, A., Kočárová, R., Syrová, Z., Syrový, J., Porubčanová, M., Lisý, P., Peška, M., Ježková, M. 2020a: The floor: a voice of human lifeways–a geoethnographical study of historical and recent floors at Dolní Němčí Mill, Czech Republic. *Archaeological and Anthropological Sciences* 12(6), 115. DOI: 10.1007/s12520-020-01060-y.

Lisá et al. 2020b: Lisá, L., Staněk, P., Zůbek, A., Nejman, L. 2020b: Floor Maintenance as a Possible Cultural Behavioural Status? Preliminary Interpretations of Floor Formation Processes from Medieval Brno, Czech Republic [online]. *Interdisciplinaria Archaeologica. Natural Sciences in Archaeology* XI(1), 63–72. [accessed 2022-05-16]. DOI: 10.24916/iansa.2020.1.5. Available from: iansa.eu/papers/IANSA-2020-01-lisa.pdf.

Lisá, L., Kolařík, V. 2020: Dokáže mikromorfologie v archeologickém kontextu odpovědět na otázku využití zahloubených prostor ve středověké vesnici? Příkladová studie Brno-Královo Pole [online]. *Archaeologia historica* 45(2), 925–940. [accessed 2022-05-18]. DOI: 10.5817/AH2020-2-19. Available from: https://digilib.phil.muni.cz/cs/handle/11222.digilib/143435.

Lisá, L., Kolařík, V., Bajer, A. 2009: The Geoarchaeological and Micromorphological Reconstruction of Medieval Food Store Room Floor Layers; the Case Study from Tišnov, Czech Republic. In: H. Thiemeyer (ed.): *Archaeological Soil Micromorphology. Contributions to the Archaeological Soil Micromorphology Working Group Meeting 3rd to 5th April 2008*. Frankfurter Geowissenschaftliche Arbeiten. Serie D. Physische Geographie 30. Frankfurt am Main: Fachbereich Geowissenschaften/Geographie Johann Wolfgang Goethe-Universität, 71–79.

Lisá, L., Komoróczy, B., Vlach, M., Válek, D., Bajer, A., Kovárník, J., Rajtár, J., Hüssen, C.M., Šumberová, R. 2015: How were the ditches filled? Sedimentological and micromorphological classification of formation processes within graben-like archaeological objects. *Quaternary International* 370, 66–76. DOI: 10.1016/j.quaint.2014.11.049.

Lisá, L., Lisý, P. 2019: Podlaha jako experiment aneb vhled do životního rytmu našich předků. *Rekonstrukce a experiment v archeologii. Živá archeologie* 21, 3–7.

Lisá, L., Peška, M., Merta, D., Gregor, M. 2017: Maintenance of Underground Granaries in Medieval Towns; Case Study from Padowetz, Brno, Czech Republic [online]. *Interdisciplinaria Archaeologica. Natural Sciences in Archaeology* VIII(2), 157–165. [accessed 2022-05-22]. DOI: 10.24916/iansa.2017.2.5. Available from: iansa.eu/papers/IANSA-2017-02-lisa.pdf.

Lisowska, E. 2013: *Wydobycie i dystrybucja surowców kamiennych we wczesnym średniowieczu na Dolnym* Śląsku. Wrocław: Instytut Archeologii Uniwersytetu Wrocławskiego.

Legant, G. 2010: *Zur Siedlungsgeschichte des ehemaligen Lübecker Kaufleuteviertels im 12. und frühen 13. Jahrhundert. Nach den ältesten Befunden der Grabung Alfstraße-Fischstraße-Schüsselbuden, 1985-1990.* Lübecker Schriften zur Archäologie und Kulturgeschichte 27. Rahden: Leidorf.

Legant-Karau, G. 1994: Mittelalterlicher Holzbau in Lübeck an der Schwelle vom ländlichen zum städtischen Siedlungsgefüge. *Archäologisches Korrespondenzblatt* 24(3), 333–345.

Lehner, M. 2011: Die Stadtwerdung von Graz aus archäologischer Sicht. In: F. Opll (ed.): *Stadtgründung und Stadtwerdung. Beiträge von Archäologie und Stadtgeschichtsforschung.* Beiträge zur Geschichte der Städte Mitteleuropas XXII. Linz: Österreichischer Arbeitskreis für Stadtgeschichtforschung, 225–243.

Líbal, D. 1967: *Uherské Hradiště, stavebně-historický průzkum jádra*. Typescript of the report. Praha: SÚRPMO. Stored in: Museum of Moravian Slovakia in Uherské Hradiště.

Lorenc, V. 1973: *Nové Město pražské.* Praha: SNTL - Nakladatelství technické literatury.

Loskotová, I., Procházka, R. 1995: Brněnské zemnice (Příspěvek k vývoji městské zástavby 13. stol.). *Brno v minulosti a dnes* XIII, 112–149.

Ložek, V., Cílek, V., Lisá, L., Bajer, A. 2020: *Geodiverzita a hydrodiverzita. Základy přírodních a kulturních hodnot naší krajiny, její současná proměna a možný budoucí vývoj v antropocénu*. Praha: Dokořán.

Lukas, J., Kolář, F. 2010: Neznámá medaile Jana Vermeyena. Elišce Fučíkové k životnímu jubileu. *Numismatické listy* 65(1), 9–17.

Luna, J., Veselý, M. 2001: *Závěrečná zpráva - vyhledávání starých důlních děl na území kraje Vysočina*. Jihlava: GEOMIN s.r.o. Stored in: Archive of the Czech Geological Survey.

Macoun, J. 1980: Paleogeografický a stratigrafický vývoj Opavské pahorkatiny v pleistocénu. *Časopis Slezského muzea. A. Vědy přírodní* 29, 125–143; 219–237.

Macphail, R. I. 1990: Soil history and micromorphology. In: M. Bell (ed.): *Brean Down Excavations 1983–1987* [online]. Archaeological Report 15. Swindon: English Heritage, 187–196. [accessed 2022-11-30]. Available from: https://archaeologydataservice.ac.uk/archiveDS/archiveDownload?t=arch-1416-1/dissemination/pdf/9781848021402_ALL.pdf.

Macphail, R. I., Cruise, G. M., Allen, M. J., Linderholm, J., Reynolds, P. 2004: Archaeological soil and pollen analysis of experimental floor deposits; with special reference to Butser Ancient Farm, Hampshire, UK. *Journal of Archaeological Science* 31(2), 175–191. DOI: 10.1016/j.jas.2003.07.005.

Macphail, R. I., Goldberg, P. 2018: *Applied Soils and Micromorphology in Archaeology.* Cambridge Manuals in Archaeology. Cambridge (U.K.): Cambridge University Press. DOI: 10.1017/9780511895562.

Małachowicz, M. 2005: Ceramika budowlana średniowiecznego Wrocławia. In: C. Buśko (ed.): *Wschodnia strefa Starego Miasta we Wrocławiu w XII–XIV wieku. Badania na Placu Nowy Targ.* Wrocław: Uniwersytet Wrocławski, Instytut Archeologii, 111–134.

Malý, K. 1999: Jihlavský rudní revír: přehled geologie a mineralogie. In: *Dolování stříbra a mincování v Jihlavě: sborník*. Jihlava: Muzeum Vysočiny, 15–27.

Marcinkiewicz, K., Piekalski, J. 2018: Przemiany zagospodarowania terenu w fazach protomiejskich. In: J. Piekalski, K. Wachowski (eds.): *Rytm rozwoju miasta na kulturowym pograniczu. Studium strefy placu Nowy Targ we Wrocławiu. Część 1* [online]. Wratislavia Antiqua. Studia z dziejów Wrocławia 23. Wrocław: Uniwersytet Wrocławski, Instytut Archeologii, 21–139. [accessed 2022-07-18]. DOI: https://doi.org/10.23734/22.18.100. Available from: wratislavia.archeo.uni.wroc.pl/23-tom/III.pdf.

Marek, L. 2018: Militaria. In: J. Piekalski, K. Wachowski (eds.): *Rytm rozwoju miasta na kulturowym pograniczu. Studium strefy placu Nowy Targ we Wrocławiu. Część 2* [online]. Wratislavia Antiqua. Studia z dziejów Wrocławia 23. Wrocław: Uniwersytet Wrocławski, Instytut Archeologii, 563–664. [accessed 2022-07-18]. DOI: https://doi.org/10.23734/22.18.100. Available from: wratislavia.archeo.uni.wroc.pl/23-tom/VIII.pdf.

Matt, C. P. 1998: Zur Parzellenstruktur der Stadt Basel vor 1300 [online]. *Jahresbericht der Archäologischen Bodenforschung des Kantons Basel-Stadt* 1996, 44–57. [accessed 2022-07-18]. DOI: 10.12685/jbab.1996.44-57. Available from: https://eterna.unibas.ch/bodenforschungjb/article/view/387/603.

Matthews, W. 2010: Geoarchaeology and taphonomy of plant remains and microarchaeological residues in early urban environments in the Ancient Near East. *Quaternary International* 214(1–2), 98–113. DOI: 10.1016/j.quaint.2009.10.019.

Měchurová, Z. 1997: *Konůvky - zaniklá středověká ves ve Ždánickém lese. Srovnávací analýza fondu ze zaniklé středověké vsi Konůvky, kat. Heršpice, okr. Vyškov* [online]. Studie Archeologického ústavu Akademie věd ČR v Brně XVII(1). Brno: Archeologický ústav Akademie věd České republiky v Brně. [accessed 2022-09-11]. Available from: https://arub.cz/wp-content/uploads/Konuvky_zanikla_stredoveka_ves_web_n.pdf.

Mencl, V. 1953: Měšťanský dům českého středověku. *Zprávy památkové péče* XIII(6), 161–192.

Mencl, V. 1980: *Lidová architektura v Československu*. Praha: Academia.

Mendl, B. (ed.) 1935: *Knihy počtů města Brna z let 1343–1365.* Prameny dějin moravských 5. Knihy městských počtů z doby předhusitské I. Brno: Československý státní ústav historický. [accessed 2022-12-25]. Available also from: https://sources.cms.flu.cas.cz/src/index.php?s=v&cat=21&bookid=428.

