THE YURTA-STROYNO ARCHAEOLOGICAL PROJECT

Studies on the Roman Rural Settlement in Thrace

Petra Tušlová – Barbora Weissová –
Stefan Bakardzhiev (eds.)

The Yurta-Stroyno Archaeological Project investigated a Roman rural settlement located along the middle stream of the Tundzha River, in south-eastern Bulgaria (Roman province of Thrace). The main objectives of the project were the determination of the habitation dynamics of the settlement, the investigation of its architectural appearance and general function, as well as its possible relation to the Roman military camp in Kabyle.

This volume brings together studies on the settlement's investigation, including the excavation and surface survey, as well as individual articles dealing with different aspects of the settlement existence and material culture.

FACULTY OF ARTS
Charles University

FACULTY OF ARTS
Charles University

THE YURTA-STROYNO ARCHAEOLOGICAL PROJECT

Studies on the Roman Rural Settlement in Thrace

Petra Tušlová – Barbora Weissová –
Stefan Bakardzhiev (eds.)

Studia Hercynia, monographs 2

Studia Hercynia, monographs 2
Petra Tušlová – Barbora Weissová – Stefan Bakardzhiev (eds.): The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace.

Proofreading
Peter Bowdery
Judd Burden

Front cover: Marble head of a bearded man (Asclepius?), 2nd–4th c. AD; drawing by Martin Černý.

This work was supported by the European Regional Development Fund project "Creativity and Adaptability as Conditions of the Success of Europe in an Interrelated World" (reg. no.: CZ.02.1.01/0.0/0.0/16_019/0000734) implemented at Charles University, Faculty of Arts. The project is carried out under the ERDF Call "Excellent Research" and its output is aimed at employees of research organizations and Ph.D. students.

EUROPEAN UNION
European Structural and Investment Funds
Operational Programme Research, Development and Education

MINISTRY OF EDUCATION, YOUTH AND SPORTS

Exchange: Institute of Classical Archaeology, Faculty of Arts, Charles University, Celetná 20, 110 00, Praha 1, Czech Republic

Subscription: Charles University, Faculty of Arts, Publishing House, nám. Jana Palacha 2, 116 38, Praha 1, Czech Republic (books@ff.cuni.cz)

Publisher: Charles University, Faculty of Arts, nám. Jana Palacha 2, 116 38 Praha 1, Czech Republic

Printed by Togga Prague

ISBN 978-80-7671-068-9 (print)
ISBN 978-80-7671-069-6 (online : pdf)

OPEN ACCESS

Contents

Preface to the book

The Yurta-Stroyno Archaeological Project (SAP)[1] was initiated as a follow up to the Tundzha Regional Archaeological Project (TRAP)[2] which focused on a systematic surface survey in the defined area of the Yambol District, in South East Bulgaria. SAP started in cooperation of the Regional Historical Museum of Yambol[3] and the Institute of Classical Archaeology, Charles University, Prague[4] in 2014, and focused on the excavation of one of the surface scatters detected by TRAP in 2010 near the village of Stroyno (TRAP no. 6018) attributed to a Roman rural settlement locally known as Yurta. The field project was designed for three years and included the settlement excavation and systematic surface survey in the form of total pickups regularly distributed over the site, followed by several years of data processing and material post-documentation. Additionally, in 2019, in order to gain comparative samples for Yurta-Stroyno and to shed some light on the settlements' hinterland, total pickups were carried out on two other surface scatters detected by TRAP and dated to the Roman period. One of these is located 2.5 km south-east of Karavelovo village (TRAP no. 6021), another one 1 km south of Robovo village (TRAP no. 7023). Further, in 2016 and 2021, geological prospections were carried out up to a 15 km radius around the settlement. They were focused on rock sampling for comparison with some of the architectural components found within the settlement as well as on the identification of clays suitable for pottery/architectural ceramic making, to identify possible sources for local pottery production. In 2021, a geophysical prospection was conducted on several areas of higher surface material concentrations in the Yambol District, including the Roman pottery scatter south of Robovo village (TRAP no. 7023); a similar but bigger one near the village of Kozarevo; and a small area next to the Roman military camp in Kabyle.

This publication provides the data gained by SAP within the first years of the project, including the excavations and the surface survey of the Yurta-Stroyno settlement. Despite the field works taking place from 2014 to 2016, several more years were necessary to process the data to this final stage. Within these years, many researchers and students were taking part in the process, including the field works itself, material processing, digitalization, publication, and consultation. All of them took an important place in the complex archaeological process and without them, the successful finalization of the field work, as well as of this publication, would not be possible.

