LIVING BY THE COINS

Roman Life in the Light of Coin Finds and Archaeology within a Residential Quarter of Carnuntum
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ROMAN LIFE IN THE LIGHT OF COIN FINDS AND ARCHAEOLOGY WITHIN A RESIDENTIAL QUARTER OF CARNUNTUM
Cristian Găzdac and Franz Humer:

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INTRODUCTION

After a forty-year gap following the excavations of the 1950s (and even earlier), large archaeological campaigns have been carried out since the 1990s in a quarter (also known as “Spaziergarten”, “insula VI” and “Open-Air Museum”) of the former “civilian” Roman town of Carnuntum. These new excavations have produced a large quantity of coins.

Some of these findings have been published in the monumental volume *Numismata Carnuntina – FMRÖ III.2* together with the rest of the coins found at Carnuntum in older collections.

The new excavations were carried out according to new methodologies, as nowadays it is a desideratum to create numismatic corpora that should gather as much information as possible about each coin, not only from a numismatic point of view but also from an archaeological one. The aim is to provide more details about both general and specific patterns of the Roman economy, society and history of a residential quarter in a Roman town.

Thus, the style of publication of coins – with a large scale of archaeological units (e.g. Roman streets, dwellings public edifices) and their stratigraphy – was chosen in this book in order to provide as much information as possible about each coin; in doing so we try to provide scholars with material and evidence that may help them to obtain a realistic picture of monetary circulation. Similarly, the coin as seen through an archaeological context may serve for a better understanding of the dating of archaeological phases, especially to illustrate when the coin may be useful within an archaeological context, as well as to highlight the pitfalls that one may come across if this artefact is misunderstood within the archaeological picture.

We hope that this book will be a useful tool for numismatists, archaeologists, historians and any reader interested in understanding Roman life through coinage.

It would not have been possible to publish such a large amount of numismatic evidence and work without the tremendous, accurate and difficult work carried out over last decades by our colleagues and friends in the field of archaeology to whom we express our gratitude: Christoph Baier, Claudia Behling, Jasmine Cencic, Dagmar Fuchs, Ágnes Alfoldy-Gázdac, Nicole Fuchshuber, Armgart Geiger, Andreas Konecny, Dominik Maschek, Matthias Pacher, Beatrix Petznek, Silvia Radbauer, Alexandra Rauchenwald, Barbara Stark, Barbara Weißmann and Ulrike Zeger.

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We also want to thank to over seventy Romanian students from the University of Cluj-Napoca, Romania and eighty seasonal workers, whose efficient work has played an important part in providing us with numismatic material and archaeological information. We would like to thank the friendly and helpful staff of the Archaeological Park Carnuntum Company and Museum Carnuntinum of the Government of Lower Austria where this book was written.

We are indebted to our colleagues and friends from the managerial department of the POSDRU programme (Cluj-Napoca, Romania) for their generous help concerning the logistics provided while this book was a work in progress.

We are grateful to the GERDA HENKEL Foundation, which has granted one of the authors a fellowship to conduct research whose results have also benefited this book.
The historical region between the two closest European capital cities (Vienna, Austria, and Bratislava, Slovakia) is the largest archaeological landscape in Central and South-Eastern Europe. In the towns known today as Bad Deutsch-Altenburg and Petronell-Carnuntum (fig. 1) lie the remains of the Roman provincial capital Carnuntum (CSAAK = *Colonia Septimia Aurelia Antoniniana Karnuntum*).

![Map of Carnuntum](image)

*Fig. 1. Map of the archaeological landscape of Carnuntum. The shaded area shows the extension of the ancient city (2008)*

**1. A brief history of the site**

The first Roman presence in what is now Lower Austria is connected with the grand scheme of Augustan expansion that planned to create the province of Germania. At the turn of the new era, there was a relatively peaceful situation in Central Europe following the integration of the Pannonian and Dalmatian regions into the province Illyricum and the annexation (without force) of the Celtic kingdom of Noricum. Rome’s attempt to crown the policy of border fortification in the mid-Danube region and along the Elbe by including the Marcomanni,
however, resulted in an uprising in the year AD 6. This is known as the so-called Pannonian-Dalmatian uprising, which destabilised Roman rule in today’s Austria, Hungary, Slovenia and Croatia, and the Empire was forced to show tremendous military strength. (see map 1)