Měřínský, Z., Hrubý, P., Zimola, D. 2009: Urbanismus, nejstarší zástavba a vnitřní vybavení domů. In: R. Pisková et al.: *Jihlava*. Dějiny českých, moravských a slezských měst. Praha: NLN, Nakladatelství Lidové noviny, 66–80.

Měřínský, Z., Plaček, M. 2008: Opevnění moravských zeměpanských a biskupských středověkých měst. *Forum urbes medii aevi* V, 6–33.

Merta, D. 2001: Nejstarší měšťanská kamenná architektura v Brně [online]. *Průzkumy památek* VIII(2), 41–60. [accessed 2022-11-12]. Available from: https://www.pruzkumypamatek.cz/pdf/2001-02-04.pdf.

Merta, D. 2012: Opava v „době dřevěné“ – k podobě Radniční ulice ve 13. a 14. století. In: K. Vojkůvková, M. Zezula (eds.): *Předměty vyprávějí... Hmotná kultura středověké a raně novověké Opavy ve světle nálezů z archeologických výzkumů v prostoru bývalé Radniční ulice a v areálu opavského pivovaru*. Ostrava: Opavská kulturní organizace, Národní památkový ústav, územní odborné pracoviště v Ostravě, 16–17.

Merta, D., Peška, M. 2001: K počátkům zděné profánní architektury v Brně. In: J. Anderle, M. Elbl, M. Hauserová, T. Karel, P. Macek (eds.): *Dějiny staveb 2001. Sborník vybraných referátů z konference Dějiny staveb*. Ústí nad Labem: Fakulta architektury ČVUT, 110–114.

Merta, D., Peška, M. (eds.) 2005: *Forum urbes medii aevi II. Sborník příspěvků z konference FUMA konané 16.–18. 4. 2003*. Brno: Archaia o. p. s. Proceedings of the second annual expert seminar held in Brno, 16-18 April 2003 focused on the problem of non-masonry dwelling architecture in early towns of Central Europe and its relation to the masonry housing.

Merta, D., Peška, M. 2007: Brněnské domy s věží. In J. Anderle et al. (eds.): *Dějiny staveb 2007. Sborník vybraných referátů z konference v Nečtinech konané ve dnech 30. 3. – 1. 4. 2007*. Plzeň: Klub Augusta Sedláčka ve spolupráci se Sdružením pro stavebněhistorický průzkum, 205–216.

Merta, D., Peška, M. 2010: Stavby typu „kamenate“ v prostředí vrcholně středověkého Brna. In: J. Anderle et al. (eds.): *Dějiny staveb 2009. Sborník vybraných referátů z konference v Nečtinech konané ve dnech 20. 3. – 22. 3. 2009*. Plzeň: Klub Augusta Sedláčka ve spolupráci se Sdružením pro stavebněhistorický průzkum, 215–222.

Merta, D., Peška, M. 2013: Stavební vývoj domů Masarykovo náměstí č. 15 a 16 v Jihlavě. Předběžná zpráva o stavebněhistorickém průzkumu. In: J. Anderle et al. (eds.): *Dějiny staveb 2013. Sborník vybraných referátů z konference v Nečtinech konané ve dnech 23. 3. – 24. 3. 2013*. Plzeň: Klub Augusta Sedláčka ve spolupráci se Sdružením pro stavebněhistorický průzkum, 175–189.

Merta, D., Peška, M. 2019: Towers and Houses with Towers in Medieval Brno. In: R. Oram (ed.): *Urbs Turrita: Urban Towers in Medieval and Renaissance Europe*. Tower Studies 3. Donington: Shaun Tyas, 72–79.

Merta, D., Peška, M., Procházka, R. 2004: Měšťanský dům středověkého Brna. Informace o průběhu a výsledcích grantového projektu. In: J. Anderle et al. (eds.): *Dějiny staveb 2004. Sborník vybraných referátů z konference v Nečtinech konané ve dnech 2. 4. – 4. 4. 2004*. Plzeň: Klub Augusta Sedláčka ve spolupráci se Sdružením pro stavebněhistorický průzkum, 171–186.

Merta, D., Peška, M., Zůbek, A. 2003: Dřevěné stavební prvky z Velkého Špalíčku. In: V. Hašek, R. Nekuda, J. Unger (eds.): *Ve službách archeologie IV. Sborník k 75. narozeninám Prof. PhDr. Vladimíra Nekudy, DrSc*. Brno: Muzejní a vlastivědná společnost, Geodrill, 202–206.

Mezník, J. 1963: Z problematiky středověkého patriciátu. *Československý časopis historický* XI, 628–637.

Michna, P. J. 1988: K poznání zahloubených obydlí doby velké kolonizace. In: V. Frolec (ed.): *Rodná země. Sborník k 100. výročí Muzejní a vlastivědné společnosti v Brně a k 60. narozeninám PhDr. Vladimíra Nekudy, CSc*. Brno: Muzejní a vlastivědná společnost v Brně, Státní vědecká knihovna v Brně, 222–284.

Milek, K. B. 2012: Floor formation processes and the interpretation of site activity areas: An ethnoarchaeological study of turf buildings at Thverá, northeast Iceland. *Journal of Anthropological Archaeology* 31(2), 119–137. DOI: 10.1016/j.jaa.2011.11.001.

Mitáček, J. 2009: Založení královského města Uherské Hradiště. In: P. Futák, M. Plaček, M. Vařeka (eds.): *Středověká města na Moravě a v sousedních zemích*. Ostrava: Repronis, 103–126.

Mitáček, J., Procházka, R. 2007: Město královské. In: J. Čoupek et al.: *Uherské Hradiště: královské město na řece Moravě*. Uherské Hradiště: Město Uherské Hradiště, 61–78.

Mitchell, P. 2001: Zur „Kontinuitätsfrage“ in Wien anhand neuester Erkenntnisse. Von der Ausgrabung Judenplatz und anderen Fundstellen. In: S. Felgenhauer-Schmiedt, A. Eibner, H. Knittler: *Zwischen Römesiedlungen und mittelalterlicher Stadt. Archäologie Aspekte zur Kontinuitätsfrage*. Beiträge zur Mittelalterarchäologie in Österreich 17. Wien: Österreichische Gesellschaft für Mittelalterarchäologie, 205–214.

Moszyński, K. 1929: *Kultura ludowa Słowian. Część 1. Kultura materialna*. Kraków: Polska Akademja Umiejętności.

Mruczek, R. 2000: Kurzy Targ we Wrocławiu. Uwagi o pierwotnym planie miasta [online]. In: J. Piekalski, K. Wachowski (eds.): *Średniowieczny Śląsk i Czechy. Centrum średniowiecznego miasta. Wrocław a Europa Środkowa*. Wratislavia Antiqua. Studia z dziejów Wrocławia 2. Wrocław: Uniwersytet Wrocławski, 259–276. [accessed 2022-07-18]. Available from: wratislavia.archeo.uni.wroc.pl/2-tom/17a.pdf.

Muk, J. 1991: Středověký městský dům ve výsledcích stavebně historického průzkumu [online]. *Husitský Tábor* 10, 87–96. [accessed 2022-07-31]. Available from: https://rukovet.cms.flu.cas.cz/static/Odkazy_upload/HT_10_1988-1991.pdf.

Murphy, C. P. 1986: *Thin Section Preparation of Soils and Sediments. Soil Survey of England and Wales Rothamsted Experimental Station*. Berkhamstead: A B Academic Publishers.

Musílek, M. 2015: *Standardní nedestruktivní stavebněhistorický průzkum. Dějiny objektu – historická rešerše. Prameny, plány, ikonografie, edice pramenů, literatura. Dům čp. 135/II Schönkirchovský palác. Domovní blok č. 1113 mezi ulicemi Národní, Mikulandská, Ostrovní, Voršilská*. Manuscript of the excavation report. Stored in: Documentation collections of the archaeological department of the National Heritage Institute – Regional Office in Prague.

Müller, J. 2000: Der mittelalterliche Holzbau in der Stadt Brandenburg seit der Mitte des 12. Jahrhunderts – ein vorläufiger Überblick anhand von Grabungsergebnissen. *Zeitschrift für Archäologie des Mittelalters* 27/28 – 1999/2000, 129–161.

Nejman, L., Lisá, L., Doláková, N., Horáček, I., Bajer, A., Novák, J., Wright, D., Sullivan, M., Wood, R., Gargett, R.H., Pacher, M., Sázelová, S., Nývltová Fišáková, M., Rohovec, J., Králík, M. 2018: Cave deposits as a sedimentary trap for the Marine Isotope Stage 3 environmental record: The case study of Pod Hradem, Czech Republic. *Palaeogeography, Palaeoclimatology, Palaeoecology* 497, 201–217. DOI: 10.1016/j.palaeo.2018.02.020.

Nekuda, V. 1975: *Pfaffenschlag. Zaniklá středověká ves u Slavonic. Příspěvek k dějinám středověké vesnice*. Studia Musei Moraviae. Brno: Blok.

Nekuda, V. 2002: Hausentwicklung in der Wüstung Mstěnice (Mähren). In: P. Ettel, R. Friedrich, W. Schier (eds.): *Interdisziplinäre Beiträge zur Siedlungsarchäologie. Gedenkschrift für Walter Janssen*. Internationale Archäologie. Studia honoraria 17. Rahden: Marie Leidorf, 255–265.

Nekuda, V. 2007: *Středověká vesnice na Moravě*. Prameny k vývoji a kultuře Moravy 12. Brno: Muzejní a vlastivědná společnost.

Netolický, P., Vařeka, P. 2015: Odraz roubené konstrukce v mazanicových otiscích. Experiment v archeologickém parku v Praze-Liboci [online]. *Rekonstrukce a experiment v archeologii. Živá archeologie* 17, 37–42. [accessed 2022-10-12]. Available from: https://uni.uhk.cz/zivaarcheologie/index.php/ziva/article/view/49/44.