Our deep gratitude belongs to the following colleagues (in alphabetical order): Viktoria Čisťakova, Tomáš Chlup, Věra Doležálková, Robert Frecer, Clarissa Haubenthal, Jakub Havlík, Hana Šofková/Havlíková, Petra Janouchová/Heřmánková, Barbora Janů, Michaela Śmiejová/Kellová, Jiří Kmošek, Markéta Kobierská, Tibor Lieskovský, Josef Mareš, Dorothea Mildová, Adéla Dorňáková/Minaříková, Martin Minařík, Miriam Nývltová Fišáková, Anna Peterková, Alexandra Rášová, Martin Straka, Johana Tlustá, Ondrej Trhan, Zuzana Zlámalová Cílová and Veronika Ženíšková/Ford. Several specialists consulted and improved individual articles; these will be mentioned in the relevant contexts. Additionally, palaeobotanical samples were discussed with Catherine Longford

1 https://ukar.ff.cuni.cz/en/research/projects/balkans/yurta-stroyno-archaeological-project/.

2 The project took place in Yambol District in the years 2009–2010 and 2017–2018 in cooperation with Shawn Ross, Adéla Sobotková, Ilija Iliev / Stefan Bakardzhiev and their teams, see http://www.tundzha.org/.

3 Represented by Stefan Bakardzhiev, Director of the Regional Historical Museum, and by his representative, Todor Vulchev, with occasional support of other colleagues from the museum, Miroslav Kozarev and Yavor Rusev. Finds were restored by Georgi Iliev, the main restorer of the RIM Yambol.

4 Represented back then by PhD students at the Institute, Petra Tušlová and Barbora Weissová.

(Department of Archaeology, The University of Sheffield); and the soil samples were evaluated by Jan Horák and Martin Janovský (Department of Archaeology, Faculty of Arts, Charles University & Department of Ecology, Faculty of Environmental Sciences, Czech University of Life Sciences).[5]

Equally essential for the realization of the project was the financial support which was generously provided by several sources. The first years (2014–2017) were financed by The Grant Agency of the Charles University no. 2086214, under the project "Archaeological Excavation of Roman Site Yurta – Stroyno, Bulgaria"; by Internal Grant of Charles University no. 2013FF006642, project "Archaeological Excavation of Site at Stroyno, Yambol Region" and by The Grant Agency of the Charles University no. 816413, project "Documentation of Roman Pottery in the Area of Roman Provinces Thrace and Moesia Inferior". From the year 2018, all the activities of The Institute of Classical Archaeology at The Charles University are supported by the European Regional Development Fund project "Creativity and Adaptability as Conditions of the Success of Europe in an Interrelated World" (reg. no.: CZ.02.1.01/0.0/0.0/16_019/0000734).

The articles collected in this volume shall provide the final results of the excavation and of the systematic surface survey of the settlement, as well as to make available the vast majority of the gained material and data. As the excavation reports were published on a yearly basis, always including the most spectacular finds of the season, some of the items (as well as related information) included in this volume have already appeared elsewhere. However, the aim of this publication is to present the whole data set together, including corrections of possible previous misinterpretations, and to incorporate them into the comprehensive picture of the settlement and its material culture. Last but not least, the contextualisation of the settlement within the development of the Roman Thrace represents one of the essential outcomes of this volume.

The results of the project are divided into two volumes. The first one, which you now have in your hands, focuses on the field works and related material studies. The historical and topographical background of the investigated settlement is introduced (P. Tušlová; **ch. 1**), and the final results of the excavations (P. Tušlová, B. Weissová and S. Bakardzhiev; **ch. 2**) and the surface survey (B. Weissová, P. Tušlová and S. Bakardzhiev; **ch. 3**) are given. Thereafter, the material studies follow, including the ceramic and stone building material (B. Weissová; **ch. 4**); the milling equipment (B. Weissová, C. Haubenthal and V. Doležálková; **ch. 5**); petrographic analysis of several stone objects from the settlement (C. Haubenthal; **ch. 6**); study on epigraphic finds (P. Heřmánková; **ch. 7**); numismatic finds (P. Heřmánková; **ch. 8**); terracotta lamps (R. Frecer; **ch. 9**); metals and metallurgical activities (V. Čisťakova and J. Kmošek; **ch. 10**); glass including its archaeometric study (V. Čisťakova and Z. Zlámalová Cílová; **ch. 11**); and other small finds covering worked bones, terracotta and miscellaneous objects (A. Minaříková; **ch. 12**); the volume is closed by article focused on osteological finds (M. Nývltová Fišáková; **ch. 13**). The second volume is solely dedicated to the pottery material found on the settlement (P. Tušlová – in 2022).