Despite the impressive strength of the Roman troops, it took three years before the rebels surrendered; however, the armed struggles in Pannonia meant that the Emperor’s plan to conquer the Marcomanni by a projected “war on two fronts”, from the west and from the south, eventually failed. The first mention of Carnuntum as a Celtic town appeared in connection with these military conflicts. The exact location of the oldest Roman Carnuntum is still a matter of debate, despite intensive research conducted over the past few years. The most recent excavations on the Brunsberg in Hainburg (Austria), on the Thebener Kogel near Devin (Slovakia), as well as the large number of Celtic coin finds within the city limits of Bratislava (Slovakia) seem to indicate that the Celtic Carnuntum was located somewhere in the area north of the Danube, presumably within Bratislava territory. Thus the Danube and the Rhine formed a natural border of the Empire, a border which remained for the following centuries. During the 1st century AD, the northern border was secured with watchtowers and smaller camps situated at regular intervals. The region east of Vienna together with western Hungary became the province of Pannonia at the latest under Emperor Claudius I (AD 41–54). (see map 1)

The archaeological finds indicate that the legio XV Apollinaris erected the first fortified camp on the south bank of the Danube around AD 40 (fig. 2). The Carnuntum legionary fortress is the only military camp between Regensburg and Belgrade on which no constructions were built between the Middle Ages and modern times. This makes this camp one of the most important archaeological sites on the Danube limes.

1 Velleius Paterculus, pp. 2, 109. Velleius Paterculus, a historian and a Roman officer in Tiberius’s Germanic and Pannonian campaigns. His two-volume Historia Romana is dated around AD 30. In the year AD 6: “…ipse a Carnunto qui locus Norici regni proximus ab hac parte erat, exercitum, qui in Illyrico merebat, ducere in Marcomannos orsus est …”.
4 The Government of the Province of Lower Austria has managed to buy the land thanks to the financial support
In addition to the legion in the legionary fortress, a cavalry camp was established in Petronell and bridgehead fortifications were constructed (fig. 3) to guard the Danube bridge in Bad Deutsch-Altenburg. Although the province Pannonia Superior was located strategically, owing to its position on the insecure mid-Danube limes, it required a massive number of troops. At the end of the 1st century AD, four legions (out of thirty legions throughout the whole Empire) were garrisoned in Pannonia: at Vindobona, Carnuntum, Brigetio and Aquincum. From AD 106 the legio XIV Gemina Martia Victrix was camped at Carnuntum.

The reasons for the fast development of the camp and the civilian settlement in Carnuntum were of a military nature – the military camp located at a high position on the Altenburg Plateau on the south bank of the Danube could easily control the Marchfeld region north of the Danube (fig. 4, 5). Thus Carnuntum played a key role in protecting the fortified Roman border in the mid-Danube region. In addition, the city was located at the junction of two

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5 The auxiliary fort was largely destroyed after its discovery in 1977 due to modern construction activities, see STIGLITZ 1997; KANDLER 1997; for the bridgehead fort, see GENSER 1986, pp. 601–684; KANDLER 2000, pp. 22–25.
ancient European trade routes: the Danube as a waterway together with the accompanying towpath flowing from west to east and the Amber Road from the Baltic to Italy.\(^6\)

When the province was divided into Upper Pannonia (\textit{Pannonia Superior}) and Lower Pannonia (\textit{Pannonia Inferior}) between AD 103 and AD 107, Carnuntum became the capital of Upper Pannonia and thus the seat of the provincial governor. Aquincum (nowadays Budapest) became the capital of Lower Pannonia.

Around AD 124, Emperor Hadrian, the former provincial governor of Lower Pannonia, raised Carnuntum to the status of a Roman municipality (\textit{municipium Aelium Carnuntum}).\(^7\)

The first period of glory under Emperors Hadrian and Antoninus Pius came to a sudden end during Marcus Aurelius’ reign due to the outbreak of the Marcomannic wars. In AD 170, Carnuntum became the strategic centre for reprisals under Emperor Marcus Aurelius who spent three years here, AD 171–173. During this time he wrote several philosophical works, including parts of his famous \textit{Meditations} in Greek. There is some evidence that he wrote the second book of this work while he was in Carnuntum (the book ends: “\(\tau\alpha \epsilon\nu \kappa\alpha\rho\nu\omega\nu\tau\omega\) = “this [was written] in Carnuntum”).\(^8\) The reliefs on the Marcus Aurelius column in Rome may show some details of the ancient Carnuntum at this time (fig. 7).

