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Choice beef for the worshippers – the cattle record from the sanctuary of Jupiter Heliopolitanus at Carnuntum (Austria)

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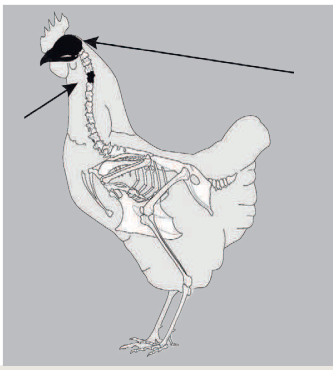

Sabine Deschler-Erb | Umberto Albarella
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ROMAN ANIMALS IN RITUAL AND FUNERARY CONTEXTS

Proceedings of the 2nd Meeting of the Zooarchaeology of the Roman Period Working Group, Basel, 1st–4th February 2018

This volume includes a number of papers that were originally presented at the conference *Roman Animals in Ritual and Funerary Contexts*, which was held in Basel (Switzerland) from 1st–4th February 2018. The conference represented the second meeting of the International Council for Archaeozoology (ICAZ) Working Group on the *Zooarchaeology of the Roman Period*.

The articles present ritually deposited animal remains across a wide geographical range and incorporate both archaeological and zoological findings. The integration of these two strands of evidence is also one of the central concerns of the ICAZ Working Group, as in the past they have often been dealt with separately. However, it is precisely this interdisciplinary cooperation that opens up new perspectives on ritual practices in a wide variety of contexts. In this volume we see the enhancement of our understanding of ritual treatment of animals in central sanctuaries, in rural areas, at natural sites, and as part of building construction processes.

The case studies presented in this volume demonstrate how animal remains such as bones and eggshells provide information beyond diet, economy, and differences in social hierarchy. Their interdisciplinary investigation additionally enables insights into practices governed by cultural, religious, and ideological conditions.

The aim of the Zooarchaeology of the Roman Period Working Group (https://alexandriaarchive.org/icaz/workroman) is to represent a network of exchange and collaboration across borders and to enable the understanding of the interconnections between the research questions associated with animal remains from this important historical period.

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DEUTSCHES ARCHÄOLOGISCHES INSTITUT
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Vorwort zur Reihe „Kolloquien zur Vor- und Frühgeschichte“

In Händen halten Sie, liebe Leserin und lieber Leser, den 26. Band der „Kolloquien zur Vor- und Frühgeschichte“, der Ihnen neu und doch vertraut vorkommen mag. Denn diese Reihe, die von der Römisch-Germanischen Kommission (RGK) und der Eurasien-Abteilung des Deutschen Archäologischen Instituts (DAI) gemeinsam herausgegeben wird, existiert seit 23 Jahren, seit im Jahr 1997 die Akten des Internationalen Perlensymposiums in Mannheim als Band 1 publiziert wurden. Neu ist aber, dass die RGK erstmals die Herausgabe eines Bandes im neuen Reihenformat des DAI betreut hat. Die Aufmachung der „Kolloquien zur Vor- und Frühgeschichte“ (KVF) entspricht nun der Aufmachung zahlreicher weiterer Publikationsreihen des DAI. Das neue Layout ist moderner, attraktiver und nutzerfreundlicher. Es ist nun für viele DAI-Publikationsreihen nutzbar und hat einerseits einen hohen Wiedererkennungswert, erlaubt andererseits individuelle Anpassungen und Nutzungen.

Auch der vorliegende Band ist, wie es seit ihren Anfängen prägend für die KVF ist, ein Beispiel international ausgerichteter, Forschungstraditionen und -regionen übergreifender Wissenschaft. Inhaltlich schließt dieser 26. Band an eine ganze Reihe von KVF-Sammelbänden mit interdisziplinärer bzw. fachübergreifender Ausrichtung an. Mit KVF 26 stehen diesmal interdisziplinäre Untersuchungen zu Mensch-Tier-Beziehungen in den verschiedenen regionalkulturellen Kontexten des Römischen Reiches im Mittelpunkt und insbesondere die Rolle von Tieren in Zusammenhang mit Bestattungen und anderen Ritualen.

Knochengewebe vermag sehr gut, viele verschiedene Spuren menschlichen Handelns zu konservieren, und diese Spuren können wir als Zeugnisse dieser Handlungen, aber auch der dahinterstehenden Überlegungen, Absichten und Traditionen verstehen. So erlauben Tierknochen, aber auch andere Überreste wie Eierschalen, die Verknüpfung zoologischer Methoden und Fragen mit jenen einer sozial- und kulturhistorisch orientierten Archäologie. Tierreste sind also in jedem Sinne *archäologische* Funde, die nicht nur zu Ernährungs- und Wirtschaftsfragen Auskunft geben können, auch nicht allein zu sozialhierarchisch begründeten Unterschieden bei Bestattungsbeigaben, sondern auch zu *per se* kulturhistorischen Fragen wie eben jenen nach kulturell, religiös bzw. weltanschaulich bestimmten Praktiken, nach Differenzen in ihrer Ausübung, nach ihren regional spezifischen Bedeutungen und nach ihren Veränderungen.

Damit liegt ein informativer und instruktiver 26. Band der KVF vor mit neuen Ansätzen, neuen Fragen und neuen Einsichten in einem neuen gestalterischen Gewand. Die Aufnahme der Reihe KVF in die einheitliche Publikationsgestaltung des DAI ermöglicht auch, diesen und weitere KVF-Bände in Zukunft in der *iDAI.world* – der digitalen Welt des DAI – unter *iDAI.publications/books* online zugänglich zu machen und zum Abruf im Open Access bereitzustellen. Zwar dient auch den interdisziplinär arbeitenden Altertumswissenschaften das gedruckt erscheinende Werk nach wie vor als Hauptmedium fachwissenschaftlichen Austauschs, doch stehen uns durch die digitale Vernetzung unterschiedlicher Daten- und Publikationsformate mittlerweile zahlreiche weitere Möglichkeiten der Veröffentlichung wissenschaftlicher Inhalte zur Verfügung. Das neue Publikationsformat ermöglicht die zukunftsweisende Verknüpfung von Print und digitalen Dokumentations- und Publikationsressourcen, z. B. durch das zeitgleiche Bereitstellen digitaler Supplemente.

Das Erscheinen von 26 Bänden in kurzen Abständen zeigt, dass die vor über 20 Jahren konzipierte Reihe erfolgreich war und ist, innovativ bleibt und in eine lebendige Zukunft blickt. Auch künftig werden Eurasien-Abteilung und RGK die Reihe „Kolloquien zur Vor- und Frühgeschichte“ im neuen Gewand und – wo sinnvoll und notwendig – als hybride Verknüpfung analoger und digitaler Wissensvermittlung fortführen. Und wie bisher werden wir in die KVF Beiträge von Tagungen und Symposien aufnehmen, an deren Vorbereitung und Durchführung wir personell bzw. organisatorisch beteiligt waren.

Zuletzt noch ein Dank an alle an der vorliegenden Publikation Beteiligten. Für die Möglichkeit im neuen Reihenformat des DAI publizieren zu können, danken wir ganz herzlichen den Kolleginnen und Kollegen der Redaktion der Zentrale. Die Bildbearbeitung der Beiträge lag in den Händen von Oliver Wagner. Johannes Gier war für das Lektorat der Beiträge verantwortlich. Lizzie Wright redigierte die englischen Texte, Hans-Ulrich Voß betreute die Drucklegung des Buches. Ihnen wie den Herausgeber*innen des Bandes danken wir sehr für die hervorragende Vorbereitung und Durchführung der Publikation.

Frankfurt am Main, den 12.11.2020

Eszter Bánffy
Erste Direktorin

Kerstin P. Hofmann
Zweite Direktorin

Alexander Gramsch
Redaktionsleiter

Preface to the series "Kolloquien zur Vor- und Frühgeschichte"

In your hands, dear reader, you hold the 26th volume of the series "Kolloquien zur Vor- und Frühgeschichte": It might seem to you different, but still familiar, because this series, concomitantly published by the Romano-Germanic Commission (RGK) and the Eurasia Department of the German Archaeological Institute (DAI), has been in existence for 23 years. The first volume, published in 1997, consisted of the proceedings of the "Internationales Perlensymposium" held in Mannheim. What is new is that the RGK has published a volume in the new DAI series format for the first time. The layout of "Kolloquien zur Vor- und Frühgeschichte" (KVF) now matches the layout of numerous other DAI publication series. This modern layout is more attractive and more user-friendly; the new format is mirrored across many DAI publication series. Not only does it have a distinctive design; it also enables individual adaptations and uses.

The present volume, as is characteristic of the KVF series from its beginnings, is an example of internationally oriented scholarship spanning diverse research traditions and research fields. In terms of content, this 26th volume continues a long tradition of conference proceedings with an interdisciplinary or cross-disciplinary orientation published within KVF. The focus of KVF 26 is on interdisciplinary studies of human-animal relationships in different regional-cultural contexts of the Roman Empire. In this, particular emphasis lies on the role of animals in burial and other ritual contexts.

Bone tissue excellently preserves many different traces of human actions. These traces can be interpreted as the evidence of these actions as well as of the underlying reflections, intentions, and traditions. Animal bones as well as other remains such as eggshells therefore make it possible to link zoological methods and issues with those related to socially and cultural-historically oriented archaeology. Animal remains are thus *archaeological* finds in every sense: They provide information not only about diet and economy, or about differences in grave goods based on social hierarchy. They touch on key cultural issues such as culturally, religiously or ideologically determined practices. Moreover, zooarchaeological analyses allow us to detect differences in these practices, to identify regionally specific meanings and the changes therein.

Thus, an informative and instructive 26th volume of the KVF series is available in a new design, including new approaches, new research questions, and new insights. In the future, through the incorporation of the KVF series into the common DAI publication design this and further volumes can be published online: on the *iDAI.world* platform – the digital world of the DAI – under *iDAI.publications/books* and in Open Access. Printed publications admittedly still serve as a main medium for subject-specific exchanges for interdisciplinary archaeological studies. The new publication format allows digital networking of various data and publication formats providing us with numerous additional possibilities for the publication of scientific content and enabling the future-oriented linking of print and digital documentation and publication resources, for example through the simultaneous provision of digital supplements.