Nicosia, C., Stoops, G. 2017: *Archaeological Soil and Sediment Micromorphology*. Hoboken: Wiley. DOI: 10.1002/9781118941065.

Niegoda, J. 2005: Zmiany w zagospodarowaniu przestrzeni w rejonie placu Nowy Targ w XII–XIV. In: C. Buśko (ed.): *Wschodnia strefa Starego Miasta we Wrocławiu w XII–XIV wieku. Badania na placu Nowy Targ*. Wrocław: Uniwersytet Wrocławski, Instytut Archeologii, 69–84.

Nováček, K. 2000: Středověký dům v Plzni. Archeologický výzkum parcely v Sedláčkově ul. 1 (čp. 187). *Sborník Západočeského muzea v Plzni. Historie* 15, 5–66.

Novák, J., Lisá, L., Pokorný, P., Kuna, M. 2012: Charcoal analyses as an environmental tool for the study of Early Medieval sunken houses infills in Roztoky near Prague, Czech Republic. *Journal of Archaeological Science* 39(4), 808–817. DOI: 10.1016/j.jas.2011.06.026.

Novotný, M. 2014: *Hliněné stavitelství na Moravě a evropské souvislosti. Kritický katalog k výstavě*. Strážnice: Národní ústav lidové kultury.

Omelka, M. 2009: Praha 2 – Nové Město, U Obecního domu čp. 600/I. In: Z. Dragoun et al.: Archeologický výzkum v Praze v letech 2007–2008. *Pražský sborník historický* XXXVII, 442–443.

Omelka, M., Podliska, J. 2004: Záchranný archeologický výzkum v areálu bývalých kasáren Jiřího z Poděbrad čp. 1078/II na Náměstí Republiky v Praze 1. *Výroční zpráva NPÚ ÚOP v hl. m. Praze 2003, 2004*, 40–46.

Pavelčík, J. 1997: *Uherské Hradiště 1997 – Reduta*. Manuscript of the excvation report, No. MTX199800049 [accessed 2022-09-22]. Stored in: Archive of the Institute of Archaeology, Czech Academy of Sciences, Brno. Available also from: Digital Archive of the Archaeological Map of the Czech Republic http://digiarchiv.amapa.cz/id/M-TX-199800049.

Pertoldová, J., Nahodilová, R., Verner, K., Hroch, T., Holásek, O., Buriánek, D., Dudíková Schulmannová, B., Hanžl, P., Žák, J. 2016: *Základní geologická mapa České republiky: 1 : 25 000 list, 23-324 Žirovnice*. Stored in: Czech Geological Survey. Map sheet.

Peška, M. (ed.) in print: *Systematický archeologický výzkum města Brna a jeho další potenciál*. Brno: Archaia Brno z. ú.

Peška, M., Merta, D. 2009: Měšťanská architektura středověkého Brna v kontextu středního Podunají. K možnostem srovnávacího studia [online]. In: J. Žuffová (ed.): *Trnava a počiatky stredovekých miest*. Pamiatky Trnavy a Trnavského kraja 12. Trnava: Krajský pamiatkový úrad Trnava, 87–102. [accessed 2022-10-01]. Available from: https://www.trnava.sk/userfiles/download/attachment/ourak_KPU-Zbornik-pamiatky_12-2009.pdf.

Pfrommer, J., Gutscher, D. 1999: *Laufen Rathausplatz. Eine hölzerne Häuserzeile in einer mittelalterlichen Kleinstadt: Hausbau, Sachkultur und Alltag. Die Ergebnisse der Grabungskampagnen 1988 und 1989* [online]. Schriftenreihe der Erziehungsdirektion des Kantons Bern. Bern: Berner Lehrmittel- und Medienverlag. DOI: 10.7892/boris.142043. [accessed 2022-09-11]. Available from: https://boris.unibe.ch/142043/1/ADB_1999-1_Laufen_Rathausplatz.pdf.

Piekalski, J. 1995: Ze studiów nad budownictwem drewnianym w późnośredniowiecznym Wrocławiu. In: J. Rozpędowski (ed.): *Architektura Wrocławia. T. 1. Dom*. Wrocław: Werk, 75–87.

Piekalski, J. 1996a: Alte und neue Holzbauten in den mittelalterlichen Rechtsstädten Schlesiens. In: H. Brachmann, J. Klápště (eds.): *Hausbau und Raumstruktur früher Städte in Ostmitteleuropa*. Památky archeologické. Supplementum 6. Prague: Institute of Archaeology, Prague, 101–112.

Piekalski, J. 1996b: Z badań drewnianej zabudowy średniowiecznej działki mieszczańskiej na Śląsku. *Kwartalnik Historii Kultury Materialnej* 44(1), 5–12.

Piekalski, J. 1996c: Holzbauten im spätmittelalterlichen Breslau. *Archäologisches Korrespondenzblatt* 26(3), 363–375.

Piekalski, J. 1999: Budownictwo i warunki zamieszkania [online]. In: C. Buśko, J. Piekalski (eds.): *Ze studiów nad życiem codziennym w średniowiecznym mieście. Parcele przy ulicy Więziennej 10-11 we Wrocławiu*. Wratislavia Antiqua. Studia z dziejów Wrocławia 1. Wrocław: Uniwersytet Wrocławski, 37–42. [accessed 2022-07-18]. Available from: wratislavia.archeo.uni.wroc.pl/1-tom/IV.pdf.

Piekalski, J. 2004a: Problem genezy budowli typu kamenate w miastach środkowoeuropejskiej strefy nadmorskiej. In: R. Czaja et al. (eds.): *Archaeologia et historia urbana*. Elbląg: Muzeum w Elblągu, 227–236.

Piekalski, J. 2004b: *Wczesne domy mieszczan w Europie Środkowej. Geneza – funkcja – forma*. Acta Universitatis Wratislaviensis 2623. Wrocław: Wydawnictwo Uniwersytetu Wrocławskiego.

Piekalski, J. 2014: *Prague, Wrocław and Krakow: Public and Private Space at the Time of the Medieval Transition* [online]. Wratislavia Antiqua. Studia z dziejów Wrocławia 19. Wrocław: Uniwersytet Wrocławski. [accessed 2022-07-19]. Available from: wratislavia.archeo.uni.wroc.pl/index.php?sw=191.

Piekalski, J. 2016: Stratygrafia a dendrochronologia na placu Nowy Targ we Wrocławiu. Problemy interpretacyjne. In: G. Nawrolska, H. Paner, J. Piekalski, E. Trawicka (eds.): *Archeologia miast Pomorza w kontekście ziem polskich. Studia dedykowane pamięci Tadeusza Nawrolskiego*. Gdańsk: Muzeum Archeologiczne w Gdańsku, 107–124.

Piekalski, J. 2018: Dom i jego wyposażenie [online]. In: J. Piekalski, K. Wachowski (eds.): *Rytm rozwoju miasta na kulturowym pograniczu. Studium strefy placu Nowy Targ we Wrocławiu. Część 2*. Wratislavia Antiqua. Studia z dziejów Wrocławia 23. Wrocław: Uniwersytet Wrocławski, 219–257. [accessed 2022-07-18]. DOI: https://doi.org/10.23734/22.18.100. Available from: wratislavia.archeo.uni.wroc.pl/23-tom/V.pdf.

Piekalski, J., Płonka, T., Wiśniewski, A. 1991: Badania średniowiecznej posesji przy ul. Nożowniczej 13 we Wrocławiu. *Śląskie Sprawozdania Archeologiczne* XXXII, 207–238.

Piekalski, J., Wachowski, K. (eds.) 2018: *Rytm rozwoju miasta na kulturowym pograniczu. Studium strefy placu Nowy Targ we Wrocławiu* [online]. Wratislavia Antiqua. Studia z dziejów Wrocławia 23. Wrocław: Uniwersytet Wrocławski. [accessed 2022-07-18]. DOI 10.23734/22.18.100. Available from: wratislavia.archeo.uni.wroc.pl/index.php?sw=231.

Plate, C. 1996: Kelleranlagen des 13. bis 15. Jahrhunderts in brandenburgischen Städten. In: H. Brachmann, J. Klápště (eds.): *Hausbau und Raumstruktur früher Städte in Ostmitteleuropa*. Památky archeologické. Supplementum 6. Prague: Institute of Archaeology, Prague, 63–71.

Poche, E. (ed.) et al. 1980: *Umělecké památky Čech 3. P/Š.* Praha: Academia.

Podliska, J. 1994: *Praha 1 – Nové Město, Pštrossova ul. čp. 1924/II.* Manuscript of the excavation report, CTX200807880 [accessed 2022-08-21]. Stored in: Archive of the Institute of Archaeology, Czech Academy of Sciences, Prague. Available also from: Digital Archive of the Archaeological Map of the Czech Republic http://digiarchiv.amapa.cz/id/C-TX-200807880.

Přichystal, A. 1988: Petrografické studium štípané a broušené industrie z lokality s moravskou malovanou keramikou v Brně-Bystrci [online]. *Archeologické rozhledy* XL(5), 508–512. [accessed 2022-09-26]. Available from: https://1url.cz/WrCan.

Přichystal, A. 2009: *Kamenné suroviny v pravěku východní části střední Evropy.* Brno: Masarykova univerzita.

Prix, D., Zezula, M. 2002: Archeologický výzkum a stavebně historický průzkum minoritského kláštera v Opavě v roce 2000. In: L. Jan, P. Obšusta (eds.): *Ve stopách sv. Benedikta. Sborník příspěvků z konference Středověké kláštery v zemích Koruny české konané ve dnech 24.–25. května 2001 v Třebíči.* Disputationes Moravicae 3. Brno: Matice moravská ve spolupráci se Západomoravským muzeem v Třebíči, 275–294.

Procházka, R. 1983: Zemědělské zázemí a potravinářská řemesla v Uherském Hradišti ve 13.–14. století [online]. *Archaeologia historica* 8, 109–118. [accessed 2023-01-08]. Available from: https://digilib.phil.muni.cz/cs/handle/11222.digilib/139446.