Previous research had led to the belief that Carnuntum had also suffered massive destruction at the hands of Germanic tribes in this epoch, but the recent excavations have not enabled us to come to any decisive conclusions on this matter.

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\(^7\) HUMER 2006, p. 185; cat. no. 608.

\(^8\) M. Aurelius, \(\tau\alpha \epsilon\iota\zeta \lambda\acute{\omega}u\delta\), (\(\tau\alpha \epsilon\iota\ heauton\), pp. 2, 17.
CARNUNTUM – THE REBORN CITY OF EMPERORS

Under Septimius Severus, legatus Augusti pro praetore of Upper Pannonia, who was proclaimed emperor by his troops on 9 April 193, Carnuntum was raised to the status of colonia Septimia Aurelia Carnuntum (fig. 8). During his reign, which lasted until AD 211, Carnuntum and the entire province clearly enjoyed a period of glory. This is revealed by the discoveries which have come from the most recent archaeological excavations in the civilian city of Carnuntum.

The 3rd century AD was a time of economic prosperity and private affluence for Carnuntum. This is demonstrated by intensive building activity (fig. 9).

9 CIL III 143593.
In the year AD 259, a local governor once more tried to rise up against the throne of Rome. As he was supported by his troops garrisoned in Carnuntum, Regalianus (fig. 10), together with his wife Dryantilla, proclaimed himself as the new emperor. He started minting coins but failed after two months and was killed by his own troops.

In AD 308, Carnuntum was once more at the centre of world politics. At the time of the deliberate abdication of Emperor Diocletian in AD 305, new radical measures were requested in order to maintain unity. The matters affecting the Tetrarchy system succession created by Diocletian’s abdication were to be settled at the Conference of the Emperors held in Carnuntum. The choice of this location was based on the geopolitical position of the town between the western and eastern halves of the Empire, not to mention great opportunities to accommodate such important personages.

The historical meeting between Diocletian, Galerius and Maximianus took place in November 308. As a result of the conference, Galerius became Augustus in the east, Licinius I in the west and Constantine I Caesar of the west. They paved the way for the coming of Christianity, as the same participants took further steps in Nicomedia (Izmit) in AD 311 and in Mediolanum (Milan) in the year AD 313.

The Emperors’ conference in Carnuntum was followed by new struggles for power until Emperor Constantine I seized sole power in AD 326. Testimony to the international event in Carnuntum can be seen today on the votive altar in the Museum Carnuntinum in Bad Deutsch-Altenburg, which was dedicated by the conference participants on the occasion of the renovation of a Mithras shrine (fig. 11).¹⁰

Much building activity went on in Carnuntum in the first half of the 4th century AD (fig. 12). Evidence of this is provided by several newly erected private and public buildings in the civilian city which have come to light in the last few years during excavations of an ancient residential quarter south of Petronell Castle.

Fig. 10. Coin of Regalianus

Fig. 11. Altar for Mithras dated AD 308

¹⁰ HUMER 2009b, pp. 75-76; cat. no. 167.
Even in the middle of the 4th century AD, Carnuntum was still enjoying its former glory: the monument of “Heidentor” (Heathens’ Gate, Fig. 13) was erected as a triumphal arch between AD 354 and AD 361 under Constantius II\(^{11}\); under Valentinianus I the fortifications on the Danube limes were renovated around AD 375 after a severe earthquake.