The publication of 26 KVF volumes at short intervals shows that this series conceived over 20 years ago has been successful, remains innovative, and looks ahead to a lively future. From now on the Eurasia Department and the Romano-Germanic Commission will continue the series "Kolloquien zur Vor- und Frühgeschichte" in the new design and, where this seems reasonable and vital, in the form of a hybrid connection of analogue and digital knowledge. As in the past, in the KVF series we will continue incorporating proceedings of meetings and symposia in the preparation of which we are involved personally or organisationally.

Lastly we want to express our gratitude to all who participated in producing the present publication. We thank our colleagues from the editorial office at the Head Office of the German Archaeological Institute for the opportunity to publish in the new DAI series format. The digital imaging of the contributions was carried out by Oliver Wagner. Johannes Gier was responsible for the copyediting of the contributions. Lizzie Wright edited the English texts. Hans-Ulrich Voß was in charge of the editorial process. We are very grateful to all these people and to the editors of the volume for the outstanding preparation and realisation of this publication.

Translated by Karoline Mazurié de Keroualin.

Frankfurt am Main, 12 November 2020

Eszter Bánffy
Director

Kerstin P. Hofmann
Deputy Director

Alexander Gramsch
Head of the editorial office

Inhaltsverzeichnis

(Logo: Stefanie Deschler)

Preface

by *Sabine Deschler-Erb / Umberto Albarella / Silvia Valenzuela Lamas / Gabriele Rasbach*

This volume includes contributions that were originally presented at the conference *Roman Animals in Ritual and Funerary Contexts*, which was held in Basel 1st–4th February 2018 and organised by Sabine Deschler-Erb. The conference represented the second meeting of the International Council for Archaeozoology (ICAZ) Working Group on the *Zooarchaeology of the Roman Period*.

ICAZ Working Groups are largely informal and independent collectives of researchers engaged with a theme of common interest. Their association with ICAZ allows them to connect to a larger international community and benefit from a number of shared facilities, such as the ICAZ web page <https://www.alexandriaarchive.org/icaz/index (last access: 20.10.20)> and Newsletter <http://alexandriaarchive.org/icaz/publications-newsletter (last access: 20.10.20)>. They also enjoy the opportunity to share the ICAZ ethos of collaboration, mutual aid, and international solidarity.

The *Zooarchaeology of the Roman Period* ICAZ Working Group was originally proposed by Silvia Valenzuela Lamas and Umberto Albarella and approved by the ICAZ International Committee in 2014. The aspiration to create such a group emerged from the awareness that the Roman World was intensively connected. Nevertheless, much research on the use of animals in Roman or Romanised areas has been carried out at a localised level, often oblivious of parallel studies undertaken in other regions of Roman influence. It was clear that many of the investigated research themes – such as the use of animals in religious contexts, livestock trade, and husbandry improvements, to mention just a few – would benefit from greater integration and enhanced international synergies. This applied to the methodological approach, as well as the actual evidence from different areas of the Empire. With this objective in mind, the first meeting was organised in Sheffield (UK) 20th–22nd November 2014 by the two Working Group promoters and focused on *Husbandry in the Western Roman Empire: a zooarchaeological perspective*. The core objective of the meeting was to bring together researchers operating in different areas of the former Roman World and contiguous regions, which was successfully achieved. Some of the contributions to that conference were published in a monographic issue of the *European Journal of Archaeology* (Volume 20, Special Issue 3, August 2017).

The focus on the western Empire that characterised the first meeting led to the need to open up geographically for the second meeting and focus on a thematic investigation which would be of fully international relevance. Sabine Deschler-Erb proposed to organise the second meeting in Basel (Switzerland) and this, at the very core of Europe, proved to be a very successful location. She suggested a number of possible topics to the informal membership of the group and the theme of 'ritual' was chosen. This was another fruitful move as there was hardly any shortage of material to present, and the conference provided a whirlwind of case studies across different areas, whose connections and shared questions could clearly be identified. The objective of the second meeting to move beyond the focus on the Western Empire was fully achieved. The list of papers included in this volume clearly shows the great geographic range on display, with different contributions presenting research based in the south, north, east, and west of the Roman area. The modern countries featured in the book include Austria, Belgium, Britain, Egypt, France, Germany, Greece, Italy, Malta, the Netherlands, Romania, Serbia, Switzerland and Turkey.

The Basel conference and its proceedings should provide an ideal springboard for further success and interconnection of researchers investigating the use of animals in Roman times.

Last but not least, we would like to express our great gratitude to all of the institutions and people who made the Basel conference and these proceedings possible. We thank the University of Basel, especially the Integrative Prehistory and Archaeological Science, for hosting the conference, as well as for technical and administrative support; the Swiss National Foundation, the Provincial Roman Archaeology Working group of Switzerland, and the Vindonissa chair of the University of Basel for their financial support; the Römerstadt Augusta Raurica, the Kantonsarchäologie Aargau, and the Römerlager Vindonissa for their warm welcome and generous catering; the organisation team, Monika Mráz, David Roth, and Viviane Kolter-Furrer, whose help was essential before, during, and after the conference; all student volunteers, Florian Bachmann, Debora Brunner, Marina Casaulta,

Laura Caspers, Sarah Lo Russo, Hildegard Müller, and Benjamin Sichert, who worked with great commitment; and the Romano-Germanic Commission, Frankfurt, who accepted these proceedings for their series. We thank Hans-Ulrich Voß and Johannes Gier, who carried out an excellent editing job.

The next conference will take place in Dublin (Ireland) on 11th–13th March 2021 and will be organised by Fabienne Pigière on the topic of *Animals in Roman economy*. It will certainly provide new opportunities for cross-fertilisation, collaboration, and exchange of ideas.

Choice beef for the worshippers – the cattle record from the sanctuary of Jupiter Heliopolitanus at Carnuntum (Austria)

by *Günther Karl Kunst / Erika Gál / Verena Gassner*

Keywords

Feasting, Roman period, animal bones, oriental religion, Lower Austria

Schlüsselwörter

Feierlichkeiten, römische Zeit, Tierknochen, orientalische Religion, Niederösterreich

Mots-clés

festin, période romaine, os d'animaux, religion orientale, Basse-Autriche

Introduction

Between 1978 and 1991, in the course of extensive rescue excavations made necessary by development of the modern village of Bad Deutsch-Altenburg, large areas of the eastern *canabae legionis* of Carnuntum (Lower Austria, communities of Petronell-Carnuntum and Deutsch-Altenburg, *fig. 1*), the civil settlement surrounding the legionary fortress, were investigated archaeologically. The area investigated was over 60 000 m^2, representing about 6 % of the total *canabae* area which was estimated to be 100 ha according to prospection data[1]. The *canabae* represent one of the two civil settlement cores of Carnuntum, the *municipium* or civil town in the eastern part being the second. In the north-east of the *canabae*, in the so-called Mühläcker (Millfields) area, two sanctuaries were discovered. A smaller one, possibly dedicated to Liber and Libera, and, 80 m to the east, a larger one, identified as the sanctuary of Jupiter Optimus Maximus Heliopolitanus[2]. This latter sanctuary, which forms the subject of the present study, was investigated from 1978 until 1982. It is also sometimes referred to as the sanctuary of Syrian or oriental deities, or of the Heliopolitan Triad, and may represent the most important discovery of all of the excavations in the *canabae* area. At least north of the Alps, no other sanctuaries dedicated to Jupiter Heliopolitanus have been found so far[3], although inscriptions are known from various places[4]. Baalbek or Roman *Heliopolis*, where the veneration of Jupiter Heliopolitanus originates from, is world-famous for the colossal Temple of Jupiter and the strict axiality of its main sanctuary[5]. In the Roman Imperial period, this cult apparently spread quickly into other areas of the empire, namely into larger harbour towns of Roman Italy and

1 Doneus et al. 2013.
2 Eschbaumer et al. 2004; Gassner et al. 2011.
3 van Ess / Rheidt 2014.
4 Gassner et al. 2014.
5 Lohmann 2014.

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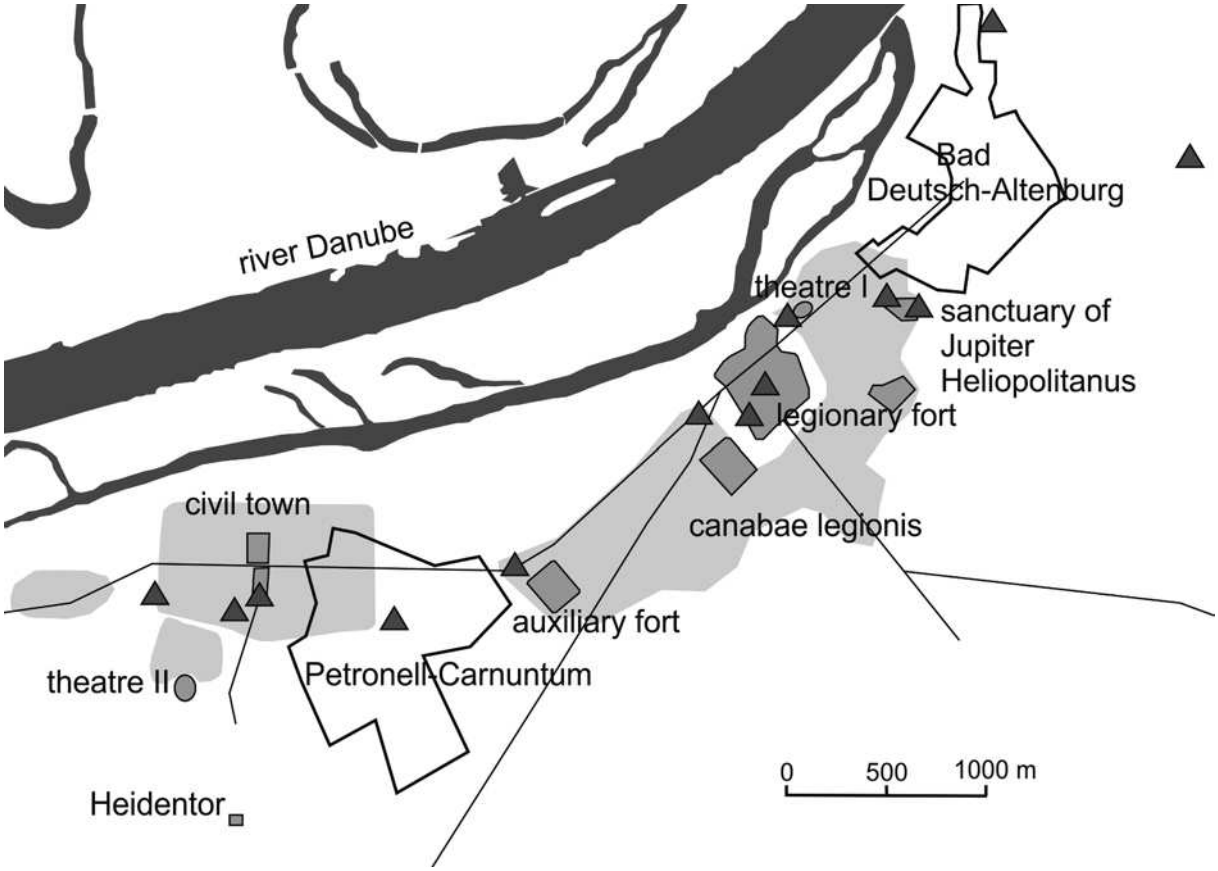


1 Generalised map of the archaeological area of Carnuntum; dark = water bodies; light grey = Roman settlement area; dark grey = major excavated structures; triangles = sanctuaries; fine lines = Roman roads; strong lines = limits of recent settlements (partly redrawn after Gugl / Kremer 2010, adapted from Gál / Kunst 2018).

into areas with a strong military presence, such as Pannonia[6].