Procházka, R. 1984a: Předběžná zpráva o archeologickém výzkumu v Uherském Brodě v roce 1982. *Studia comeniana et historica* 28, 147–149.

Procházka, R. 1984b: Záchranný výzkum v Uherském Brodě (okr. Uherské Hradiště). *Přehled výzkumů* 1982, 70. [accessed 2022-09-23]. Available also from: https://www.arub.cz/wp-content/uploads/pv_27_1982.pdf.

Procházka, R. 1988: Archeologické prameny ke středověkému Brnu (Z nových výzkumů 1983–1987) [online]. *Archaeologia historica* 13, 83–95. [accessed 2022-10-13]. Available from: https://digilib.phil.muni.cz/cs/handle/11222.digilib/139753.

Procházka, R. 1992: Mittelalterliche Stadtkernforschung in Brno (Brünn) [online]. *Beiträge zur Mittelalterarchäologie in Österreich* 8, 159–181. [accessed 2022-10-13]. Available from: https://www.oegm.or.at/images/bmoe_pdf/bmoe_08-1992.pdf.

Procházka, R. 1993: Archeologie k počátkům středověkého města Brna. *Brno v minulosti a dnes* XI, 29–53.

Procházka, R. 1996: Zur Frage der ältesten Bebauung in der südmährischen Städten. In: H. Brachmann, J. Klápště (eds.): *Hausbau und Raumstruktur früher Städte in Ostmitteleuropa*. Památky archeologické. Supplementum 6. Prague: Institute of Archaeology, Prague, 120–141.

Procházka, R. 1997: *Uherské Hradiště – Zelný trh. Česká pojišťovna, a. s., 1995–1996*. Manuscript of the excavation report, No. 15/97. Stored in: Institute for Archaeological Heritage Brno.

Procházka, R. 1999: Uherské Hradiště (okr. Uherské Hradiště). *Přehled výzkumů* 39 (1995-1996), 465–467. [accessed 2022-09-23]. Available also from: https://www.arub.cz/wp-content/uploads/pv_39-1995-1996.pdf.

Procházka, R. 2000: Zrod středověkého města na příkladu Brna (k otázce odrazu společenské změny v archeologických pramenech). In: M. Ježek, J. Klápště (eds.): *Brno a jeho region*. Mediaevalia archaeologica 2. Praha: Archeologický ústav AV ČR Praha, 7–158.

Procházka, R. 2003: Pozdně románský dům z areálu minoritského kláštera v Brně [online]. *Průzkumy památek* X(2), 163–168. [accessed 2022-11-12]. Available from: https://www.pruzkumypamatek.cz/pdf/2003-02-07.pdf.

Procházka, R. 2007a: Archeologie a poznání moravských a slezských měst [online]. *Archaeologia historica* 32, 37–80. [accessed 2022-12-18]. Available from: https://digilib.phil.muni.cz/node/25995.

Procházka, R. 2007b: Area …sive parva, sive magna… Parcela ve vývoji raného a komunálního města. *Forum urbes medii aevi* IV, 6–41.

Procházka, R. 2008: Urbanizace středního Pomoraví a vznik Uherského Hradiště. In: L. Galuška, P. Kouřil, J. Mitáček (eds.): *Východní Morava v 10. až 14. století*. Brno: Moravské zemské muzeum, Archeologický ústav AV ČR Brno, 213–228.

Procházka, R. 2015: Mittelalterliche Töpferöfen in Mähren. In: L. Grunwald (ed.): *Den Töpfern auf der Spur. Orte der Keramikherstellung im Licht der neuesten Forschung. 46. Internationales Symposium Keramikforschung des Arbeitskreises für Keramikforschung und des Römisch-Germanischen Zentralmuseums Mainz vom 16. bis zum 20. September 2013 in Mayen*. RGZM – Tagungen 21. Mainz: Verlag der Römisch-Germanischen Zentralmuseums, 215–224.

Procházka, R., Balcárková, A., Nývltová Fišáková, M., Přichystal, A. 2020: *Přerov, Horní náměstí č. p. 19, 20. Otázka prostorového vývoje lokality a možnosti poznání socioekonomického profilu jejich obyvatel v 9. – 12. století*. Spisy Archeologického ústavu AV ČR Brno 67. Brno: Archeologický ústav AV ČR, Brno.

Procházka, R., Borský, P., Černoušková, D., Holub, P., Kolařík, V., Merta, D., Peška, M., Sadílek, J. 2006: Zděný dům středověkého Brna. Stručné charakteristiky stojících a archeologicky plošně odkrytých reliktů. *Forum urbes medii aevi* III, 242–265.

Procházka, R., Havlíček, P. 1996: Die slawische Besiedlung von Uherské Hradiště und ihr natürliches Milieu [online]. In: Č. Staňa, L. Poláček (eds.): *Frühmittelalterliche Machtzentren in Mitteleuropa. Mehrjährige Grabungen und ihre Auswertung.* Internationale Tagungen in Mikulčice III. Spisy Archeologického ústavu AV ČR Brno 6. Brno: Archäologisches Institut der Akademie der Wissenschaften der Tschechischen Republik Brno, 199–212. [accessed 2022-09-11]. Available from: https://mikulcice.arub.cz/wp-content/uploads/2016/06/ITM3_16_Prochazka_Havlicek.pdf.

Procházka, R., Peška, M. 2007: Základní rysy vývoje brněnské keramiky ve 12.–13./14. století. *Přehled výzkumů* 48, 143–232. [accessed 2022-10-13]. Available also from: https://www.arub.cz/prehled-vydanych-cisel/PV48_studie_9.pdf.

Procházka, R., Snášil, R. l983: Výzkumy v Uherském Hradišti v roce 1981 (okr. Uherské Hradiště). *Přehled výzkumů* 1981, 62–64. [accessed 2022-09-23]. Available also from: https://www.arub.cz/wp-content/uploads/pv_26_1981.pdf.

Procházka, R., Snášil, R. 1984: Hlavní rysy lokační zástavby Uherského Hradiště ve 2. polovině 13. století. In: M. Richter (ed.): *Urbes medii aevi. Investigationes archaeologicae. XV. celostátní konference archeologů středověku, Praha 17.-21. X. 1983.* Praha: Archeologický ústav ČSAV, 43–52.

Procházka, R., Sulitková, L. 1984: *Uherské Hradiště ve 13.–15. století. Sociálně-ekonomická struktura, topografie.* Uherské Hradiště: Slovácké muzeum v Uherském Hradišti.

Procházka, R., Zůbek, A. 2012: Výpověď archeologických pramenů o prostorovém vývoji jihovýchodní části Brna ve 12.–15. století na příkladu parcely někdejšího domu Josefská 7 [online]. *Archaeologia historica* 37(1), 189–208. [accessed 2022-09-29]. Available from: https://digilib.phil.muni.cz/handle/11222.digilib/128250.

Prokop, O., Kolář, T., Kyncl, T., Rybníček, M. 2017: Updating the Czech Millennia-Long Oak Tree-Ring Width Chronology. *Tree-Ring Research* 73(1), 47–52. DOI: 10.3959/1536-1098-73.1.47.

Radová-Štiková, M. 1991a: Ke stavební technologii středověkého domu [online]. *Husitský Tábor* 10, 97–102. [accessed 2022-12-05]. Available from: https://rukovet.cms.flu.cas.cz/static/Odkazy_upload/HT_10_1988-1991.pdf.

Radová-Štiková, M. 1991b: Stavební proměny a typy středověkého domu. In: M. Radová, J. Škabrada: *Příspěvky k poznání středověkého stavitelství.* Praha: Ediční středisko ČVUT, 17–22.

Razím, V. 2019: *Středověká opevnění českých měst. 3. díl. Katalog Morava a Slezsko.* Praha: Národní památkový ústav, územní odborné pracoviště středních Čech v Praze.

Razím, V. 2020: *Středověká opevnění českých měst. 2. díl, 2. svazek. Katalog Čechy (P-Ž).* Praha: Národní památkový ústav, územní odborné pracoviště středních Čech v Praze.

Rębkowski, M. 2001: *Pierwsze lokacje miast w Księstwie zachodniopomorskim. Przemiany przestrzenne i kulturowe.* Kołobrzeg: Instytut Archeologii i Etnologii Polskiej Akademii Nauk.

Rentzel, P., Nicosia, C., Gebhardt, A., Brönnimann, D., Pümpin, C., Ismail-Meyer, K. 2017: Trampling, Poaching and the Effect of Traffic. In: C. Nicosia, G. Stoops (eds): *Archaeological Soil and Sediment Micromorphology.* Hoboken: Wiley, 281–297. DOI: 10.1002/9781118941065.

Richter, M. 1963: Výzkum středověké opevněné osady v Hradišťku u Davle [online]. *Archeologické rozhledy* XV(2), 200–219, 221–223. [accessed 2022-08-18]. Available from: https://1url.cz/zrCax.

Richter, M. 1982: *Hradišťko u Davle: městečko ostrovského kláštera.* Monumenta archaeologica 20. Praha: Academia.

Richter, M., Krajíc, R. 2001: *Sezimovo Ústí: archeologie středověkého poddanského města 2. Levobřežní předměstí – archeologický výzkum 1962-1988.* Praha, Sezimovo Ústí, Tábor: Archeologický ústav AV ČR v Praze, Husitské muzeum v Táboře, Městský úřad v Sezimově Ústí ve spolupráci s Prácheňským nakladatelstvím v Písku.

Rötting, H. 1996: Das ostsächsische Doppelhaus des hohen Mittelalters im archäologisch-rechtshistorischen Befund von Braunschweig. In: H. Brachmann, J. Klápště (eds.): *Hausbau und Raumstruktur früher Städte in Ostmitteleuropa.* Památky archeologické. Supplementum 6. Prague: Institute of Archaeology, Prague, 40–54.

Rusnák, R. 2012: K charakteru stredovekej drevenej zástavby na košických parcelách [online]. *Archaeologia historica* 37(1), 87–100. [accessed 2022-09-11]. Available from: https://digilib.phil.muni.cz/en/handle/11222.digilib/128242.