The editors
Petra Tušlová, Barbora Weissová & Stefan Bakardzhiev

5 However, due to the disruption of the site and impossibility to have the specialists on the place for extraction, the archaeobotanical samples from the excavated trenches as well as the soil samples from the excavated trenches and from the surface survey proved to be of low quality and small informative value. Consequently, it was decided in both cases not to include the inconclusive results into the publication.

The Historical and Topographical Setting of Yurta-Stroyno

Petra Tušlová

ABSTRACT
The rural settlement of Yurta-Stroyno, which is the main interest of this book, was founded in the Roman province of Thrace, along the middle stream of the Tundzha River. The first finds of Roman period imports in the area are assumed to be dated somewhere around the second half of the 1st / at the turn of the 1st and 2nd c. AD and were identified in several burial mounds located in its hinterland. However, no settlement of such a date was so-far investigated, raising the question about the beginning of the Roman period habitation along the middle stream of the Tundzha River.

The following article will shorty introduce the historical and topographical setting of the Roman province of Thrace, and, especially, of the hinterland of the Yurta-Stroyno settlement, including the so far investigated pottery scatters, habitations, and burial mounds dated to the Roman and Late Antique periods. The recent history of the settlement will be introduced as well, including challenges caused by its state of preservation, as well as reasons for its investigation. Last but not least, this article aims to provide context to the settlement related studies presented in this volume.

KEYWORDS
Thrace; Roman period; Tundzha River; Yurta-Stroyno; rural settlement; *vicus*; burial mounds.

A SHORT HISTORY OF ANCIENT THRACE

Before focusing on the settlement itself, it is necessary to shortly introduce the historical background of Ancient Thrace to better understand under which circumstances the Roman province of Thrace was created and what its main characteristics were. A quick overview of the main historical events taking place during the Roman period in Thrace is also crucial, as we aim to put the establishment and development of the settlement into the cultural and historical context. Similarly important is to outline the specifications of the Roman period settlements in Thrace, especially in the area of the middle stream of the Tundzha River (modern times Yambol District), which represents the immediate hinterland of the Roman settlement of Yurta-Stroyno.

PRE-ROMAN THRACE

Ancient Thrace, or the territory inhabited by the Thracian tribes/*ethne* (Graninger 2015, 22), spread over a vast area of South-Eastern Europe, including the modern countries of Moldova, the south-western part of Ukraine, the eastern and southern parts of Romania, Bulgaria, the eastern parts of Serbia and North Macedonia, a part of Northern Greece and the European part of Turkey. Additionally, we may also include the islands of Thasos and Samothrace, as well as parts of Asia Minor, into which several Thracian tribes migrated (Bouzek – Graninger 2015, 13; Sears 2013, 6–8; Theodossiev 2011, 2). The borders of the Thracian territory were

relative, dynamic and often changing, depending on the political situation (Theodossiev 2011, 2). However, the core of Ancient Thrace might be considered to be the geographically delimited area of the south-eastern Balkan peninsula with the Aegean and Marmara Sea on the southern edge, the Black Sea on the eastern edge, the Danube River / Stara Planina Mountains on the northern edge and the line of the Morava / Struma River valleys on the western edge (Bouzek – Greninger 2015, 13).

During the Iron Age (IA; starting ca. 1100–1000 BC), the area of Ancient Thrace witnessed internal political consolidation and the rise of local tribes, which resulted in the creation of the Odrysian Kingdom in the 5th c. BC (Theodossiev 2011, 4; Archibald 1998). At the same time (IA), Thrace was gradually affected by various impulses from the outside, including Greeks, Persians, and Macedonians (Zahrnt 2015, 36–39; Delev 2015a; 2015b). During the subsequent wars between Rome and the Macedonian Kingdom at the end of the 3rd c. BC and, especially, in the 2nd c. BC, the Thracian territory fell into the sphere of the Roman political interest, at that moment limited to the surroundings of Via Egnatia, the main trans-Balkan military road running from east (Dyrrhachium) to west (Byzantium) across the southern – Aegean – part of Thrace (Lozanov 2015, 76).