At the Carnuntum-Mühläcker sanctuary, the identification of Jupiter Heliopolitanus as the main deity is based on epigraphic evidence from an altar fragment and from *tabulae ansatae*, which all derive from destruction layers attributed to the last phase of the sanctuary's use. For the earlier phases, the evidence for Jupiter Heliopolitanus is scanty and is limited to vases with snake-applications which also appear in the later periods of the sanctuary[7]. A second representative of the so-called Heliopolitan Triad, Venus Victrix, may be evidenced by statue fragments found in one of the pits (G7), inside layers associated with the re-organisation of the sanctuary (AD 170/180–220/230). Snake-decorated vessels, or vessels with appliques of vine branches or other 'chthonian' elements like lizards and frogs, point at the veneration of a second male deity, which is tentatively identified as Bacchus. Finds of sherds of snake- or grape-decorated vessels are already quite frequent in the early horizons of the sanctuary[8]. At Baalbek, Bacchus, the third element of the Heliopolitan Triad, was probably venerated inside a separate temple in the south of the Jupiter sanctuary[9]. At Carnuntum, it is possible that the nearby so-called sanctuary of Liber and Libera was in fact dedicated to a Bacchus-like deity[10]. According to widespread agreement among scholars, oriental religions in the Roman Empire, including Mithraeism, were not simply adopted as such but became largely modified and adapted to local traditions in a syncretistic way. Therefore, deviant practices, as referred to Baalbek, can be expected for Carnuntum as well[11].

The Carnuntine sanctuary was obviously much smaller and more simply designed than its counterpart at Baalbek, regarding the size of the temples, the general spatial extension of the compound, and the complexity

6 Gassner et al. 2014.
7 Gassner 2004.
8 Eschbaumer et al. 2004, fig. 20; Gassner 2004.
9 Lohmann 2014.
10 Gassner et al. 2014.
11 Gassner 2013.

of its layout. However, there are common features present in both sanctuaries: the veneration of the Heliopolitan Triad, the presence of a large bath inside the sanctuary, and the installation of long rows of benches inside the halls, which in both cases has led to their interpretation as banquet halls.

Excavation and geophysical prospection

Surrounded by a polygonal enclosure wall, the sanctuary occupied an area of almost 0.8 ha during its largest extension, measuring about 110 m from north to south and 90 m from west to east *(fig. 2)*. It was situated 600 m to the north-east of the legionary fortress, and 500 m to the east of the military amphitheatre. A detailed topography of the *canabae*, based on excavations and aerial photographs, presented by Doneus et al.[12] clearly indicates the peripheral position of the sanctuary of Jupiter Heliopolitanus within the densely settled agglomeration of the *canabae*. Nevertheless, it certainly appeared as a dominant landmark of the local landscape. Today, the western settlement margin of the village of Bad Deutsch-Altenburg runs across the former excavation, which was stopped in this area in 1983: the remaining lots were finally declared as cultural heritage, leaving western and central parts of the sanctuary intact, but also unexplored. To close this gap, geophysical prospection using ground-penetrating radar was applied across these remaining surfaces in 2012, yielding important results, notably the foundations of the probable central temple[13].

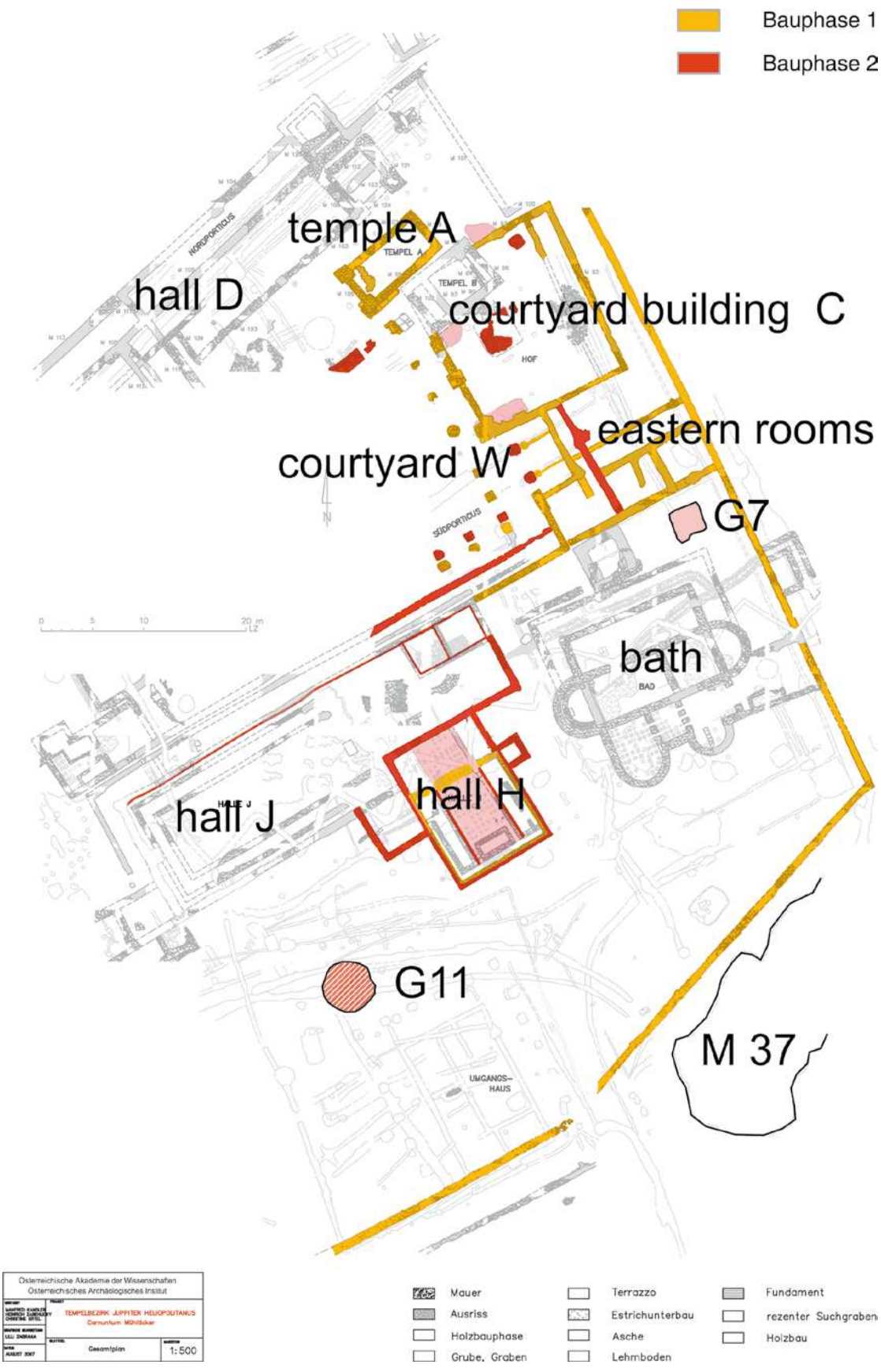
Generally, it can be said that the excavations were carried out by the standards of their time, as far as documentation is concerned. Artificial layers and section profiles were used throughout, and stratigraphic affiliation of finds has often to be constructed afterwards, from the drawings. However, both animal bones and artifacts were collected carefully by squares and depths, and often by layers. No sieving and very little sampling for botanic remains was carried out.

The ground plan of the sanctuary[14], as far as evidenced by the excavations, can be described as an array of cult-related buildings arranged around a central, trapezoidal courtyard (W), which was flanked by porticos to the east and south. Starting in the north and running clockwise to the south, around the courtyard, these buildings comprise hall D, two simple, small temples (A and B), in the east, a complex with a courtyard building (C) and interconnected rooms flanked by an exedra facing the courtyard, a small bath complex (F) and two banquet halls (H and J) in the south *(fig. 2)*. Most of these buildings were represented by important parts of the lower masonry and basements. None of them could be preserved or reconstructed after the excavations were finished, nor remains anything visible as an above-ground feature to this day.

The western part was not excavated, but from the geophysical prospection carried out, it became clear that the central courtyard, measuring a total of 22.5 x 31.5 m, was, at least finally, flanked by porticos on all sides. Most important, a large building obviously representing a temple (M) with a surrounding structure (portico or encirclement N), was situated to the west of it. Conceivably, this building represented the main temple of the sanctuary and was dedicated to Jupiter[15]. The authors suggest a possible similarity to the Apollo temple at Faimingen (Germany). Without excavations, it is not possible to integrate the structures revealed by the survey into the stratigraphic scheme worked out along the evidence from the eastern part of the sanctuary.

To summarise the evidence, all major buildings were arranged around, and accessible from, the central courtyard. To the south, a larger area inside the precinct, adjacent to the banquet halls and the bath, remained open space. The principal entrance of the sanctuary cannot be defined easily, it was tentatively localised in the north-east. Apart from that, it is likely that the central courtyard and the putative main temple were accessible from outside only via one of the minor building complexes abutting the wall[16]. This, in fact, may have been one important aspect of the religious activities.