Ruttkay, M. 2002: Der ländliche Hausbau des 5. bis 15. Jh. im nördlichen Karpatenbecken (Slowakei) [online]. In: J. Klápště (ed.): *Ruralia IV. The rural house from the migration period to the oldest still standing buildings. 8.-13. September 2001 Bad Bederkesa, Lower Saxony, Germany.* Památky archeologické. Supplementum 15. Prague: Institute of Archaeology, Academy of Sciences of the Czech Republic, Prague, 264–271. [accessed 2022-09-11]. Available from: ruralia2.ff.cuni.cz/wp-content/uploads/2018/04/264-271.pdf.

Růžička, V. 1956: Počátky města Uherského Brodu. *Studie Krajského musea v Gottwaldově. Řada společenských věd* 13. *Historický sborník. Studie historické a ethnografické*, 24–34.

Růžička, V. 1968: *Uherský Brod: průvodce městem Komenského.* Uherský Brod: Vydáno péčí městského národního výboru v Uherském Brodě.

Rybníček, M., Vavrčík, H., Hubený, R. 2006: Determination of the number of sapwood annual rings in oak in the region of southern Moravia [online]. *Journal of Forest Science* 52(3), 141–146. [accessed 2022-10-10]. DOI: 10.17221/4496-JFS. Available from: https://www.agriculturejournals.cz/publicFiles/55089.pdf.

Rykl, M. 2004: Zbytky gotického krovu v domě čp. 151/I v Praze na Starém Městě. In: J. Anderle et al. (eds.): *Dějiny staveb 2003. Sborník příspěvků z konference Dějiny staveb.* Plzeň: Klub Augusta Sedláčka ve spolupráci se Sdružením pro stavebněhistorický průzkum, 224–227.

Rykl, M. 2012: Výpověď stavební historie domu čp. 509 pro poznání dějin Havelského Města. In: M. Musílek et al.: *Havelské Město pražské ve středověku. Historie – archeologie – stavební historie.* Praha: Casablanca, 298–322.

Rykl, M., Rakušan, D., Dragoun, Z. 2003: Poznámky k pokračujícímu výzkumu domů čp. 150, 151 a 153/I v Karlově ulici na Starém Městě pražském. *Staletá Praha* XXIV, 99–131.

Šalkovský, P. 2001: *Häuser in der frühmittelalterlichen slawischen Welt.* Archaeologica Slovaca monographiae. Studia Instituti archaeologici Nitriensis Academiae scientiarum Slovacae VI. Nitra: Archeologický ústav Slovenskej akadémie vied.

Samek, B. 1963: Brněnská radnice. *Brno v minulosti a dnes* V, 168–196.

Šaurová, D. 1973: Typické domové půdorysy v zaniklé středověké vesnici Konůvky na Slavkovsku [online]. *Archeologické rozhledy* XXV(1), 83–85. [accessed 2022-09-24]. Available from: https://1url.cz/orCaA.

Šaurová, D. 1977: Vilémov – zaniklá středověká vesnice na úpatí Drahanské vrchoviny. In: M. Richter (ed.): *Středověká archeologie a studium počátků měst. Sborník příspěvků přednesených na celostátní konferenci středověkých archeologů v Hradci Králové, 22.–27. září 1975.* Praha: Archeologický ústav ČSAV, pracoviště Praha, 264–271.

Schalies, I. 2012: Gebäude und topographische Strukturen im hoch- und spätmittelalterlichen Lübeck. Ergebnisse stadtarchäologischer Untersuchungen [online]. In: M. Untermann (ed.): *Holzbau in Mittelalter und Neuzeit.* Mitteilungen der Deutschen Gesellschaft für Archäologie des Mittelalters und der Neuzeit 24. Paderborn: Deutsche Gesellschaft für Archäologie des Mittelalters und der Neuzeit e.V., 111–122. [accessed 2022-09-11]. DOI: 10.11588/dgamn.2012.1.17149. Available from: https://journals.ub.uni-heidelberg.de/index.php/mitt-dgamn/article/view/17149.

Scheftel, M. 1990: Mittelalterlicher Holzbau in den Städten des niederdeutschen Raumes und der angrenzenden Küstengebiete. In: G. P. Fëhring (ed.): *Topografie und Hausbau der Frühzeit in Städten des hansischen Wirtschaftsraumes.* Lübecker Schriften zur Archäologie und Kulturgeschichte 20. Bonn: Habelt, 7–100.

Schermann, S. 1967: *Magismeret II.* Budapest: Akadémiai Kiadó.

Schietzel, K. 1981: *Stand der siedlungsarchäologischen Forschung in Haithabu. Ergebnisse und Probleme.* Berichte über die Ausgrabungen in Haithabu. Bericht 16. Neumünster: Karl Wachholtz Verlag.

Schneider, J., Gutscher, D., Etter, H., Hanser, J. 1982: *Der Münsterhof in Zürich. Bericht über die vom städtischen Büro für Archäologie durchgeführten Stadtkernforschungen 1977/78. Teil 1.* Schweizer Beiträge zur Kulturgeschichte und Archäologie des Mittelalters 9. Olten: Walter.

Schoch, W., Heller, I., Schweingruber, F. H., Kienast, F. 2004: *Wood anatomy of central European Species* [online]. 12. 09. 2007. [accessed 2022-03-09]. Available from: www.woodanatomy.ch.

Schreg, R. 2002: Haus und Hof im Rahmen der Dorfgenese. Zum Wandel der Bauformen in Südwestdeutschland [online]. In: J. Klápště (ed.): *Ruralia IV. The rural house from the migration period to the oldest still standing buildings. 8.-13. September 2001 Bad Bederkesa, Lower Saxony, Germany.* Památky archeologické. Supplementum 15. Prague: Institute of Archaeology, Academy of Sciences of the Czech Republic, Prague, 111–122. [accessed 2022-09-24]. Available from: ruralia2.ff.cuni.cz/wp-content/uploads/2018/04/111-122.pdf.

Schreg, R. 2006: *Dorfgenese in Südwestdeutschland – Das Renninger Becken im Mittelalter.* Materialhefte zur Archäologie in Baden-Württemberg 76. Stuttgart: Konrad Theiss Verlag.

Schwabenicky, W. 1997: Hausbau in hochmittelalterlichen Bergbausiedlungen des sächsischen Erzgebirges. In: J. Kubková et al. (eds.): *Život v archeologii středověku.* Praha: Peres, Archeologický ústav AV ČR, Praha, 568–578.

Schweingruber, F. H. 1978: *Mikroskopische Holzanatomie. Formenspektren mitteleuropäischer Stamm- und Zweigholzer zur Bestimmung von rezentem und subfossilem Material.* Birmensdorf: Eidgenossische Anstalt fur das Forstliche Versuchwesen.

Semerád, M., Taibl, P. 2021: *Praha 1 - Staré Město, Karlova ul., čp. 162, 165 a 167, ppč. 94.* Investor's archaeological report (field evaluation No. 2021/11). Stored in: Documentation collections of the archaeological department of the National Heritage Institute – Regional Office in Prague.

Semerád, M., Taibl, P., Musílek, M. 2020: Vývoj zástavby na parcele domu čp. 887/II v ulici Nekázanka jako příklad sekundární parcelace jednoho z bloků Nového Města pražského [online]. *Staletá Praha* XXXVI(2), 120–142. [accessed 2022-07-16]. Available from: www.staletapraha.cz/media/2020_2/sp-2020-2-cl-06-semerad-taibl-nekazanka-72dpi.pdf.

Šimík, J. 2020a: Uherský Brod (okr. Uherské Hradiště). *Přehled výzkumů* 61(2), 182. [accessed 2022-09-27]. Available also from: pv.arub.avcr.cz/61_2_06.pdf.

Šimík, J. 2020b: *Vývoj zástavby Uherského Brodu ve vrcholném středověku na základě nálezové situace z parcely č. 120 na Masarykově náměstí* [online]. Manuscript of the master's thesis. Masarykova univerzita. Filozofická fakulta. Ústav archeologie a muzeologie. [accessed 2022-09-11]. Available from: https://is.muni.cz/th/eq2pg/.

Škabrada, J. 1978: Sýpky domů v Pfaffenschlagu ve světle struktury vesnického domu jihočeské oblasti („Šíje" vesnických sýpek a středověkých zemnic) [online]. *Archaeologia historica* 3, 355–369. [accessed 2022-07-16]. Available from: https://digilib.phil.muni.cz/handle/11222.digilib/139239.

Škabrada, J. 1998: Dům jako sestava trojdílných bytů. (K možnostem typologického uspořádání středověkého domu) [online]. *Průzkumy památek* 5(I), 33–42. [accessed 2022-10-01]. Available from: https://www.pruzkumypamatek.cz/pdf/1998-01-04.pdf.

Škabrada, J. 2003: *Konstrukce historických staveb.* Praha: Argo.

Skalická, P., Marethová, B. 2012: *Nálezová zpráva 45/10 Opava City Center (bývalá Radniční ulice) - part I.* Manuscript of the excavation report. Stored in: National Heritage Institute – Regional Office in Ostrava.

Skalická, P., Marethová, B. 2013: Středověká dřevohliněná zástavba domovního bloku – předběžné shrnutí výsledků předstihového výzkumu v prostoru bývalé Radniční ulice v Opavě [online]. *Časopis Slezského zemského muzea. B. Vědy historické* 62(2–3), 253–271. [accessed 2022-08-20]. Available from: www.szm.cz/media/docs/cszm-b-2-3-2013-57a-32c64ed17c.pdf.

Šlézar, P. 2005: Litovel (okr. Olomouc). *Přehled výzkumů* 46, 288–290. [accessed 2022-09-24]. Available also from: https://www.arub.cz/wp-content/uploads/pv_46_2004_stredovek_a_novovek.pdf.

Šlézar, P. 2008: Archeologický výzkum v suterénu budovy Městského klubu v Litovli. *Vlastivědný věstník moravský* LX(2), 167–183.