During the reign of Augustus, a client kingdom was created in the territory of Thrace as a result of political cooperation of the local tribes with Rome. Around the same time, a permanent military garrison of at least two legions was stationed on the lower Danube under the command of the Macedonian governor which created a base for the soon to be Roman province of Moesia (Lozanov 2015, 76–78).

ROMAN PROVINCE MOESIA AND THRACE / DIOCESE OF THRACIA

The province of Moesia was founded at the beginning of the 1st c. AD, and despite several different years having been proposed, it most probably occurred in either AD 12 (i.e. shortly before the death of Augustus) or AD 15 (i.e. in first years of Tiberius's reign). At first, it only stretched over a tiny strip along the southern part of the Danube River (*TIR* 2012, 227; Lozanov 2015, 80).

In AD 45/46, during the reign of Claudius, in the territory of a client kingdom south of the Stara Planina Mountains, the Roman province of Thrace was founded. It is not uninteresting to note that it was the last Roman province founded in Eastern Europe / at the Balkan peninsula in a territory which was at that time already surrounded by Roman domains. The province spread from the Black Sea to the Marmara Sea, the Aegean Sea, and to the Mesta River in the west. At the same time, the borders of Moesia moved and extended, covering the southern part of the lower stream of the Danube River to the Stara Planina Mountains and all the way up to the Black Sea (*TIR* 2012, 226–237, 377–388). In AD 85/86 Moesia was invaded by the Dacians, and as a consequence of the attack, it was divided into two smaller provinces – Moesia Inferior and Moesia Superior (Haynes 2011, 7). Moesia Inferior kept the area of northern Bulgaria and Romanian Dobrudzha (south of the Danube delta) and as such constituted a direct – northern – neighbour to Thrace. The border between Moesia and Thrace, located in the area of the Stara Planina Mountains, changed several times (at least twice, in AD 136 and AD 193). The outer borders of both provinces, however, did not significantly move until the 270s, when the eastern parts of Moesia Inferior and Thrace were incorporated into the newly created provinces of Dacia Ripensis and Dacia Mediterranea. At the end of the 3rd c. AD / mid-4th c. AD, during the administrative Diocletian – Constantinian reforms, both provinces were incorporated into a bigger administrative unit of the Diocese of Thracia which replaced Moesia Inferior and Thrace with six smaller provinces – Scythia Minor, Moesia Secunda, Thracia, Rhodope, Haemimontus and Europa (Lozanov 2015, 76).

In AD 395, when the Roman Empire was divided under Theodosius I into two parts, Thrace remained under the Eastern Empire, near its capital in Constantinople. In AD 536, under Justinian I, a new administrative unit – *quaestura excercitus* – was founded, removing the provinces of Moesia Inferior and Scythia from the Diocese of Thracia and putting them together with the Cycladic Islands, Caria and Cyprus. This new formation was administered by the prefect of Scythia from Odessos (Varna). The rest of the Diocese of Thracia was administered from Constantinople by the *vicarius Thraciae* (Dumanov 2015, 92).

MAJOR HISTORICAL DEVELOPMENTS OF THRACE DURING THE ROMAN AND LATE ANTIQUE PERIODS

After the foundations of Moesia Inferior and Thrace, the gradual consolidation of the two provinces started. At the beginning of the 2nd c. AD, after the Dacian wars under Trajan, administrative and political changes took place, stimulating economic growth and stability which lasted until the late 230s. During this period new urban settlements were founded, including smaller civilian sites (*vici* and *canabae*) as well as large villa estates (Lozanov 2015, 86–87); many new roads were maintained or newly built (Madzharov 2009). This period was mainly peaceful and prosperous, in spite of the major incursion of the Costoboci in AD 170 (Lozanov 2015, 87).

The crisis of the Roman Empire during the 3rd c. AD struck most in AD 248–251 when a devastating invasion of gothic tribes caused extensive damage across much of the territory of Moesia Inferior and Thrace (Haynes 2011, 8). The raids of gothic tribes continued in the second half of the 3rd c. and in the 4th c. AD resulting in the Battle of Hadrianopolis in AD 378, perceived as a great defeat for the Roman army, which heralded the end of the empire itself (Velkov 1977, 35).