12 Doneus et al. 2013.
13 Gassner / Steigberger 2013.
14 See e. g. Gassner 2013; Gassner / Steigberger 2013 for latest detailed versions.
15 Gassner / Steigberger 2013.
16 Gassner / Steigberger 2013.



2 Site map of the sanctuary, with some of the major features indicated; only excavated structures shown; yellow = phase 2.1.; red = phase 2.2. (source of map: Institute for Study of Ancient Culture, Austrian Academy of Sciences).

Stratigraphy

The analysis of the stratigraphy and chronology of the sanctuary, with a focus on the eastern area, was based primarily on the pottery, namely on the spectra of terra sigillata, on the fragments of wall paintings and on a careful re-reading of the field records, while coins played a minor role[17]. Accordingly, the following phases can be discerned:

- Phase 1.: During the Flavian dynasty (AD 69–96), traces of wooden architecture, i. e. small ditches, were variously observed. Definite wooden houses, interpreted as belonging to the early *canabae*, could be documented in the southern part. In the north under the later sanctuary, remains of halls, constructed in wood, were observed. They already follow the groundplan of the later sanctuary and together with the remains of a shrine under the later court-area C very probably represent the first phase of the sanctuary[18]. They were broken down at the turn of the 1st and 2nd century AD, to be followed by an interruption of settlement activity.
- Phase 2.1.: The definite beginning of the sanctuary can be attributed to the Trajanic-Hadrianic period (AD 98–138), possibly towards the end of the Trajanic reign (98–117), as indicated by rooftiles indicating the presence of a certain legion. Temple A in the east, the adjacent courtyard complex C with the interconnected rooms farther south, and the predecessor of the banquet hall H together with the adjacent porticos, were established. The principal concept of the sanctuary, cultic buildings arranged around a trapezoidal courtyard, already becomes apparent at this early stage.
- Phase 2.2.: This phase brought about local changes. These comprised reconstructions in the northern area, in the room complex in the east, where an exedra was added, in hall H in the south, where surrounding podia indicate a banquet hall, and a widening of the southern portico.

An important event in the history of the sanctuary occurred towards the end of the 2nd or early in the 3rd century AD: Many of the standing structures of phases 2.1. and 2.2., notably temple A and the courtyard complex C, were broken down. The resultant rubble was either levelled or disposed of into pits. Thus, larger areas could be prepared as buildings lots for new constructions.

This important re-organisation stage must have occurred after 170/180 AD or in the Severan period. Although it could theoretically be connected with the Marcomannic Wars (AD 166–180), the stratigraphy and the archaeological evidence indicate planned actions in the course of a deliberate abandonment, rather than a catastrophic event[19]. It was also either during these organised destruction processes, or in the course of the re-organisation of the sanctuary, that important animal bone assemblages were generated. Obviously, these two stages are causally linked and therefore cannot be clearly separated from one another.

- Phase 2.3.: During this phase, the sanctuary reached its heyday and its largest extension. Several buildings were newly erected or largely reconstructed: the small temple B just beside the destroyed temple A, the bath in the south-east, and altogether three complexes interpreted as cult halls in the north and south-west (D, H, J with benches). The central courtyard was maintained. Because occupation layers are not well preserved, the end of the buildings is difficult to establish. It may have been caused by an earthquake which occurred in the middle of the 4th century AD and was also documented elswhere in Carnuntum[20]. Other than the horizons connected to the end of phase 2.2., implying intentional demolition, the final layers of the sanctuary appear to be *in situ* destruction layers. It is unclear if the area was still used for ritual activities by this time.

17 Eschbaumer et al. 2004; Gassner et al. 2011.
18 Gassner et al. 2013.
19 Steigberger / Tober 2013.
20 Konecny et al. 2019.

Pits and levellings – contexts

In the course of the destruction event at the end of phase 2.2. and the re-organisation or new establishment of the sanctuary at the beginning of phase 2.3., the area saw important interventions into the soil. These processes were responsible for accumulations of pottery, building rubble and other types of artifacts and also, in some cases, of animal remains[21]. Waste parts were either dumped into pits or basements, or levelled horizontally. For instance, a series of pits and former basements of altars or statues in the north-eastern part contained very special assemblages, indicating both organised disposal and re-use of building materials. Some of these were probably generated by teams of masons, who would reshape building blocks and left chipped-off elements behind. Other pits contained related fragments of wall plaster and/or wall paintings, which allowed for the definition of recurrent type groups. Another category of pits was obviously linked to ritual activities. Its main representatives are pit G7 in square C/35 and pit G11 in square L/29. Because these two contexts yielded the most remarkable animal bone samples of the whole sanctuary, they will be introduced in more detail. Both were filled up during the re-organisation phase and are situated in the southern part of the sanctuary, on the backside of buildings surrounding the central courtyard, but still inside the *temenos* wall.

Pit G7 in square C/35 is a roughly rectangular (3.00 x 3.25 m) pit[22], situated just south of the eastern room complex, possibly close to one entrance, and only a few meters away from the wall. Because its sides go down perpendicularly, G7 could also be categorised as a shaft and may have originally represented a well. In 1979, excavations were stopped at a depth of 1.80 m before the bottom was reached. The fill was described as rather homogenous and loamy with burnt rubble, however pictures show different layers which gently slope towards the centre. On its top, G7 was sealed by a levelling layer containing brick and mortar fragments, with a thickness of up to 0.20 m. It probably resulted from the destruction of the eastern buildings and covered most of this area[23]. Matching potsherds from different depths make is seem likely that the fill was brought in during a single event. The terra sigillata, dominated by beakers, comprise freshly broken sherds, while reworked specimens are almost absent. They cover a time span of about AD 180–230. Coins indicate a *terminus post quem* of AD 175/176. Statue fragments, most notably the head of a probable Venus Victrix, and a fragment of a small voodoo doll[24] range among the more spectacular finds. Among the snake-decorated pottery, one krater could be almost completely restored. A fragmentary *dipinto* "IO", painted in red on white plaster, may be complemented as Iuppiter Optimus Maximus, another common indication for Jupiter Heliopolitanus. Animal bones, charcoal, brick chippings and fragments of other building materials and of wall paintings are dominant in the fill. The mentioned finds and the spectra of the terra sigillata and animal bones, however, indicate a special background and intentional deposition, at least for parts of the assemblage.

Pit G11 in square L/29 was situated in the southern part which remained open ground throughout the whole use period of the sanctuary. It was about 15 m to the south-east from banquet hall H, and 20 m away from the southern *temenos* wall *(fig. 2)*. The stratigraphy, finds and interpretations of G11 are extensively discussed by Gassner[25]. The pit is almost perfectly circular in outline. Other than G7, it was not touched by destruction events or levellings. Rather, the pit cuts into the ground from a layer designated as antic humus, probably corresponding to phases 2.1./2.2. Its walls go down perpendicularly for 0.3 m, and then gradually taper towards the centre. Excavations were stopped at a depth of 3 m when the bottom of the fill was reached. The whole, relative depth of the pit reaches down for more than 2 m. Because no erosion debris was allowed to accumulate, the pit was probably filled immediately after its construction. The sedimentary sequence of the fill is documented by drawings and photographs *(fig. 3)*. From the bottom, it starts with a thin ashy layer, to be followed by a thick horizon of burned clay and fragments of secondarily burned mud bricks. Since no traces of heating were recognised in the wall, all burned objects must have reached the pit in an already cooled state. Locally, animal bones were deposited above this horizon. Separated by a dark loamy layer, a second horizon of burned clay or mud brick follows, overlaid by a densely packed layer of animal bones. The heat influence on the animal bones was variable, but mostly moderate and it exhibits no clear pattern, affecting only a minor portion of the sample *(figs 4 and 5)*. Fragments of unburnt wall paintings were frequent in both horizons with mud bricks. More loamy layers fol-

21 Gassner et al. 2011, 143–145; Steigberger / Tober 2013.
22 Eschbaumer et al. 2004, 134–136, Gassner et al. 2011, 146–148.
23 Eschbaumer et al. 2004.
24 Gassner 2008.
25 Gassner 2013.

3 Pit G11 during excavation (1981); dense concentration of animal bones in centre of section.

low on top. Probably these also belong to the primary fill of the pit. This sequence of alternating layers of burnt mud, brick debris and loamy horizons points at an intentional, quick fill process. Or, possibly, of two fill events following each other quickly.

Most of the archaeological finds derive from the two layers with mud bricks, showing a strong uniformity in composition. This further indicates that the fill was intentionally created in the course of a single action. The few coins give a *terminus post quem* of AD 178/182. The terra sigillata assemblage indicates a time-span of AD 170/180–210/220. Again, drinking vessels and other types of tableware prevail among the terra sigillata. Fragments of kraters with snake and grape appliques, and of plates and jars used for baking and cooking, further enhance the 'culinary' character of the pottery assemblage. It can be clearly distinguished from samples normally met at Carnuntum. As a direct sign of cult, a graffito "IOM" (Jupiter Optimus Maximus) was identified on one cooking pot. The idea of common meals attended by many people makes sense regarding the vicinity of hall H, identified as a banquet hall by its architecture. Small finds are represented by rings, medical tools, and lamp fragments. While the direct indicators of ritual activity are less pronounced than in G7, the collection of animal remains is many times larger. The scarcity of building rubble is another important difference to the fill of G7.

Both pits are classified as ritual pits, or as pits related to special aspects of ritual behaviour, namely common feasting, both in summarising reports[26], and in separate articles devoted to certain find groups[27]. The events responsible for the creation of these assemblages were probably linked to special and critical stages in the development of the sanctuary, either to closing ceremonies at the end of phase 2.2.[28], or to the establishment of the final sanctuary of phase 2.3. If such feasts had happened on an annual basis many more contexts of this kind were to be expected. Although the animal bone assemblages have little in common regarding species composition, the whole setting, a large pit filled up with putative feasting remains, bears some resemblance to the situation found in a pit at the Mithraeum at Tienen (Belgium), carefully described by Lentacker et al.[29].

26 Eschbaumer et al. 2004; Gassner et al. 2011.
27 Gassner 2004; Gassner 2013.
28 *Riti di chiusura*: Gassner 2013, 230.
29 Lentacker et al. 2004.

4 Random sample from pit G11, with many complete and well preserved bird bones and cattle bones. Some specimens with signs of heat influence. Prior to sorting and study, December 2006.