Šlézar, P. 2013: „Nova villa" – počátky královského města očima archeologie. In: K. Konečný (ed.): *Uničov: historie moravského města*. Uničov: Město Uničov, 56–70.

Šlézar, P. 2018: Archeologie středověkého města. In: K. Konečný et al.: *Litovel. Velké dějiny města. 1. díl. Od nejstarších dob do roku 1918.* Olomouc: Univerzita Palackého v Olomouci pro město Litovel, 68–103.

Šlézar, P., Faltýnek, K. 2004: Litovel (okr. Olomouc). *Přehled výzkumů* 45, 204–207. [accessed 2022-09-24]. Available also from: https://www.arub.cz/wp-content/uploads/pv_45_2003_stredovek_a_novovek.pdf.

Šmerda, J. 1996: *Denáry české a moravské. Katalog mincí českého státu od X. do počátku XIII. století*. Brno: Datel.

Smetánka, Z. 1994: K problematice trojdílného domu v Čechách a na Moravě v období vrcholného a pozdního středověku. In: J. Fridrich, J. Klápště, P. Vařeka (eds.): *Mediaevalia archaeologica bohemica 1993*. Památky archeologické. Supplementum 2. Prague: Institute of Archaeology, 117–138.

Snášil, R. 1982a: Hrnčířská pec z trhové vsi Veligradu [online]. In: V. Herka (ed.): *Zkoumání výrobních objektů a technologií archeologickými metodami. Sborník z 2. semináře, který se konal dne 11. prosince 1979 v Technickém muzeu v Brně.* Brno: Technické muzeum, 3–24. [accessed 2022-09-24]. Available from: archeologiatechnica.cz/sites/default/files/2018-10/at_02_01.pdf.

Snášil, R. 1982b: Keramický depot z počátku 14. století z Uherského Hradiště-Starého Města (okr. Uherské Hradiště). *Přehled výzkumů* 1980, 44–46. [accessed 2022-09-24]. Available also from: https://www.arub.cz/wp-content/uploads/pv_25_1980.pdf.

Snášil, R. 1983: Nález nejstarší destilační aparatury na Moravě [online]. *Vlastivědný věstník moravský* XXXV(1), 76–79. [accessed 2022-09-24]. Available from: https://1url.cz/4rCay.

Snášil, R., Novotný, J. 1985: Výzkumy v Uherském Hradišti v roce 1983 (okr. Uherské Hradiště). *Přehled výzkumů* 1983, 71–74. [accessed 2022-09-24]. Available also from: https://www.arub.cz/wp-content/uploads/pv_28_1983.pdf.

Snášil, R., Procházka, R. 1981: Archeologické výzkumy v Uherském Hradišti v roce 1979 (okr. Uherské Hradiště). *Přehled výzkumů* 1979, 53–54. [accessed 2022-09-24]. Available also from: https://www.arub.cz/wp-content/uploads/pv_24_1979.pdf.

Snášil, R., Procházka, R. 1982: Výzkumy v Uherském Hradišti v roce 1980 (okr. Uherské Hradiště). *Přehled výzkumů* 1980, 52–55. [accessed 2022-09-24]. Available also from: https://www.arub.cz/wp-content/uploads/pv_25_1980.pdf.

Snášil, R., Procházka, R. 1984: Výzkumy v Uherském Hradišti v roce 1982 (okr. Uherské Hradiště). *Přehled výzkumů* 1982, 63–65. [accessed 2022-09-24]. Available also from: https://www.arub.cz/wp-content/uploads/pv_27_1982.pdf.

SOkA Opava: *Státní okresní archiv Opava*. Fond Archiv města Opavy, Inv. No. 1926. Landeshauptstadt Troppau, urban plan of E. Labitzky.

Staník, I., Žuffová, J. 1995: Počiatky urbanizmu města Trnava [online]. *Archaeologia historica* 20, 285–298. [accessed 2022-11-12]. Available from: https://digilib.phil.muni.cz/en/handle/11222.digilib/140142.

Stoops, G. 2003: *Guidelines for Analysis and Description of Soil and Regolith Thin Sections*. Madison: Soil Science Society of America.

Stoops, G., Canti, M. G., Kapur, S. 2017: Calcareous Mortars, Plasters and Floors. In: C. Nicosia, G. Stoops (eds): *Archaeological Soil and Sediment Micromorphology*. Hoboken: Wiley, 189–199. DOI: 10.1002/9781118941065.

Stoops, G., Marcelino, V., Mees, F. 2010: *Interpretation of Micromorphological Features of Soils and Regoliths*. Amsterdam: Elsevier. DOI: 10.1016/C2009-0-18081-9.

Stoops, G. Sr., Stoops, G. Jr. 1994: Petrographic study of red floor fragments from the palaces at Babylon and Susa. In: H. Gasche, M. Tanret, A. Degraeve (eds.): *Cinquante-deux reflexions sur le Proche-Orient Ancien offertes en hommage à Léon De Meyer*. Mesopotamian History and Environment, Occasional Publications 2. Leuven: Peeters, 477–486.

Stuchlíková, J. 1995: *Uherské Hradiště, jezuitský klášter 1993.* Manuscript of the excavation report, No. MTX201701643. Stored in: Archive of the Institute of Archaeology, Czech Academy of Sciences, Brno.

Stuchlíková, J. 1997: Uherské Hradiště (okr. Uherské Hradiště). *Přehled výzkumů* 1993-1994, 254. [accessed 2022-09-24]. Available also from: https://www.arub.cz/wp-content/uploads/pv_38_1993-1994.pdf.

SUB II: *Schlesisches Urkundenbuch. Zweiter Band, 1231–1250.* Ed. W. Irgang. Wien 1977.

Syrová, Z., Syrový, J. 2012: Rammed earth in Moravia (Czech Republic) in the context of neighboring lands [online]. In: C. Mileto, F. Vegas, V. Cristini (eds.): *Rammed Earth Conservation. Proceedings of the first International Conference on Rammed Earth Conservation, Restapia 2012, Valencia, Spain 21–23 June 2012.* Boca Raton (Florida): CRC Press, 229–235. [accessed 2022-12-05]. Available from: https://sovamm.cz/PDFs/Biblio/Restapia_2012-037.pdf.

Syrová, Z., Syrový, J. 2014: Historic daubed corner-timbered constructions in Czech Republic [online]. In: M. Correia, G. Carlos, S. Rocha (eds.): *Vernacular Heritage and Earthen Architecture: Contributions for Sustainable Development*. Boca Raton (Florida): CRC Press, 29–34. [accessed 2022-12-05]. Available from: https://sovamm.cz/PDFs/Biblio/VerSUS2013_005.pdf.

Syrová-Anýžová, Z., Škabrada, J. (eds.) 2018: *Nejstarší venkovské domy ve východních Čechách*. Pardubice, Brno: Univerzita Pardubice, Fakulta filozofická, Společnost pro obnovu vesnice a malého města, z.s.

Těsnohlídek, J., Duffek, P., Těsnohlídková, K., Prachařová, M., Skořepová, M., Janoušek, T., Stančíková, M. 2017: Výsledky archeologického výzkumu Palackého náměstí v Počátkách (okres Pelhřimov) [online]. *Archaeologia historica* 42(2), 669–689. [accessed 2022-09-22]. DOI: 10.5817/AH2017-2-14. Available from: https://digilib.phil.muni.cz/handle/11222.digilib/137051.

Těsnohlídek, J., Maršíčková, M., Duffek, P., Hrubý, P. 2019: *Mateřská škola Na Dolech, záchranný archeologický výzkum*. Manuscript of the excavation report, No. A037/2018. Stored in: Archaia Brno.

Těsnohlídková, K., Těsnohlídek, J., Duffek, P. 2018: Archeologie nejstaršího horizontu města Počátky (okres Pelhřimov) [online]. *Archaeologia historica* 43(1), 115–143. [accessed 2022-09-22]. DOI: 10.5817/AH2018-1-7. Available from: https://digilib.phil.muni.cz/en/handle/11222.digilib/138125.

Teuber, S. 2009: *Einbeck – Petersilienwasser. Befunde und Bebauungsstrukturen des 13. bis 20. Jahrhunderts*. Materialhefte zur Ur- und Frühgeschichte Niedersachsens 41. Rahden: Verlag Marie Leidorf.

Timpel, W. 1982: *Gommerstedt: ein hochmittelalterlicher Herrensitz in Thüringen*. Weimarer Monographien zur Ur- und Frühgeschichte 5. Weimar: Museum für Ur- und Frühgeschichte Thüringens.

Tomas, J. 2014: Burgus. Užití termínu v českých zemích ve 12. a 13. století. In: I. Boháčová, P. Sommer (eds.): *Středověká Evropa v pohybu. K poctě Jana Klápště*. Praha: Archeologický ústav AV ČR, Praha, v. v. i., 449–459.

Tomeček, R. 2002: *Uherský Brod: putování historií královského města*. Uherský Brod: Q Studio.

Tomek, W. W. 1855: *Dějepis Prahy. Díl I* [online]. Nowočeská bibliothéka XVIII. Spisů musejních LI. Praha: W kommissí u Františka Řiwnáče. [accessed 2022-07-16]. Available from: https://1url.cz/irCa7.

Tryml, M. 2000: Praha 1 - Nové Město, Žitná čp. 1319/II. In: Z. Dragoun et al.: Archeologický výzkum v Praze v letech 1997–1998. *Pražský sborník historický* XXXI, 386–387.

Tryml, M. 2001: Praha 1 – Nové Město, Ul. Žitná čp. 1319/II, ppč. 2035. *Výzkumy v Čechách* 1999, 227–228.

Untermann, M. (ed.) 2012: *Holzbau in Mittelalter und Neuzeit*. Mitteilungen der Deutschen Gesellschaft für Archäologie des Mittelalters und der Neuzeit 24. Paderborn: Deutsche Gesellschaft für Archäologie des Mittelalters und der Neuzeit e.V.