The unrest caused by the incoming of migrators brought Roman rule to an end along the Danube. In AD 395, the Marcomanni and Quadi broke through the Pannonian limes; however, according to archaeological evidence, the area of the military camp continued to be in use until the first half of the 5th century AD. In *Notitia Dignitatum* – a late Roman Empire official record – Carnuntum is still mentioned around AD 430 as the seat of military

command over the Roman troops (a *praefectus legionis quartae decimae geminæ, a praefectus classis histricæ*).\(^\text{12}\)

The provinces on the Danube were finally abandoned by the Romans in AD 433 and officially ceded to the Huns (see map 11). Army and administration were withdrawn and some of the unprotected Romanised population may also have moved with them. The city was not destroyed by violent means but rather abandoned by its inhabitants at the end of antiquity.\(^\text{13}\) Traces of a possible Slavic habitation within their settlements dating from Carolingian times have been found in the vicinity of the legionary camp.\(^\text{14}\)

Since the middle of the 19th century, excavations have taken place (with some interruptions) in Carnuntum.\(^\text{15}\) A large part of the areas excavated at that time were covered up again and nowadays they can hardly be identified in the field. In contrast to the large-scale excavations of the 19th century, the investigations after 1945 attempted to keep parts of the ancient city open in the form of an open-air museum accessible to visitors (fig. 14).\(^\text{16}\)

\(^{12}\) Not. Dign. Occ. 34,26; 34,28.
\(^{13}\) SWOBODA 1958, pp. 66–70; JOBST 1983, pp. 70–75.
\(^{15}\) HUMER 2007, pp. 17–54.
Today, the Government of Lower Austria – the owner of the open excavations – together with the Archäologischer Kulturpark Niederösterreich Betriebsges.m.b.H. – the operating company within the framework of a public private partnership – are concerned with the conservation, scientific research and the presentation and marketing of the Roman monuments.\textsuperscript{17}

In the last ten years, archaeological activity has taken place in Carnuntum, particularly within the former Roman civilian city in Petronell-Carnuntum. Since 2001, a large-scale project has been in operation mainly within the Open-Air Museum Petronell (which was first established sixty years ago). This Museum displays a small part of the south-east sector of the civilian city which has been scientifically investigated according to the criteria of modern field research (see maps 3–6). Based on the archaeological features evaluated in this way, an authentic presentation of the buildings has also been realised as far as possible. Full-scale and functional reconstructions offer the public the opportunity to experience what Roman life was really like. A museum in the classical sense has not been erected, but the visitor has the impression that the Roman buildings are still in use. In order to give a reliable presentation of Roman life and Roman ambience, it is necessary to be as accurate as possible concerning the details for building and decoration, especially in the unconditional use of ancient building materials and ancient craft skills. This has been achieved in Carnuntum with experimental archaeology. Experimental archaeology here means making history comprehensible in the original location using the methods and techniques of ancient Rome. From the very beginning, an important aim for the implementation in Carnuntum was not to simply build up a single edifice, but to give the visitors the impression of a densely built-up Roman city quarter, with all its twists and turns, with courtyards, large-scale roof areas etc. from a single era, namely the 1st half of the 4th century AD. Apart from the restoration of three Roman paved roads and the erection of partially rebuilt residential buildings and offices, a further three structures have been reconstructed since 2005 as models in situ following the archaeological features on a 1:1 scale: a dwelling, a villa urbana and the public baths.

\textsuperscript{17} HUMER 2009a; HUMER 2012a (in print).
In contrast to many other former Roman towns along the Danube limes (Regensburg, Passau, Linz, Vienna, Budapest), the structures in Carnuntum were not built upon in the Middle Ages and in modern times, but became important sources of stone. The stone material was removed and used for other buildings. The Roman stones from Carnuntum are to be found in many other structures in the region: in Romanesque religious buildings in Petronell, Bad Deutsch-Altenburg, Hainburg and Wildungsmauer (fig. 15), as well as in the medieval town walls of Hainburg and Bruck an der Leitha, or in early modern castles north and south of the river Danube.

Many pictures on Roman monuments preserved on the surface show that people lived next to the remains of the Roman city for centuries. An example is the famous View of Castle and Lords and Ladies in Petronell dating from 1656 by M. Merian. This depicts the countryside and the territory that belonged to Petronell Castle (with archaeological motifs of ruins and finds). The Roman spoils used in newly erected structures and the archives of Petronell castle also show that in Baroque times the landowners used Roman remains as cheap building material.