5 Representative random sample from pit G11, exhibiting little heat influence. Prior to study, December 2006.

The large, irregular pit or pit-group from square M/37 (in the following: M/37) is situated just outside the south-eastern *temenos* wall. Rather than representing a single, defined object like G7 and G11, M/37 represents a group, or partly intersecting sequence of shallow, irregular pit-like structures. It probably received much material influx from outside. M/37 nevertheless shows some influence from the sanctuary, e. g. the presence of snake-decorated pottery[30], but late antic glazed ware is also present. This object was obviously disturbed in the late 3rd c. AD. The available archaeological documentation does not allow for a further resolution of the stratigraphy.

Material and methods

All available animal remains from the Mühläcker area were collected by hand. As far as can be judged from the composition of the bone samples, recovery and collection were certainly carried out very diligently. Even within large samples, which are dominated by big bones of cattle or equids, the dusty remnants present in the bottom of sample bags may contain tiny fragments and elements e. g., digits of domestic chicken. Archaeological data for each faunal sample were carefully recorded, in a fashion analogous to the artefacts, which is likewise remarkable for the standard of the time. However, at the present state of stratigraphic research on the sanctuary, these excavation data cannot be easily translated into an internal stratigraphic scheme for the pits. The records indicate squares and depths, but no information on specific layers. Therefore, the respective pits G7, G11 and M/37 had to be used as the smallest analytical units. This does not exclude the future possibility to discriminate between areas or layers of the fill, namely in G11. Here, discrete bone layers are visible in the drawings and photographs and are also recorded in the excavation diaries, but sampling was not carried out according to a stratigraphic scheme, or at least not in a straightforward fashion. To sum up, the samples from the Mühläcker sanctuary are comparable, by and large, to other faunal materials recovered in the Carnuntum area during more recent decades. Recovery bias, especially concerning the size of skeletal parts, may be low for medium-sized and larger mammals, but may be more important in birds. Obviously, the recovery was not done selectively, and no sorting out of 'unattractive' fragments or other specimens deemed as unimportant occurred. The state of preservation can be, generally, regarded as good, if not extraordinary, especially in the pits G7 and G11 *(figs 4 and 5)*. It allows for an easy recognition and assessment of surface conditions, notably cut marks and traces of burning.

Regarding the choice of animal bone samples from the sanctuary of Jupiter Heliopolitanus to be studied in the course of an interdisciplinary project (2011–2013), it

30 Eschbaumer et al. 2004, fig. 20.

was decided to focus completely on the remains from the pits. This made sense because both G7 and G11, together with a series of smaller pits, produced the largest zoological assemblages of the sanctuary, and because the pottery and other finds from these contexts had been studied before. This provided a sound basis for chronology and further interpretations. For the sake of comparison, the material from M/37 was also integrated, although the lack of stratigraphic and functional information represented important shortcomings. It was included for two reasons. Firstly, it produced a bone assemblage of dimensions comparable to G11. Secondly, it provided an ideal outgroup for the comparison with the contexts inside the encirclement. Obviously, M/37 contains elements, namely partial or disarticulated skeletons of dogs and equids, which are incompatible with the idea of feasting remains. Rather, the whole assemblage from M/37 may correspond to a mixture of remains to be expected in peripheral areas of settlements (dumping of carcasses of equids and dogs and other noxious rubbish), and of bone debris specific for the sanctuary. The remains of dogs and eqids could likewise represent intrusive late antique admixtures. The animal remains from the levelling layers and smaller pits inside the sanctuary have, mostly, not been studied or checked so far.

Data collection and recording, including bone measurements, were carried out according to standard procedure[31], and by using a comparative collection. For all specimens, bone weights were recorded to the nearest 0.1 g. The quantification methods used are specimen counts (NISP) and bone weights. In theory, a calculation of minimum numbers of individuals (MNI) makes sense, too, especially in a ritual or 'feasting' setting. For domestic chicken in G11, it was estimated to be 193. Due to the state of research, no further MNI-values can be given for the other species.

Apart from some of the bird remains, the material did not present major challenges for its identification. Regarding the main domestic mammals, a pragmatic stance was adopted. The samples, especially those from G7 and G11, did not provide many opportunities for the discrimination of sheep and goat. Because remains of red deer are rare, domestic cattle is practically the only artiodactyl species within its size group. Nevertheless, only fragments exhibiting sufficient diagnostic properties were classified to species level. This may be especially critical in the case of long bone splinters, axial elements and juvenile specimens. Because of the special focus on axial remains from cattle as far as butchery marks are concerned[32], the percentage of vertebrae and rib specimens actually attributed to species level may be higher here than elsewhere. We believe that such considerations should be explicitly addressed. The axial remains of mammals were not completely recorded throughout the whole material. In G7, they were studied in total, whereas they are yet unrecorded for M/37. In G11, they were recorded for about two thirds of the samples (see below). Consequently, overall abundances and skeletal part frequencies were only calculated for these samples. Otherwise, the percentages of taxonomic groups well represented by vertebrae, ribs and sternebrae, that is cattle and, to a lesser degree, caprines, would be strongly underestimated. In the given context, the exclusion of the mammalian axial skeleton would mainly raise percentages of domestic chicken and other birds. This problem is felt less for M/37. Here, the frequencies of axial elements are considerably lower, and the number of taxa affected by the exclusion is higher. Nevertheless, it must be kept in mind that the percentages of cattle, equids, caprines, pigs and dogs are probably underestimated in M/37. Skeletal part representation was assessed by using the relative weight of skeletal parts, relying on the values published by IPNA (Integrative Prähistorische und Naturwissenschaftliche Archäologie) in Basel (CH)[33]. In using this method, the weight percentages of skeletal areas for a taxon within the sample are compared to a standard, which is represented by one or more complete skeleton(s). Thus, it is possible to include elements which are otherwise difficult to count, and to circumvent the effects of differential fragmentation.

31 E. g. von den Driesch 1976.
32 Kunst 2013; Kunst 2015.
33 Website: https://duw.unibas.ch/de/ipna/forschung/archaeobiologie/archaeozoologie/methodik/ (consulted in February 2020).

Previous research on animal remains from the sanctuary

Previous studies of the zooarchaeological material from Carnuntum-Mühläcker were devoted to selected contexts, special categories of finds, certain taxonomic groups or other aspects of the assemblages.

A first report on the animal remains from pit G7, including basic quantitative data and taxonomic composition, was provided by Fegerl in her diploma thesis[34]. In an article devoted especially to pit G11, Gassner makes reference to a cursory assessment of the quantitative composition of the animal bone assemblage, carried out by the first author[35]. Also from G11, a very limited, but remarkable collection of worked bone specimens was described by Gál[36]. It comprises a flute carved out of a goose humerus and a metacarpus of a horse which might represent a little used bone skate. Apparently, bone artefacts are otherwise rare in layers from inside the sanctuary. The avian assemblage from pit G11 was extensively presented by Gál and Kunst[37]. Apart from pathologies and bone modifications, an emphasis was put on the osteometry of domestic chicken. On the basis of the measurements of sexed tarsometatarsi, two size groups of domestic chicken were identified. The dominance of male over female birds, together with the scarcity of pigs, was taken as an evidence for the Eastern origin of the local feasting habits. The dominance of cattle remains over caprines was recognised as a difference to published reports from Mithraea. According to the skeletal part representation, the birds were slaughtered inside the sanctuary. Pathological conditions of mammalian remains are treated in Gál and Kunst[38]. While bones from M37 displayed a variety of pathological lesions among cattle, sheep, equids, and dogs, healed fractures on cattle ribs are the dominant category observed in G11. This was deemed to be related to the young or prime slaughter age prevalent in this context. It can also be seen as independent evidence that these cattle remains derive from a close-knit, selected population. The mammal remains from G7 are practically devoid of pathological lesions. Two more studies were devoted to the butchery pattern of the axial skeleton of cattle from pit G11[39]. The distribution and categories of butchery marks indicate that cattle carcasses were butchered and, at least as far as the axial parts or rumps are concerned, consumed inside the sanctuary, and that these procedures followed a uniform pattern. Admittedly, the investigations on the animal remains from the sanctuary, along with the studies on the stratigraphy and artefacts, are far from being completed. In the following, some of the more important general aspects on the animal remains from G7, G11 and M/37 will be provided.

Overall species composition

Given the time of excavation and the large amount of material, the presentation of basic data needs some comments *(tab. 1)*. First of all, it must be kept in mind, that in the cases of G7 and G11, only a part of the pits were excavated. The objects were sectioned in the middle, or quartered, in order to draw the profiles, a typical procedure before the adoption of the stratigraphic excavation method. For safety and economic reasons, parts of the fill were left *in situ*. The amount of this material loss is difficult to estimate, but may be more than half of the bones in both cases. Still, the available samples are important and contain more remains than any single settlement features from the nearby civil town.

34 Fegerl 2008.
35 Gassner 2013.
36 Gál 2013.
37 Gál / Kunst 2014.
38 Gál / Kunst 2018.
39 Kunst 2013; Kunst 2015.

NISP											
	Bos	Ovis/ Capra	Sus	Gallus	Anas	Anser	other birds	Equus	Canis	other	total
G11	5810	344	19	429	24	344	5	143	37	48	7203
G7	1151	56	10	46		46	1	4	1	2	1317
M/37	1586	257	105	120	5	77	2	126	128	15	2421
Bone weight (g)											
G11	163 137.90	2871.80	279.70	1083.30	48.60	1552.70	7.10	7546.60	463.10	416.30	177 407.10
G7	35 917.38	415.20	63.70	97.00		173.90	0.60	337.30	27.63	13.30	37 046.01
M/37	63 746.10	3071.70	2348.90	236.90	12.90	350.60	1.20	11 392.10	2653.10	492.60	84 306.10

Tab. 1 Basic data for G7, G11 and M/37.

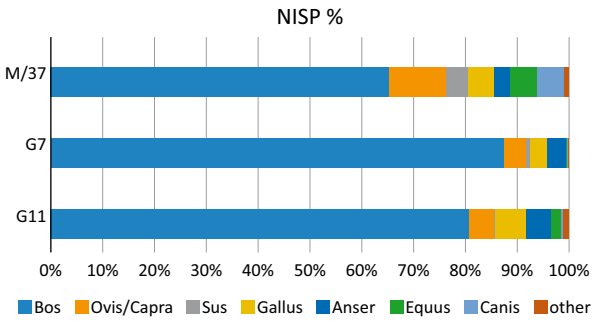
By comparison, the overall sizes of the two pits inide the sanctuary do not differ that much, although G11 exhibits more depth than G7. Regardless of how much bones were left unexcavated in the former, the total values (NISP, bone weight) are many times larger in G11. Apparently, this is due to an extraordinarily high density of bone finds within this feature, as evidenced from photographs and drawings. Because modern methods were lacking during the time of the excavation, it is however impossible to actually indicate a value for the amount of bone finds per volume. M/37, certainly, occupied a much larger area than both G7 and G11.