Continuing raids by gothic tribes were accompanied by invasions of the Huns, which started to take place at the very end of the 4th c. AD. Their attacks strengthened towards the mid-5th c. AD when they severely devastated Thrace (Velkov 1977, 38–42). During this period, many cities in Thrace were abandoned, moved from their previous location and significantly reduced in size. Furthermore, the concept of rural villas disappeared and the dominance of the agricultural economy of Thrace came to an end, with a preference for cattle breeding (Dumanov 2015, 98–101). At the end of the 5th c. AD, Thrace suffered due to raids by the Ostrogoths, and the first invasions of the Bulgars and Slavs whose attacks strengthened in the first half of the 6th c. AD and continued thereafter. During the second half of the 6th c. AD the Avars also appeared on the scene, fighting several major battles with the Romans, especially during the late 580s. As a reaction to the unstable situation and high number of Slav and Avar raids, a new type of small-sized fortified cities located on elevated defensible places emerged during the 6th c. AD (Velkov 1977, 47–59; Dumanov 2015, 98–100). Further developments are obscure until the 7th c. AD, when The First Bulgarian Empire was established (Velkov 1977, 59).

THE HINTERLAND OF YURTA-STROYNO DURING THE ROMAN PERIOD AND LATE ANTIQUITY

The settlement of Yurta-Stroyno is located in South-Eastern Bulgaria, in the modern-day Yambol District. The main natural dominant of the territory is the middle stream of the Tundzha River which passes ca. 100 km across the district. The river flows here through the lowlands of the eastern edge of the Upper Thracian Plain and creates the main north-south axis of the Yambol District, dividing it into two halves. The Tundzha River was navigable in antiquity,

creating one of the major connection lines of inner Thrace with Mediterranean Sea, springing in the Stara Planina Mountains (Plovdiv District), and emptying into the Aegean Sea near the ancient city of Ainos/Aenus. Between Kabyle and Hadrianopolis, the river was followed by a supra-regional road connecting the Danubian Plain with the Upper Thracian Plain, crossing the Stara Planina Mountains. Another major road led from the Black Sea coast to the Thracian inland, starting in Anchialos, passing by Kabyle and heading towards Philippopolis. Both roads were very likely built during the administrative reforms of Trajan at the beginning of the 2nd c. AD (Madzharov 2009, 230, 237).

During the Roman period, the whole area of the Yambol District belonged to the province of Thrace, while, after the reforms at the end of the 3rd c. AD / mid-4th c. AD, when the Diocese of Thracia was created, the part to the east of the Tundzha River was assigned as the Haemimontus province (with its capital in Hadrianopolis) and the part to the west of the river as the province of Thracia (with its capital in Philippopolis) (*TIR* 2012, 144; *TIR* map Roman province borders).

Putting the settlement of Yurta-Stroyno into the historical context of this area, it was founded during a peaceful period in the Roman province of Thrace. After the reforms in the 3rd c. AD / mid-4th c. AD, the settlement and its hinterland was assigned to the Haemimontus province.

The main Roman period installation in the area is the military camp of auxiliary unit cohort II Lucensium (equitata) at Kabyle, founded in AD 135/136 during the reign of Hadrian. It is situated about 34 km to the north of Yurta-Stroyno as the crow flies. Kabyle[1] was located on the spot of an older Thracian settlement and sanctuary founded near the Tundzha River, and, during the Roman period, on the junction of two roads which were mentioned above, one running from east to west, from Anchialus to Philippopolis, and another one, going along the Tundzha River from north to south in the direction to Hadrianopolis and Ainos/Aenus (*TIR* 2012, 68–69). The latter crossed two major trans-Balkan roads on its way, Via Diagonalis and Via Egnatia (see **Map 1**). As the major military installation in the area, the establishment of the camp in Kabyle attracted newcomers as well as encouraged the return of the Roman veterans of a local origin[2] after their military service and gave rise to the creation of a *vici* in its hinterland (Boyanov 2007, 73). Besides the camp in Kabyle, only one more permanent military installation was existent in the Province of Thrace, the camp Germania (Germaneia),[3] situated in the upper Struma River Valley.