Urbánková, K., Wihodová, V. (eds.) 2008: *Brněnské berní rejstříky z přelomu 14. a 15. století*. Prameny dějin moravských 15. Brno: Matice moravská.

Vařeka, P. 2002: Zahloubené stavby v českých městech vrcholného středověku – zemnice nebo suterény nenalezených nadzemních domů. In: E. Neustupný (ed.): *Archeologie nenalézaného. Sborník přátel, kolegů a žáků k životnímu jubileu Slavomila Vencla*. Dobrá Voda u Pelhřimova: Aleš Čeněk, 252–286.

Vařeka, P. 2004: *Archeologie středověkého domu I. Proměny vesnického obydlí v Evropě v průběhu staletí. 6.–15. století*. Archaeologica 1. Plzeň: Katedra archeologie, FHS ZČU.

Vařeka, P. 2008: Vesnice vrcholného a pozdního středověku. In: V. Dudková, J. Orna, P. Vařeka: *Hledání zmizelého. Archeologie zaniklých vesnic na Plzeňsku. Katalog výstavy konané v Západočeském muzeu v Plzni 11. září 2008 - 11. ledna 2009*. Plzeň: Západočeské muzeum v Plzni, 20–25.

Vařeka, P. 2018: The formation of the three-compartment rural house in medieval Central Europe as a cultural synthesis of different building traditions. In: D. Berryman, S. Kerr (eds.): *Buildings of Medieval Europe. Studies in social and landscape contexts of medieval buildings*. Oxford: Oxbow Books, 139–155.

Vařeka, J., Frolec, V. 2007: *Lidová architektura – Encyklopedie*. 2., přeprac. vyd., v nakl. Grada 1. vyd. Praha: Grada Publishing.

Vejrostová, L., Lisá, L., Bajer, A., Pacina, J. 2017: Evaluation of human impact on valley bottom sedimentation in Highlands: case study from Česká Bělá, Czechia [online]. *Geografie* 122(1), 21–44. [accessed 2022-09-26]. DOI: 10.37040/geografie2017122010021. Available from: https://geografie.cz/media/pdf/geo_2017122010021.pdf.

Verbík, A. 1981a: Hradiště v době husitské a pohusitské (1419–1479). In: J. Čoupek et al. (eds.): *Uherské Hradiště: dějiny města*. Brno: Blok, 126–141.

Verbík, A. 1981b: Středověké město. In: J. Čoupek et al. (eds.): *Uherské Hradiště: dějiny města*. Brno: Blok, 81–124.

Vičar, O. 1965: Místopis Brna v polovici 14. století (Prostor uvnitř městských hradeb). *Brno v minulosti a dnes* VII, 242–283.

Vičar, O. 1971: Jak vypadaly měšťanské domy v Brně v polovici 14. století. *Monumentorum tutela. Ochrana pamiatok* 7, 57–83.

Vitruvius II: Marcus Vitruvius Pollio. *Vitruvii de architectura libri decem. Liber Secundus*. Ed. F. Krohn. Bibliotheca scriptorium Graecorum et Romanorum Teubneriana. Lipsiae MCMXII. [accessed 2022-09-11]. Available also from: https://archive.org/details/vitruviidearchit00vitr/page/n3/mode/2up.

Vitula, P. 1994: *Uherské Hradiště, dům manželů A*[...]. Manuscript ot the excavation report, No. MTX201700962. Stored in: Archive of the Institute of Archaeology, Czech Academy of Sciences, Brno.

Vitula, P. 1997: Uherské Hradiště (okr. Uherské Hradiště). *Přehled výzkumů* 1993-1994, 254–256. [accessed 2022-09-11]. Available also from: https://arub.cz/wp-content/uploads/07_pv_38_1993-1994_stredovek_a_novovek.pdf.

Vlček, P. 1999: čp. 211/III. In: P. Vlček et al.: *Umělecké památky Prahy. Malá Strana*. Praha: Academia, 314–316.

Vogel, V. 1991: Profaner Holzbau des 11. bis frühen 13. Jahrhunderts in Schleswig. In: H. W. Böhme (ed.): *Siedlungen und Landesausbau zur Salierzeit. Teil 1. In den nördlichen Landschaften des Reiches*. Römisch-Germanisches Zentralmuseum: Monographien 27. Sigmaringen: Jan Thorbecke, 263–276.

Vošahlík, A. 1981: K počátkům stavebního vývoje měšťanských domů v Jihlavě. *Památky a příroda: časopis Státní památkové péče a ochrany přírody* 6(8), 449–470, 479, 480.

Vyšohlíd, M. 2017: Archeologický výzkum zaniklé vsi Opatovice v Křemencové ulici [online]. In: *Archaia Praha. Obecně prospěšná společnost*. 07. 02. 2017. [accessed 2022-08-05]. Available from: http://www.archaiapraha.cz/praha-cs/?acc=aktuality&id=204.

Vyšohlíd, M. 2022: Archeologie domu U Sixtů v letech 2020-2022 [online]. In: *Archaia Praha. Obecně prospěšná společnost*. 03. 02. 2022. [accessed 2022-08-05]. Available from: https://www.archaiapraha.cz/praha-cs/?acc=aktuality&id=232.

Vyšohlíd, M., Zavřel, J. 2019: Metalurgické aktivity v předlokační osadě Opatovice v Praze-Novém Městě [online]. *Staletá Praha* XXXV(2), 68–85. [accessed 2022-08-05]. Available from: http://www.staletapraha.cz/media/2019_2/sp-2019-2-cl-03-vysohlid-kremencova-72dpi.pdf.

Wallisová, M. 1998: Nejstarší dějiny Opatovic v písemných a archeologických pramenech [online]. *Documenta Pragensia* XVII, 37–42. [accessed 2022-07-16]. Available from: www.ahmp.cz/docs/dp/22_DP%20XVII.pdf.

Wallisová, M., Tryml, M. 1995: Praha 1 – Nové Město, Pštrossova ulice čp. 192/II a 193/II. In: Z. Dragoun et al.: Archeologický výzkum v Praze v letech 1992–1994. *Pražský sborník historický* XXVIII, 248–249.

Winter, Z. 1906: *Dějiny řemesel a obchodu v Čechách v XIV. a v XV. století* [online]. Praha: Nákladem České akademie císaře Františka Josefa pro vědy, slovesnost a umění. [accessed 2022-07-16]. Available from: https://1url.cz/arC3t.

Zatloukal, R. 1999: Zpráva o archeologickém výzkumu ve Žďáře nad Sázavou, trať Staré Město, v letech 1996–1999. In: M. Ježek, J. Klápště (eds.): *Praha - Wrocław*. Mediaevalia archaeologica 1. Praha: Archeologický ústav AV ČR, 193–207.

Zatloukal, R. 2017: Olomouc (k. ú. Olomouc-město, okr. Olomouc). *Přehled výzkumů* 58(2), 231–232. [accessed 2022-09-27]. Available also from: https://www.arub.cz/prehled-vydanych-cisel/PV-58-2_stredovek_novovek.pdf.

Zavřel, J., Čiháková, J. 1997: *Praha 1 - Malá Strana, Sněmovní čp. 1/III*. Manuscript of the excavation report, CTX199706736 [accessed 2022-08-21]. Stored in: Archive of the Institute of Archaeology, Czech Academy of Sciences, Prague. Available also from: Digital Archive of the Archaeological Map of the Czech Republic http://digiarchiv.amapa.cz/id/C-TX-199706736.

Žďárská, A. 2017: Valentinská čp. 1061/I. In: Z. Dragoun et al. (eds.): Archeologický výzkum v Praze v letech 2015–2016. *Pražský sborník historický* XLV, 646–647.

Zemek, M., Hosák, L. 1972: Doba předhusitská. In: M. Zemek et al.: *Uherský Brod: minulost i současnost slováckého města*. Brno: Blok, 41–64.

Zemek, P. (ed.) 2004: *Bartoškova kronika*. Prameny k dějinám Uherského Brodu 2. Uherský Brod, Uherské Hradiště: Muzeum J.A. Komenského v Uherském Brodě v nakladatelství Ottobre 12.

Žemlička, J. 2014: *Království v pohybu: kolonizace, města a stříbro v závěru přemyslovské epochy*. Česká historie 29. Praha: NLN, Nakladatelství Lidové noviny.

Zezula, M. 2014: Archeologie v Městské památkové zóně Opava. In: D. Halátek, K. Pelcová, M. Zezula (eds.): *Hodnoty, které chráníme. 20 let městské památkové zóny Opava*. Opava, Ostrava: Opavská kulturní organizace, Statutární město Opava, Národní památkový ústav, územní odborné pracoviště v Ostravě, 52–61.

Zezula, M. 2017: Archeologické prameny: podoba středověké Ostravy. In: R. Antonín et al.: *Ostrava: počátky a vývoj středověkého města*. Ostrava: Statutární město Ostrava, 80–97.

Zezula, M., Kiecoň, M., Kolář, F. 2007: Archeologické doklady k vývoji půdorysu, uliční sítě a parcelace středověké Opavy. *Forum urbes medii aevi* IV, 118–143.

Zezula, M., Prix, D. 2011: Středověké osídlení Bohušova. In: P. Kozák, D. Prix, M. Zezula et al.: *Kostel sv. Martina v Bohušově*. Bohušov, Ostrava: Obec Bohušov, Národní památkový ústav, územní odborné pracoviště v Ostravě, 55–84.

Zientara, B. 1997: *Henryk Brodaty i jego czasy*. Wydanie II uzupełnione. Warszawa: Wydawnictwo Trio.

Zimmermann Haio, H. 1998: *Pfosten, Ständer und Schwellen und der Übergang vom Pfosten- zum Ständerbau. Eine Studie zu Innovation und Beharrung im Hausbau. Zu Konstruktion und Haltbarkeit prähistorischer bis neuzeitlicher Holzbauten von den Nord- und Ostseeländern bis zu den Alpen*. Probleme der Küstenforschung im Südlichen Nordseegebiet 25. Oldenburg: Isensee Verlag.