2. Excavating the ancient city and conservation issues

It has already been mentioned that excavations have taken place in Carnuntum – with interruptions – from the middle of the 19th century. Today, Carnuntum is Austria’s largest archaeological landscape but its very substance is still under threat. Apart from destruction caused by farming, the building of edifices and roads, as well as the extraction of raw materials, the forces of nature have caused – and are still causing – further deterioration to the historical substance. Considerable parts of the ancient city in the north have been washed away by erosion caused over centuries by the Danube. Old photographs show more clearly than can be seen today how the Roman walls in places rise up over the cliffs on the steep slope above the Danube. The regulation of the river in the late 19th century allowed the almost vertical drop in the terrain to become overgrown; the former frequent erosion by floods has stopped and nowadays there are rarely mudslides. Looking at the map, one can see that not only the entire northern part of the wall of the legionary camp, but also the adjacent barracks to the south has completely disappeared (fig. 16).

18 “22 Claffter Stain im Spaziergarten … dem Maurer wegen Kalchoffen …” (entry in the accounts kept for the ruling Abensperg-Traun family for the year 1631) or “… 25 July 1675 bezahl ich denen Stainprechern Simon Weißenbach und Jacob Schnitter wegen daß sie die Perg am Plaz hinaus gegen dem Spitall eben gemacht haben …” (entry in the aforementioned book for the year 1675 that describes the levelling of Roman walls in the current excavation area in a residential part of the civilian city), NEDELJK 2002, pp. 214, 249.

The same situation applies to the canabae and the governor’s palace. Nonetheless, the strong Ice Age gravel terrace upon which Carnuntum is located, with slopes steeply running down towards the Danube, offered an important natural advantage in Roman times over the flat countryside north of the Danube.

Today, the remains of the Roman city lie in the villages of Bad Deutsch-Altenburg and Petronell-Carnuntum. The excavations of a Roman city quarter south of Petronell Castle in the field known as “Spaziergarten” give an idea of Carnuntum’s urban structures (fig. 17).

An important aim of the Archaeological Park Carnuntum is to offer visitors today a comprehensible impression of the ancient city structure and the extent of the area it covered. Due to its very large size and the local history of excavations, the individual city quarters are also fragmented and are in a very poor state of preservation (fig. 18, 19).

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20 Humer 2011b, pp. 39–45.
It was previously almost impossible for visitors to comprehend the extent of the ancient city. Therefore, it was most urgent to conserve the few (in relation to the total extent of the ancient city, which covers some ten sq. kilometres) visible archaeological units and to exhibit them in the best possible manner. After the field archaeology investigations were completed, the excavated ancient structures were then conserved and exhibited following internationally valid measures for the archaeological preservation of monuments.

It was deemed that visitors should be given a logical explanation about the historical enlargement of the Roman city (10 km²) and so a special scientific programme started in 2005: this very interesting scientific project involved collecting all archaeological data from
old excavations, surveys, geomagnetic data and the results of other non-invasive prospection methods, aerial views and airborne laser scanning. During the first step, it was possible to reconstruct the ancient geomorphology of the landscape of Roman Carnuntum, which was undertaken by specialists from the government of Lower Austria. The next stage was the reconstruction of the whole town, based on the data that was collected previously, which was carried out in cooperation with archaeologists and IT-specialists. The final result was not only a virtual reconstruction of the whole town, but also a model version (3D, scale 1:300), which now gives every visitor of Carnuntum a good picture of the real size of the ancient town (fig. 20, 21).

3. Reconstructions in situ

These ideas are still being realised in the form of restorations, partial or full reconstructions, or in multimedia forms. Here are now four examples.

House I

After successful archaeological investigations from 2001 to 2002, this complex, which lies in the southwest part of the Open-Air Museum (fig. 22), was partially reconstructed as a
Carnuntum residential building from the 4th century AD (fig. 23). The presentation of the results, which followed the guidelines for the preservation of ancient monuments, showed that all the original features that still remained had been preserved and safeguarded. The (now visible) new wall copings are slightly wavy on top of the original foundations and at the top they have been completed irregularly. These gently sloping copings are shaped like a gable roof to ensure that rainwater runs off quickly and they thus provide a first-rate protection against the elements. The doors and the entrances are marked where they have been substantiated archaeologically. Where they can be only assumed or else regarded as an absolute functional necessity, these parts are delineated by a lowering of the wall copings.

The path levels have been made with compacted broken rock of a different grain and differentiated colouring (inner and outer areas). The addition of crushed brick, for instance, indicates functional use (heating). The remains of brick mosaics have been suggested over small areas with modern reproduced bricks.