These large volumes are also caused by the excellent preservation conditions within the spacious pits, as indicated by pictures of random samples from G11 *(figs 4 and 5)*. Further, the state of recording is not comparable across the contexts. In G11, axial elements were only identified in parts of the material. The results presented in *figures 6–8* for G11 are therefore based on only those samples where the elements of the mammalian axial skeleton were identified. As can be illustrated by the random sample *(fig. 5)*, axial elements, especially cattle ribs, account for an important part of the material from G11. Because the bird remains and the mammal bones without the axial skeleton have been studied for the whole sample, the total NISP and total bone weight for the whole material recovered from G11 can be estimated. According to this, the samples with the axial skeleton studied make up between 54 % (domestic chicken) to 68 % (cattle) of the total material. The respective percentages for the bone weights are 57 % (domestic chicken) and 72 % (cattle). The total NISP of G11, therefore, can be estimated between 10 593 (based on the cattle remains) and 13 339 (domestic chicken). For the weight of the identified bones, the estimated values are between 246.4 kg and 311.2 kg, respectively, that is more than a quarter of a ton. The different results obtained from the chicken and cattle remains indicate that the faunal elements, notably chicken and cattle are not evenly distributed across the fill of the pit. This is compatible with the idea of a quick fill, which might preserve spatial signals of different dumping episodes. Hopefully, this can be worked out in detail once the internal stratigraphy of G11 is better understood.

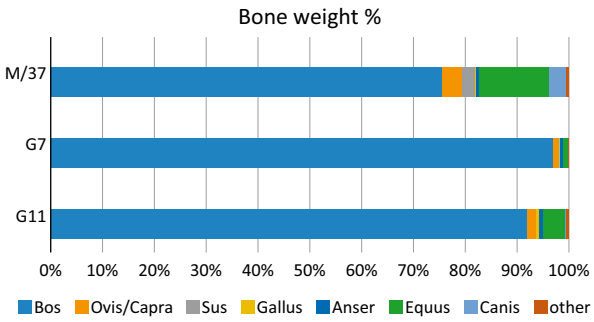
Also in M/37, axial elements of mammals have not been identified so far. The results for M/37, therefore, may not be strictly comparable to the other two pits. Based on a cursorial knowledge of the material, the exclusion of axial parts affects the dominant species groups cattle, equids and dogs to about the same degree. Therefore, the inclusion of the axial parts of mammals would significantly lower the percentages of domestic chicken and goose in M/37.

The results for percentages of NISP *(fig. 6)* exhibit the most complete dominance of cattle in G7 with 87 %, to be followed by 81 % in G11, whereas M/37 shows a more balanced distribution with cattle reaching 66 %. Pigs make up over 4 % of the total for M/37. For G11, the inclusion of axial elements certainly enhanced the percentages of cattle as compared to previous estimates. It is nevertheless remarkable that the overall percentage of all birds counted together amounts to about 11 %, which is not too far away from 16 % which were based on a test sample only superficially screened by the first author[40].

40 Gassner 2013, fig. 10.



6 Carnuntum-Mühläcker, relative species composition according to NISP, in pits G7, G11 and M/37.



7 Carnuntum-Mühläcker, relative species composition according to bone weight, in pits G7, G11 and M/37.

It is this dominance of cattle, together with the high percentages of domestic birds, which can be valued as the most significant aspect of all the Mühläcker samples. Otherwise in Carnuntum, high abundancies of domestic birds often coincide with high percentages of pigs and caprines, and are often antagonistic to cattle[41].

As previously observed, the scarcity, if not quasi absence, of pigs is another major aspect of G7 and G11. This sets them apart from most other samples throughout the Carnuntum area and beyond, and is most likely related to a specific ritual behaviour, such as food prescriptions in connection with the local cult. Unfortunately, no faunal data is available for Baalbek. The small presence of equids and canids in G11 should not be ignored. Their presence casts doubt on the strict homogeneity, or single origin, of these assemblages. Along with other 'rare' elements like hares, bear, and other wild mammals, it cannot be judged if they derive from feasting events or rather represent erratic finds. At least the few dog remains are represented by associated bones and may result from disarticulated carcasses. Judging from the find numbers, both dogs and equids are limited to certain areas within the fill.

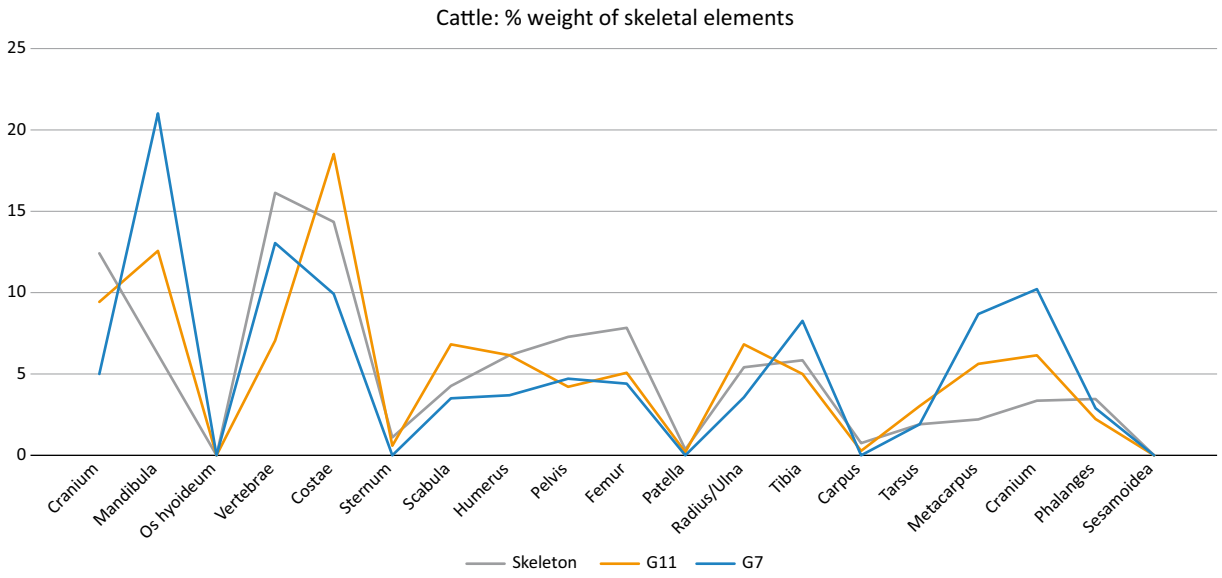
Quite likely, a certain amount of residual or intrusive elements can be assumed for G11, which is all the more plausible if we think of the large dimensions of this structure and the overall size of the sample. In this respect, G7 forms the most clear-cut feasting assemblage. Nevertheless, the principal similarity regarding species distribution between G7 and G11 appears to be the most noteworthy result, and it is also based on large assemblages in both cases. On the other hand, M/37 may really be a mixed assemblage made up of different sources: the high chicken and goose abundances may be due to the bone influx from the interior of the sanctuary, while equids and dogs could be related to the 'peripheral' taphonomic setting, where carcasses are dumped on the outer area of a clustered settlement.

As would be expected, the percentages of the larger species cattle and equids are higher in the weight diagram *(fig. 7)*. The dominance of cattle in G7 becomes even more accentuated, thanks to the quasi absence of equids.

Skeletal part representation of cattle

As outlined above, skeletal part representation was assessed by using weight percentages of skeletal areas. The comparative values were only calculated for G7 and G11 and show some remarkable trends *(fig. 8)*. Some element groups exhibit values surpassing two or three times the expected value. These observations are based on sufficiently large samples (35 and 160 kg, respectively). The favourable preservation conditions make it likely that most of the bias observed in skeletal part representation is due to human activity. Marks resulting from carnivore gnawing are almost absent.

41 Protective, fine-grained vs. "coarse" taphonomic settings; Kirchengast 2019; Abd El Karem et al. in print.



8 Carnuntum-Mühläcker, cattle, relative weight percentages of skeletal areas in pits G7 and G11, compared to a complete skeleton.

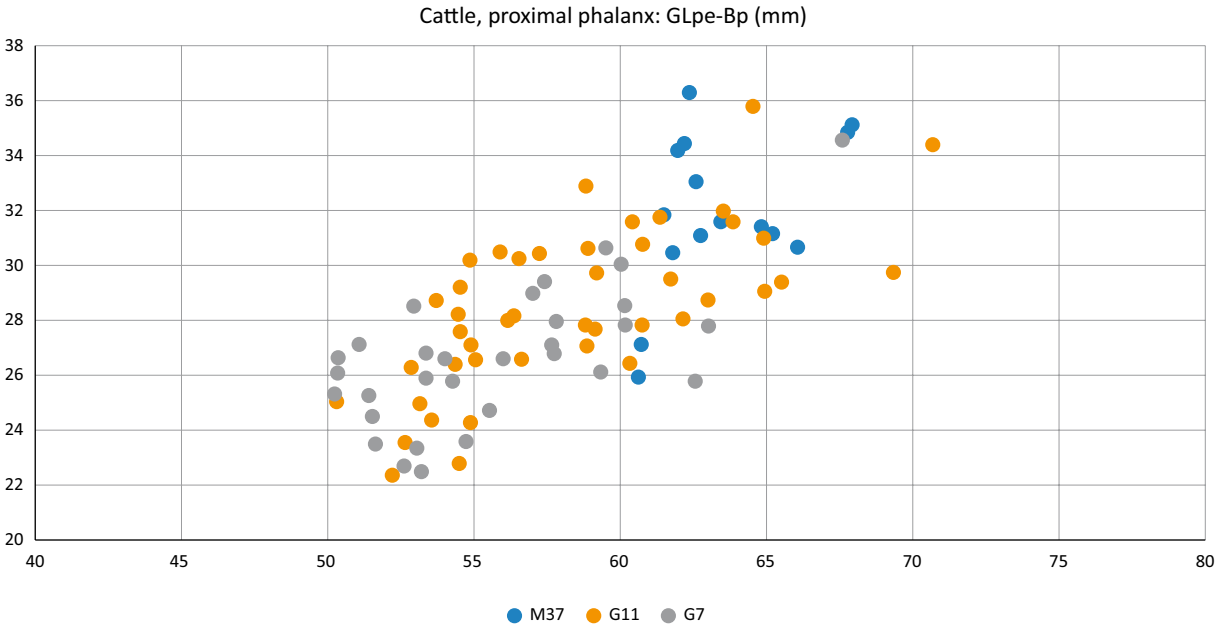
– G7: Very marked over-representations can be observed for the mandible and the metapodials, less so for the tibia; strong deficits occur in the upper skull; they are less accentuated in the long bones and the pelvis. The values for vertebrae and ribs, although being below their natural percentages, can even be described as good, given their frequent deficit in assemblages. Further, they appear in the natural proportion relative to each other. This pattern indicates a mixture of waste parts (mandibles, metapodials) and bones related to consumption (axial skeleton). For the long bones and the girdle elements, the pattern is not so clear. Possibly, slaughter occurred at the site, but certain parts were removed elsewhere, notably the upper skull. Horn cores are definitely absent, also practically missing from G11. Since no polled cattle are known from the Carnuntum area, but accumulations of horn cores are frequently met within the civil town[42], this indicates the active removal of these parts of the skeleton out of the sanctuary, or, at least, away from the pits. Horns and skins may have provided an additional income for the sanctuary.
– G11: The general picture appears to be more balanced here, the only strong over-representations can be observed for the mandible and the scapula, and also for the metapodials. The trend is less marked for these elements as compared to G7. A strong disequilibrium is extant for the ribs (slightly over-represented) and vertebrae (marked deficit). The radius/ulna and humerus occur close to their expected values, while pelvis and femur are in deficit. Their values correspond exactly to those met in G7.