Zůbek, A. 2016: Vývoj historické zástavby parcely č. 1149/3 při Kopečné ulici v Brně [online]. *Archaeologia historica* 41(2), 345–362. [accessed 2022-09-27]. DOI: 10.5817/AH2016-2-17. Available from: https://digilib.phil.muni.cz/en/handle/11222.digilib/135609.

Zůbek, A. 2018a: Archeologické projevy středověké a raně novověké nezděné zástavby na parcelách někdejších domů č. 6 a 8 na Vídeňské ulici v Brně [online]. *Archaeologia historica* 43(1), 65–95. [accessed 2022-09-27]. DOI: 10.5817/AH2018-1-5. Available from: https://digilib.phil.muni.cz/handle/11222.digilib/138123.

Zůbek, A. 2018b: *Hřbitov při kostele sv. Jakuba v Brně. Vyhodnocení archeologických poznatků*. Brno: Archaia Brno o. p. s.

Zůbek, A. 2019a: Archeologické projevy středověké a raně novověké zástavby první předměstské čtvrti v Brně [online]. *Archaeologia historica* 44(1), 289–311. [accessed 2022-10-13]. DOI: 10.5817/AH2019-1-13. Available from: https://digilib.phil.muni.cz/en/handle/11222.digilib/141304.

Zůbek, A. 2019b: *Mazanice – stavební materiál v brněnském prostředí. Příkladová studie zpracování a analýzy souboru fragmentů vypálené mazanice z výplní suterénu VS029 na parcele domu Kobližná 4*. Brno: Archaia Brno z. ú.

Žuffová, J. (ed.) 2009: *Trnava a počiatky stredovekých miest* [online]. Pamiatky Trnavy a Trnavského kraja 12. Trnava: Krajský pamiatkový úrad Trnava. [accessed 2022-12-05]. Available from: https://www.trnava.sk/userfiles/download/attachment/ourak_KPU-Zbornik-pamiatky_12-2009.pdf.

This publication has been produced with the assistance of the database Czech Medieval Sources online, provided by the LINDAT/CLARIAH-CZ Research Infrastructure (https://lindat.cz), supported by the Ministry of Education, Youth, and Sports of the Czech Republic (Project No. LM2018101).

Selected abbreviations:

BCM – Brno City Museum

CUZK – State Administration of Land Surveying and Cadastre

Critical editions of diplomatic sources concerning Bohemia and Silesia:
- **CDB** – Codex diplomaticus et epistolaris regni Bohemiae
- **CDS** – Codex diplomaticus Silesiae
- **SUB** – Schlesisches Urkundenbuch

SOkA Opava – State District Archive Opava

S. u. – Stratigraphic unit(s) – individual anthropogenic activities (e.g. layers, pits, graves, walls, wooden structures, contact areas). Stratigraphic unit is often confused with the traditional term 'feature', in particular by older researchers.

S. u. g. – Stratigraphic unit group(s) – groups of higher archaeological spatial evidence. These involve sets of stratigraphic units (s. u.) forming a functional whole (the structure of a house, heating device, fortification phase, wattle fence). While the stratigraphic unit(s) (s. u.) in stratigraphic unit group(s) (s. u. g.) need not be contemporaneous, they must have a close stratigraphic connection that can be expressed collectively in graphic form in a matrix. Formations of stratigraphic unit group (s) (s. u. g.) partially correspond to the traditional term 'feature'. Labelling (numbering) depends on the relevant excavation.

Affiliations

Mgr. Jaroslav Bartík, Ph.D.
Institute of Archaeology, Czech Academy of Sciences, Brno
bartik@arub.cz

Mgr. David Buriánek, Ph.D.
Czech Geological Survey, Branch Brno
david.burianek@geology.cz

Prof. dr. hab. inż. arch. Małgorzata Chorowska
Wrocław University of Science and Technology, Faculty of Architecture
malgorzata.chorowska@pwr.edu.pl

Mgr. Tomáš Chrástek
Museum of Moravian Slovakia in Uherské Hradiště, contribution organization
tomas.chrastek@slovackemuzeum.cz

Mgr. Tomasz Cymbalak
National Heritage Institute, Regional Office in Prague
cymbalak.tomasz@npu.cz

Petr Duffek
Archaia Brno, non-profit institution
archaiajihlava@volny.cz

Mgr. Petr Kočár
Institute of Archaeology, Czech Academy of Sciences, Prague
kocar@arup.cas.cz

Mgr. Romana Kočárová
Independent researcher
rkocarova@seznam.cz

Mgr. Veronika Kočí Dudková
Silesian University in Opava, Faculty of Philosophy and Science in Opava
veri.dudkova@seznam.cz

Ing. Tomáš Kolář, Ph.D.
Mendel University in Brno, Faculty of Forestry and Wood Technology, Department of Wood Science and Technology
tomas.kolar.und@mendelu.cz

Mgr. Václav Kolařík
Archaia Brno, non-profit institution
vkolarik@archaiabrno.cz

Mgr. Peter Kováčik, Ph.D.
Silesian University in Opava, Faculty of Philosophy and Science in Opava
peter.kovacik@fpf.slu.cz

Ing. Tomáš Kyncl
DendroLab Brno
kyncl@dendrochronologie.cz

Doc. Mgr. Lenka Lisá, Ph.D.
Institute of Geology, Czech Academy of Sciences; Nuclear Physics Institute, Czech Academy of Sciences, CRL Radiocarbon Laboratory
lisa@gli.cas.cz

Mgr. Barbara Marethová
National Heritage Institute, Regional Office in Opava; National Heritage Institute, Regional Office in Ostrava
marethova.barbara@npu.cz

David Merta
Archaia Brno, non-profit institution
davmerta@seznam.cz

Mgr. Marek Peška, Ph.D.
Archaia Brno, non-profit institution
mpeska@archaiabrno.cz

Prof. dr. hab. Jerzy Piekalski
University of Wrocław, Faculty of Historical and Pedagogical Sciences, Institute of Archaeology
Jerzy.Piekalski@uwr.edu.pl

PhDr. Rudolf Procházka, CSc.
Czech Academy of Sciences, Institute of Archaeology, Brno
prochazka@arub.cz

Doc. Ing. Michal Rybníček, Ph.D.
Mendel University in Brno, Faculty of Forestry and Wood Technology, Department of Wood Science and Technology
michal.rybnicek@mendelu.cz

Doc. Ing. Michael Rykl, Ph.D.
Czech Technical University in Prague, Faculty of Architecture
rykl@fa.cvut.cz, michael.rykl@centrum.cz

Mgr. Lenka Sedláčková, Ph.D.
Archaia Brno, non-profit institution
lsedlackova@archaiabrno.cz

Ing. arch. Matouš Semerád
National Heritage Institute, Regional Office in Prague
semerad.matous@npu.cz

Mgr. Jakub Šimík
Archaia Brno, non-profit institution
simik@archaiabrno.cz

Mgr. Pavel Staněk
Archaia Brno, non-profit institution
stnkpvl@seznam.cz

Mgr. Pavel Taibl
National Heritage Institute, Regional Office in Prague
taibl.pavel@npu.cz

Mgr. Jakub Těsnohlídek
Archaia Brno, non-profit institution
archaiajihlava@volny.cz

† **Mgr. Jitka Vrbová-Dvorská, Ph.D.**

Mgr. Pavla Žďárková
Regional Museum Dobruška
muzeum@mestodobruska.cz

Mgr. Anna Žďárská
National Heritage Institute, Regional Office in Prague
zdarska.anna@npu.cz

Mgr. Michal Zezula, Ph.D.
National Heritage Institute, Regional Office in Ostrava
zezula.michal@npu.cz

Mgr. Antonín Zůbek, Ph.D.
Archaia Brno, non-profit institution
azubek@archaiabrno.cz

Spisy Archeologického ústavu AV ČR Brno 72
Editor-in-chief: Balázs Komoróczy
ISSN 1804-1345

The transformation of burgher houses in medieval Moravia with respect to Bohemia and Silesia

Lenka Lisá – Marek Peška et al.

Authors in alphabetical order:
Jaroslav Bartík, David Buriánek, Małgorzata Chorowska, Tomáš Chrástek, Tomasz Cymbalak, Petr Duffek, Petr Kočár, Romana Kočárová, Veronika Kočí Dudková, Tomáš Kolář, Václav Kolařík, Peter Kováčik, Tomáš Kyncl, Lenka Lisá, Barbara Marethová, David Merta, Marek Peška, Jerzy Piekalski, Rudolf Procházka, Michal Rybníček, Michael Rykl, Lenka Sedláčková, Matouš Semerád, Jakub Šimík, Pavel Staněk, Pavel Taibl, Jakub Těsnohlídek, † Jitka Vrbová-Dvorská, Pavla Žďárková, Anna Žďárská, Michal Zezula, Antonín Zůbek.

Managing editors: Martin Ollé, Martina Kudlíková
Translation and proofreading: David Gaul, Milan Rydvan, Paul Simpson, Martin Ollé, Klára Matulová, Irma Charvátová
Editorial support: Hedvika Břínková
Cover design: Milan Filip / Azu design s. r. o.
Graphic design and prepress: Milan Filip / Azu design s. r. o.
Press: Azu design s. r. o., Bayerova 805/40, 602 00 Brno, Czech Republic
First edition

Publishers:
Czech Academy of Sciences, Institute of Archaeology, Brno,
Čechyňská 363/19, 602 00 Brno, Czech Republic, www.arub.cz
Archaia Brno, Bezručova 15, 602 00 Brno, Czech Republic, www.archaiabrno.org

Brno 2022

ISBN 978-80-7524-053-8 (Czech Academy of Sciences, Institute of Archaeology, Brno) (print)
ISBN 978-80-7524-059-0 (Czech Academy of Sciences, Institute of Archaeology, Brno) (online ; pdf)
ISBN 978-80-908220-2-3 (Archaia Brno) (print)
ISBN 978-80-908220-6-1 (Archaia Brno) (online ; pdf)

Institute of Archaeology
Czech Acad Sci, Brno

Czech Academy
of Sciences

978-80-7524-053-8