Due to the state of preservation of the archaeological characteristics, a full-scale reconstruction of this house was not a possibility. There is only a so-called “Strukturgerüst” (structure framework) in the north-eastern corner to show the original height. The garden

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24 HUMER 2005b, pp. 245–256.
in the south (17.9 x 17.5 m) was to be entered by a veranda on its north side (tile mosaics, entrance basement to garden in situ).

Unfortunately, the fragrance of flowers and their colours are not things that the soil can conserve. The archaeological evidence shows ten circular holes with different colourings at the bottom. It is useful to re-enact this garden, showing how Roman gardens in Carnuntum could have looked 1700 years ago. At the moment, the best way to reconstruct a Pannonian garden is archaeological evidence and literary and pictorial sources from the Roman Empire. The plan of the garden and the plants chosen correspond to the customs and preferences of these times as far as we can tell from archaeological features, literary references and figurative sources.

**House II**

Parallel to these measures, the archaeological features of the adjacent building to the east of House I (House II) were preserved between 2003 and 2005. Here, a complex used as a residential building, also dating from the 1st to the 4th century AD, has been identified together with the functionality of almost all the rooms.25

In the middle of the 4th century AD, the house was rebuilt on the walls of the previous building and extended (see map 9). After completion of the archaeological investigations and following the issuing of the relevant official permits, conduits to drain rainwater and groundwater were put down according to the drainage plans that had been agreed with the authorities, as well as maintenance shafts to enable easy access to the excavation area in the future. The pipes were laid taking existing walls or building structures into consideration and damage to them was avoided. Any unavoidable crossings took place under the bottom of the foundations of the original walls, so that even here the ancient masonry was not damaged. The accumulated water runs via the drainage system to the pipes that already existed. All excavation areas and original walls were covered with geotextiles for drainage and the excavated areas filled with rough broken rock. The wall foundations have been left in situ and missing parts have been completed with modern stone material. To clarify some aspects a virtual reconstruction of the house, a completed model of the building to a scale of 1:100 was also created (fig. 24).


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*Fig. 24. 3D model House II*
Every individual stone in the outer walls has been placed by hand to make ancient non-coursed masonry (fig. 25). The stones, which were collected over the years in the whole former city area of Carnuntum, were prepared on the spot with tools. A lime mortar (mixed with quarry and river sand from the region) similar to the Roman original was made on site to create the stone walls.

It was a deliberate decision not to use freshly cut wood from a saw mill for roof structures and other parts made of solid wood, but mainly old wood from the 19th and early 20th centuries. This material was manually chopped in east Austria at this time using tools and not processed in a saw mill. Thus the wood has been treated almost completely as in ancient times. It was also necessary to collect old wood in the region over the years whenever the opportunity presented itself, for example, when barns, roof constructions in old buildings etc., were demolished. The work on the wood pieces on the spot, particularly the roof structure, was carried out by hand without the use of modern machines following ancient craft traditions (wooden joints and nails, Fig. 26).

The construction phase thus became a living journey back in time during which the Roman architecture and living could be experienced at close hand and in great detail. During the building phase, it transpired that the large roof areas accumulated enormous amounts of rainwater and it was therefore decided to collect this water using wooden, V-shaped gutters and to drain it away. Gutters have not yet been clearly documented in an archaeological context, but the fact that wood can only be preserved in certain specific circumstances in the northern Alps is a solid reason why no clear proof has been found here. The
down-pipe systems of ancient Greece also show that this problem of necessary drainage was always present, even in Mediterranean regions with much less rainfall. The roof has been covered with reproduced flat tiles and semi-cylindrical roofing tiles (*tegulae* and *imbrices*), which were modelled on original tiles found during excavations.

The foundations of many of the interior walls indicated lighter wooden frame constructions: the individual panels of a solid wooden frame were filled with suitable supporting material from the region: willow rods (available regionally: Danube riparian wetlands) or reed (available regionally near the Neusiedl Lake). Both materials were also used for reconstruction work and then hardened with clay on the outside.