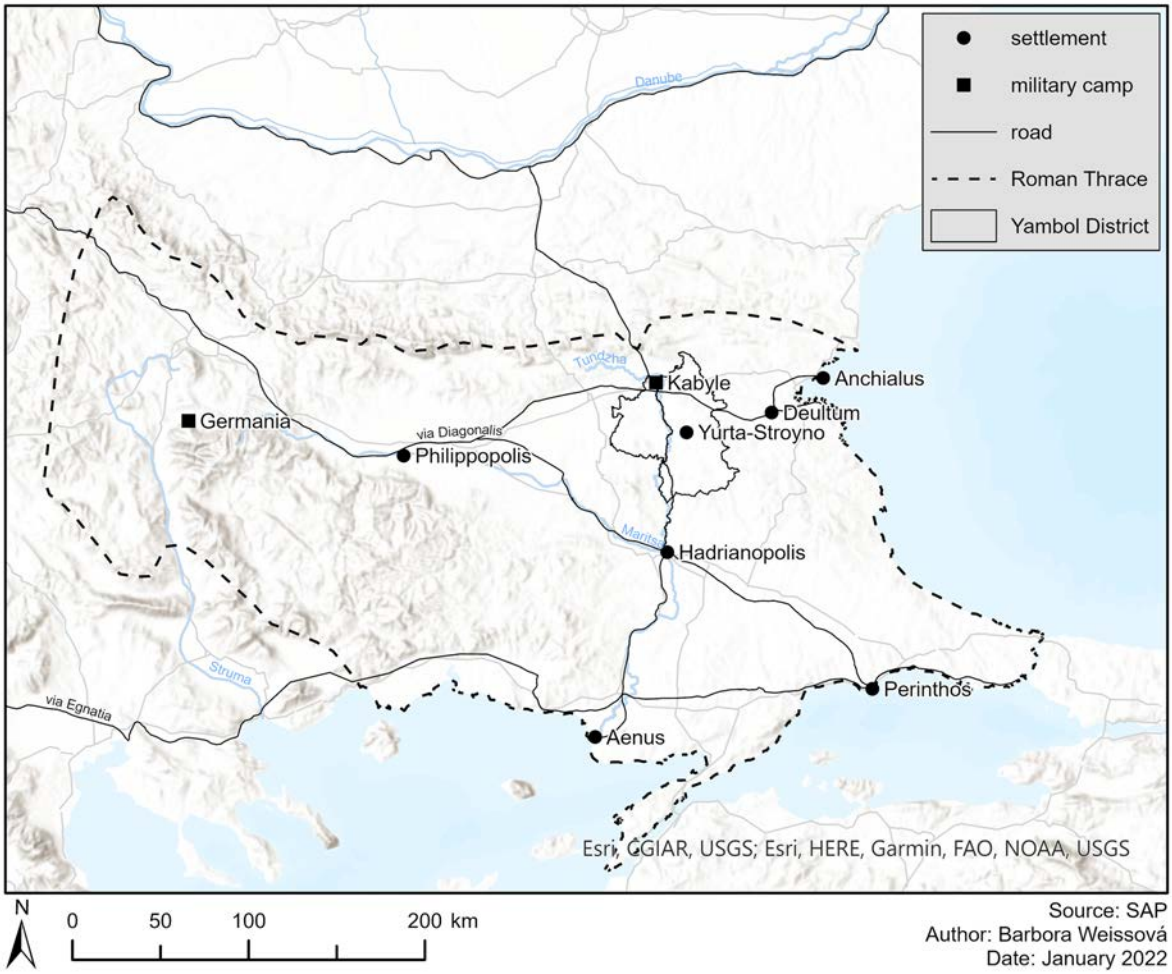
No other major urban Roman-period installation is known from the area, and it seems likely that the Roman presence was represented here mainly by the rural settlements of the newcomers attracted by the camp in Kabyle, and/or by the Roman army veterans, who settled strategically along the middle stream of the Tundzha River and along the major roads as suggested by the spatial distribution of finds of bronze military diploma fragments (Boyanov 2007) and inscriptions mentioning Roman army veterans (Heřmánková 2022, map 1). The settlement of Yurta-Stroyno itself yielded a fragment of a bronze military diploma of Classis Misenensis veteran dated to AD 152–158 (Boyanov 2007, 69–74).

In contrast to the (lack of) major urban settlement, the rural areas of the middle stream of the Tundzha River seem to be densely inhabited. Besides the hinterland of Kabyle, especially

1 In the texts of this book, Kabyle is used for the ancient Thracian and Roman city; while Kabile is used for the modern town, the archaeological base near the town, and for the Archaeological Park of Thracian and Ancient City of Kabile, which is an official name of the site.