This picture cannot be attributed to a single cause or function alone, because both waste parts and meat-bearing bones are over-represented. Like in G7, it can be assumed that the animals were slaughtered at the site, significant parts were removed, and both carcass parts resulting from primary butchery and bones related to consumption were dumped locally. Another similarity to G7 can be seen in the disparity between anatomically connected parts, although here vertebrae (deficit) and ribs (accumulation) are affected.

The skeletal element patterns extant in both contexts point at deliberate, systematic attitudes towards the carcasses. These results should be supplemented with observations on butchery traces. This has already been tried for the ribs and vertebrae from G11, which show a marked degree of consistency[43].

42 E. g. Radbauer / Kunst 2011.

43 Kunst 2015.



9 Carnuntum-Mühläcker, cattle, Bivariate scatterplot of proximal phalanx, Greatest peripheral length (GLpe), horizontally – proximal Breadth (pB), vertically.

Size trends in cattle

In many parts of the Roman Empire, and notably in Central Europe, the remains of cattle exhibit an important size variability, which is mostly explained by the synchronous presence of 'Roman' and 'native' cattle. This issue represents a long-term, recurrent *topos* in Roman zooarchaeology[44]. In the case of the Mühläcker sanctuary, the proximal phalanges provided an opportunity for the comparison of a sufficient number of measurable bones. Although, as a whole, including four different anatomical elements (anterior/posterior, medial/lateral), they can be used to assess overall size trends[45]. By and large, all three pits together cover the whole variability known from elsewhere in Carnuntum and other sites from nearby Pannonia and Noricum, maybe without extreme outliers[46]. However, the data points for each of the three contexts are not distributed equally across the whole field *(fig. 9)*. With a few exceptions, the values for G7 occupy the lower part of the distribution and may correspond to the local or 'native' breed, including female and male specimens[47]. The scatter for G11 covers the whole variation of the site, but the majority of data points occupy the lower part of the range. It therefore seems that local breeds, possibly imported from the Barbaricum, were preferred for slaughter and consumption in the sanctuary. The proximal phalanges from M/37 are concentrated in the upper part of the distribution. Possibly, mainly Roman types are represented here. This is also indicated by the presence of bones from elderly animals with pathological lesions from this context[48]. They may represent draught oxen, the meat of which was not consumed in the sanctuary. Clearly, no phalanges with pathological conditions on the proximal articulations were included into the diagram. There is indeed very little size overlap between the specimens from G7 and M/37. Such size differences among samples of cattle bones from the same site appear to be rare. Larger samples from the civil town of Carnuntum tend to include the whole Roman variation, whereas in rural producer sites, the Roman breed may be the only one represented[49]. Rather than linked to the chronological position, the occurrence of small and large cattle types appears to be more closely linked to site function. Pucher has previously reported all of the known local Roman size variation, including measurements for the proximal pha-

44 E. g. Peters 1998; Breuer et al. 1999; Pucher 2016.
45 E. g. Lepetz 1997, fig. 18.
46 Kunst 2014, fig. 41; Kirchengast 2019.
47 E. g. Pucher 2016.
48 Gál / Kunst 2018.
49 Riedel 2004; Kunst 2014.

lanx, for Bruckneudorf, which allegedly yielded material from the 1st century AD only[50]. This site is less than 20 km away from Carnuntum. The almost exclusive presence of the small breed or type within an uncontested Roman context, like G7, and its dominance in another (G11), therefore appears all the more noteworthy.

Conclusion

Overall, the results from species composition, skeletal part representation and body size distribution corroborate the idea that these three contexts, or at least G7 and G11 from inside the sanctuary, were each accumulated in the course of individual, short-termed events. Possibly, they are only representative for a special phase in the history of the site. Notably G7 may appear as a real time capsule, which preserved the remains of a single cattle population. This trend is less clearly expressed in the much larger sample from G11, while M/37 may already represent 'normal' (sub)urban features, although comparative samples from the adjacent *canabae* are lacking. Regarding osteometry, the observations on the cattle remains are somehow complementary to those made on the bones of domestic chicken. Here, the simultaneous presence of two different breeds within the same context was the main point[51]. Thus, independently of their cultural and historical relevance, faunal samples resulting from ritual activities may also provide important zooarchaeological datasets. This may be due to their organised, structured origin, which generates accumulations of animal bones processed and modified in a similar fashion.

Here, much attention has been paid to the archaeological context of the features, the stratigraphy of the sanctuary and the interpretations based on find groups other than animal remains. It may be asked if the bone assemblages from G7 and G11 would also be recognised as something 'special' or 'ritual' if this additional information was lacking. At least in G11, the large sample size would imply gastronomy, if not communal feasting. Otherwise, it is not so much a single feature, but a combination of traits which makes them stick out from those from other contexts, such as, samples from the nearby civil town. For example, samples with explicit cattle dominance may appear elsewhere, notably accumulations of long bone splinters or horn cores. But these rarely go together with a good representation of bird bones. Similar remarks could be made for the skeletal part representation and the butchery marks. For example, marks indicative for the consumption of preserved meat, otherwise dominant within urban Roman assemblages[52], are rare within the pits from the sanctuary. Therefore, a comprehensive assessment of the butchery marks present on the cattle remains may provide a strong tool in recognising special taphonomic and functional pathways.

References

Abd El Karem et al. in print M. Abd El Karem / G. K. Kunst / M.-T. Schneider, Archäozoologische Analyse ausgewählter Befunde aus dem Bereich der Thermen in Insula VI. In: A. Konecny / E. Pollhammer / A. Rauchenwald / M. Großmann (eds), Die Therme in der Insula VI der Zivilstadt von Carnuntum (in print).

Breuer et al. 1999 G. Breuer / A. Rehazek / B. Stopp, Grössenveränderungen des Hausrindes. Osteometrische Untersuchungen grosser Fundserien aus der Nordschweiz von der Spätlatènezeit bis ins Frühmittelalter am Beispiel von Basel, Augst (Augusta Raurica) und Schleitheim-Brüel. Jahresberichte aus Augst und Kaiseraugst 20, 1999, 207–228.

Deschler-Erb 2006 S. Deschler-Erb, Leimsiederei- und Räuchereiwarenabfälle des 3. Jahrhunderts aus dem Bereich zwischen Frauenthermen und Theater von Augusta Raurica. Jahresberichte aus Augst und Kaiseraugst 27, 2006, 323–346.

50 Pucher 2016.
51 Gál / Kunst 2014.
52 E. g. Deschler-Erb 2006.

Doneus et al. 2013 M. Doneus / C. Gugl / N. Doneus, Die Canabae von Carnuntum. Eine Modellstudie der Erforschung römischer Lagervorstädte. Der Römische Limes in Österreich 47 (Wien 2013).

Eschbaumer et al. 2004 P. Eschbaumer / V. Gassner / S. Jilek / M. Kandler / G. Kremer / M. Pfisterer / S. Radbauer / H. Winter, Der Kultbezirk des Iuppiter Optimus Maximus Heliopolitanus in den östlichen Canabae von Carnuntum. Carnuntum Jahrbuch 2003 (Wien 2004) 117–167.

Fegerl 2008 K. Fegerl, Archäozoologische Untersuchungen eines Fundkomplexes aus dem Tempelbezirk des Jupiter Heliopolitanus von Carnuntum. [Unpubl. Diploma Thesis, University of Vienna] (Wien 2008).

Gál 2013 E. Gál, Two Bone Artefacts from the Sanctuary of Iuppiter Heliopolitanus in Carnuntum (Lower Austria). In: F. Lang (ed.), The Sound of Bones. Proceedings of the 8th Meeting oft he ICAZ Worked Bone Research Group in Salzburg 2011 (Salzburg 2013) 107–115.

Gál / Kunst 2014 E. Gál / G. K. Kunst, Offered to Gods, Eaten by People. Bird Bones from the Sanctuary of Jupiter Heliopolitanus in Carnuntum-Mühläcker (Austria). International Journal of Osteorarchaeology 24, 2014, 336–346.

Gál / Kunst 2018 E. Gál / G. K. Kunst, Pathological Observations on Mammalian Remains from the Roman Sanctuary at Carnuntum-Mühläcker (Austria). In: L. Bartosiewicz / E. Gál (eds), Care or Neglect? Evidence of Animal Disease in Archaeology (Oxford 2018) 45–60.

Gassner 2004 V. Gassner, Snake-decorated vessels from the canabae of Carnuntum. Evidence for another mithraeum? In: M. Martens / G. De Boe (eds), Roman Mithraism. The Evidence of the Small Finds. Archeologie in Vlaanderen Monografie 5 (Brussel 2004) 229–238.