![Fig. 27. The chimney on the roof ... in use](image)

The under-floor heating was reconstructed as a functioning system in the living quarters. The construction pieces used (modelled on excavated original pieces – *suspensura* slabs, *tubuli*) were fired on site, in the reconstructed kiln north of this building as part of an experimental archaeology project, and then built into the house.\(^{26}\) The bricks of the hypocaust pillars (like the excavated brick mosaics of the floors) were produced by a private company and are modelled on excavated originals. The chimneys on the roof outside have been completed with replicated pottery chimney caps (fig. 27). The most important thing in the presentation is that all the ancient techniques are fully functional. The wall painting was reconstructed in detail and the floors were re-made with *tessellatae*. Thus the house of Lucius Maticius Clemens, one of the ancient owners is now a living time travel machine (fig. 28).

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Villa urbana
From 2005 to 2007, archaeological investigations were also carried out on the northeast part of the Open-Air Museum (see maps 4–6). After earlier investigations in 1956, a steel structure was erected in winter 1988 over this location in order to protect the excavations, which conserved the archaeological features relatively well. This structure was well-adapted to the sloping terrain owing to its steel supports of different heights. To avoid the formation of hard-packed foundations, crossbeams with concrete weights attached to them were erected between the individual supports. The sides of the structure were covered with plastic tarpaulin. With the exception of the outer edges, the archaeological features were fairly well protected by this shelter for almost two decades; however, the decay of the original features could only be delayed, not prevented. The structure rose up out of the surrounding lower walls of the Open-Air Museum like a massive building. This led the visitors to believe that the shape of the steel structure reflected the original architecture of a Roman building on this
spot. From 2005 to 2007, fresh archaeological investigations were carried out and revealed that several buildings were erected one after the other at the same location (fig. 29). Interdisciplinary cooperation between archaeologists, architects, researchers, conservationists and restorers has led to the model-like reconstruction of this Roman building. In order to recreate this building as a model, it was necessary to work out how the building could have looked in ancient times. All the available archaeological information (excavation reports, floor plans with existing walls, their thickness, floor coverings and wall decorations of the individual rooms) together with possible comparable examples had to be referred to, examined and evaluated. Vitruvius’ work, which contains many indications of building materials and building techniques, was always at hand.

With all this evidence in hand, the next step was to create a possible rooftop scenario and thus consider the height of individual building structures (fig. 30).
Then all structural facts (Roman building technology, constructive and static aspects, and questions regarding the use of rooms and lighting, where the windows should be placed, or simply drainage of rainwater) were examined for their functionality. Following the above criteria, a number of possible building forms were discarded until a final total view of the edifice was produced (fig. 31).

The reconstruction of windows was one of the biggest issues. They were a sine qua non condition in order to have natural light into the rooms. Window glass was used more frequently rather than murky cast glass. One can only conjecture as to the size of the windows, particularly in Pannonia, as none of the excavated structures had walls that reached up to window height. Casements and window frames, both made of wood, have not survived. Various options (including the previously mentioned Roman examples)
had to be taken into consideration to find a window size that was both functional and formally satisfying.

There were clear features of the original floors in all the rooms. The brick mosaic stones have been produced by hand and laid with meticulous care in a bed of mortar. The crushed brick concrete floors in the living and utility rooms of the house have been reproduced and the domestic quarters have been given a clay concrete floor. Only some of the stone thresholds of the doors were preserved, the doors themselves were made as explained before, using old tools and techniques.28

The considerable remains of the original wall paintings in the interior rooms were used to reconstruct the basic decorative pattern as well as some detailed panels.29

The rooms were furnished on the basis of examples of provincial Rome (Sarcophagus of Simpelveld, reliefs, painted panels etc., Fig. 32, 33).

Apart from these three completely different private houses, three Roman paved roads, a public portico as well as public baths have been investigated and reconstructed in this excavation area over the past few years.

Public baths
From 2005 to 2007, the project continued with the archaeological investigation of the public baths (thermae) west of the villa urbana, – see maps 4–6).30 The renewed archaeological investigations revealed that the baths were erected in the first half of the 2nd century AD. Around the mid-3rd century AD, major renovations were undertaken, which undoubtedly safeguarded the functionality of the baths. In the early 4th century AD, further renovations took place. Subsequently, the building was no longer used as a bathing establishment and had other functions that could not be determined from the evidence. The public baths fell out of use at the latest when the civilian city of Carnuntum was abandoned.

28 KONECNY/HUMER/RAUCHENWALD 2012 (in print).