Gassner 2008 V. Gassner, Eine Zauberpuppe aus dem Heiligtum des Iuppiter Heliopolitanus in Carnuntum. Anodos. Studies of the Ancient World 8, 2008, 221–230.

Gassner 2013 V. Gassner, Die Grube im Heiligtum des Iuppiter Heliopolitanus in den Canabae von Carnuntum. Zeugnis eines großen Festes oder „Sacred Rubbish"? In: A. Schäfer / M. Witteyer (eds), Rituelle Deponierungen in Heiligtümern der Hellenistisch-Römischen Welt, Mainzer Archäologische Schriften 10 (Mainz 2013) 259–278.

Gassner et al. 2011 V. Gassner / E. Steigberger / B. Tober, Das Heiligtum des Iuppiter Heliopolitanus in Carnuntum. Überlegungen zu den älteren Kultbauten an der Ostseite, ihrer Ausstattung und den Mechanismen ihrer Aufgabe. Carnuntum Jahrbuch 2009–2011 (Wien 2011) 129–171.

Gassner et al. 2013 V. Gassner / E. Steigberger / A. Preinfalk / F. Preinfalk, Die Frühphase der östlichen Canabae von Carnuntum. Carnuntum Jahrbuch 2013 (Wien 2013) 23–49.

Gassner et al. 2014 V. Gassner / E. Steigberger / B. Tober, Das Heiligtum des Iuppiter Heliopolitanus in Carnuntum. In: van Ess / Rheidt 2014, 98–107.

Gassner / Steigberger 2013 V. Gassner / E. Steigberger, Das unsichtbare Heiligtum. Die Ergebnisse der geophysikalischen Prospektion im Westteil des Heiligtums des Iuppiter Heliopolitanus in Carnuntum. Carnuntum Jahrbuch 2013 (Wien 2013) 9–21.

Kirchengast 2019 N. I. Kirchengast, Tierknochen im Kontext. Eine befundorientierte Analyse von archäozoologischem Fundmaterial am Beispiel von „Haus 2" in der Zivilstadt von Carnuntum [Unpubl. Diploma Thesis, University of Vienna] (Wien 2019).

Konecny et al. 2019 A. Konecny / F. Humer / K. Decker (eds), Das Carnuntiner Erdbeben im Kontext. Archäologischer Park Carnuntum, Neue Forschungen 14 (St. Pölten 2019).

Kunst 2013 G. K. Kunst, Choice and constraint. Butchery practices on cattle ribs from a Roman sanctuary at Carnuntum (Lower Austria). Archeometriai Műhely 10,3, 2013, 215–224.

Kunst 2014 G. K. Kunst, Beigaben, Müll und Bodeneingriffe. Tierreste aus dem römischen Gräberfeld Halbturn. In: N. Doneus (ed.), Gräberfeld Halbturn, RGZM Monographien 122,2 (Mainz 2014) 485–640.

Kunst 2015 G. K. Kunst, Quantitative approaches to cattle butchery. Chopped vertebrae and ribs from a Roman sanctuary. In: A. Körös / A. Szotyori-Nagy (eds), Hungarian Grey, Racka, Mangalitsa (Budapest 2015) 201–213.

Lentacker et al. 2004 A. Lentacker / A. Ervynck / W. Van Neer, The Symbolic Meaning of the Cock. The Animal Remains from the Mithraeum at Tienen (Belgium). In: M. Martens / G. De Boe (eds), Roman Mithraeism. The Evidence of the Small Finds (Brussel 2004) 57–79.

Lepetz 1997 S. Lepetz, L'animal dans la societé Gallo-Romaine de la France du Nord. Revue Archéologique de Picardie numéro spécial 12, 1996.

Lohmann 2014 D. Lohmann, Das Heiligtum des Jupiter Heliopolitanus. In: van Ess / Rheidt 2014, 60–73.

Peters 1998 J. Peters, Römische Tierhaltung und Tierzucht. Eine Synthese aus archäozoologischer Untersuchung und schriftlich-bildlicher Überlieferung. Passauer Universitätsschriften zur Archäologie 5 (Rahden / Westf. 1998).

Pucher 2016 E. Pucher, Der Tierknochenfundkomplex eines germanischen Dorfs im römischen Machtbereich: Bruckneudorf. Fundberichte aus Österreich 55, 2016, 235–422.

Radbauer / Kunst 2011 S. Radbauer / G. K. Kunst, Case study. Earlier Studies Done Well and What We Can Learn – Carnuntum. In: G. C. M. Jansen / A. O. Koloski-Ostrow / E. M. Moormann (eds), Roman Toilets. Their Archaeology and Cultural History. BABESCH – Annual Papers on Mediterranean Archaeology. Supplement 19, 2011, 18–20.

Riedel 2004 A. Riedel, Tierknochen aus der römischen Villa rustica von Nickelsdorf im Burgenland (Österreich). Annalen des Naturhistorischen Museums Wien 106,A, 2004, 449–539.

Steigberger / Tober 2013 E. Steigberger / B. Tober, The sanctuary of Iuppiter Heliopolitanus at Carnuntum. Destruction or demolition? A case study. In: J. Driessen (ed.), Destruction. Archaeological, Philological and Historical Perspectives (Louvain 2013) 435–448.

van Ess / Rheidt 2014 M. van Ess / K. Rheidt (eds), Baalbek – Heliopolis. 10 000 Jahre Stadtgeschichte. (Darmstadt 2014).

von den Driesch 1976 A. von den Driesch, A Guide to the Measurement of Animal Bones from Archaeological Sites. Peabody Museum Bulletin 1 (Harvard 1976).

References of figures

Fig. 1: Partly redrawn after Gugl / Kremer 2010, adapted from Gál / Kunst 2018. – Fig. 2: Source of map: Institute for Study of Ancient Culture, Austrian Academy of Sciences. – Fig. 3: Institute for Study of Ancient Culture, Austrian Academy of Sciences. – Fig. 4, 5: Photo G. K. Kunst. – All other figures: Authors.

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Abstract

Presented here are three large animal bone assemblages recovered from three pits from the area of the sanctuary of Jupiter Heliopolitanus at Carnuntum. Two of them (G7 and G11) are from inside the precinct and are possibly linked to a reconstruction phase of the sanctuary at around the end of the 2nd /beginning of the 3rd century AD. They are believed to represent leftovers from communal meals of large groups of people. A third large pit (M/37) was situated immediately outside of the sanctuary and may represent a normal garbage pit, although its taphonomic history is less clear. This object is included mainly for comparative purposes. Summary data (NISP, bone weight) of the faunal remains are presented for the first time. After special reports were dedicated to bone artefacts, the bird remains and the butchery record from G11, this paper is devoted to the cattle remains in general, which form the core part of all three assemblages. Skeletal part representation and osteometry are important tools in recognising special features and similarities of the three assemblages. The skeletal part representations of the cattle remains from pit G7 and G11 indicate both butchery and consumption. Bone measurements suggest the presence of a uniform cattle population during certain phases of the sanctuary.

Zusammenfassung

Ausgesuchtes Rindfleisch für die Gläubigen – Die Rinderreste aus dem Heiligtum von Jupiter Heliopolitanus in Carnuntum (Österreich)

In dieser Studie werden umfangreiche Tierknochen-Vergesellschaftungen vorgestellt, die aus drei Gruben aus dem Areal des Heiligtums des Jupiter Heliopolitanus in Carnuntum geborgen wurden. Zwei von ihnen (G7 und G11) stammen aus dem Inneren des Bezirks und stehen möglicherweise in Zusammenhang mit einer Wiederaufbauphase des Heiligtums gegen Ende des 2./Anfang des 3. Jahrhunderts n. Chr. Vermutlich enthalten sie die Überreste von gemeinsamen Mahlzeiten großer Personengruppen. Eine dritte große Grube (M/37) befand sich unmittelbar außerhalb des Heiligtums und könnte als Müllgrube anzusprechen sein, auch wenn ihre taphonomische Geschichte weniger klar ist. Dieser Befund wurde hier zu Vergleichszwecken einbezogen. Zusammenfassende Daten (NISP, Knochengewicht) der Faunenreste werden hier erstmals vorgelegt. Nachdem auf die Knochenartefakte, Vogelknochen und die Schlachtspuren an Knochen von G11 bereits in eigenen Artikeln eingegangen wurde, widmet sich diese Studie den Überresten der Rinder, die den Hauptteil innerhalb aller drei Assemblagen bilden. Die Repräsentanz der Skelettteile und die Osteometrie sind wichtige Instrumente, um Besonderheiten und Ähnlichkeiten der drei Assemblagen zu erkennen. Die Skelettverteilung der Rinderknochen aus den Gruben G7 und G11 zeigt sowohl Schlachtkörperzerlegung als auch Konsum an. Die Skelettmaße deuten auf das Vorhandensein einer einheitlichen Rinderpopulation während bestimmter Phasen des Heiligtums hin.

Résumé

Des Boeuf de choix pour les adorants – les traces de bovins du sanctuaire de Jupiter Heliopolitanus à Carnuntum (Autriche)

On présente ici trois grands ensembles animaux provenant de trois fosses de la zone sacrée du sanctuaire de Jupiter Heliopolitanus à Carnuntum. Deux d'entre eux (G7 et G11) proviennent de l'enceinte et sont peut-être liés à la phase de reconstruction du sanctuaire vers la fin du 2^{e}/début du 3^{e} siècle ap. J.-C. On pense qu'ils représentent les restes de repas pris en commun. Une troisième grande fosse (M/37) était située immédiatement à l'extérieur du sanctuaire et représente probablement une fosse normale de déchets, quoique son histoire taphonomique reste moins claire. Nous avons inclus cet ensemble à des fins comparatives. Les données synthétiques (NISP, poids des os) des restes de faune sont présentées pour la première fois. Des rapports spéciaux ayant été dédiés aux artefacts osseux, restes d'oiseaux et traces de boucherie de la fosse G11, cet article vise les restes de bovins en général qui forment l'élément central des trois ensembles. La représentation des parties du squelette et l'ostéométrie sont des outils importants pour reconnaître les traits particuliers et les similarités des trois ensembles. Les représentations des parties du squelette des bovins des fosses G7 et G11 indiquent des activités de boucherie et une combustion de consommation de viande. Les mesures des os suggèrent l'abbattage d'une population bovine homogène durant certaines phases du sanctuaire.