2 Likely also of different origin.

3 Modern-day Sapareva Banya.



Map 1: South-Eastern Balkan Peninsula with selection of Roman period roads, cities and military installations mentioned in the text, with presumed border of Roman Thrace at the end of the 2nd c. AD.

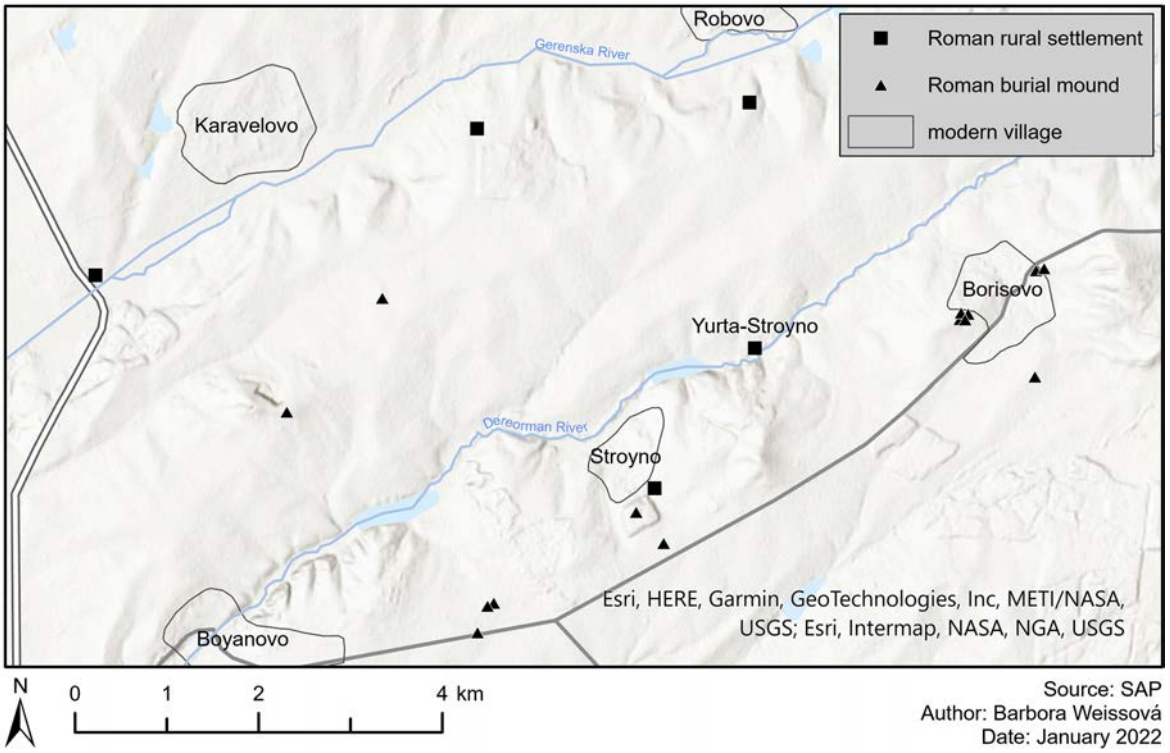
rich on Roman rural settlements is the area located on the left bank of the Tundzha River, at the boarder of Tundzha and Elhovo municipalities.[4] We may note a high concentration of surface scatters dated to the Roman period along the Gerenska and Dereorman rivers, both eastern estuaries of the Tundzha River, especially in the hinterland of the villages Karavelovo, Robovo, Boyanovo, Stroyno and Borisovo. Within a perimeter with a radius of 4 km from Yurta-Stroyno, several Roman period settlements are located. Two are situated to the north, near the villages of Karavelovo and Robovo (**Map 2**). A site near Karavelovo is spread over a vast area of 28 hectares, while one in Robovo is much smaller in size, covering just 1 hectare. However, the surface survey conducted on both settlements in 2019 uncovered the same pottery types, glass fragments and agricultural tools (quern stones, whetstones) as the ones known from Yurta-Stroyno.[5] Consequently, we may expect the same chronology and likely also character

4 This statement is based on a long-term observation of Stefan Bakardzhiev, director of the RIM Yambol, who, for this reason, recommended this area to TRAP for surface survey.

5 The field work was conducted in cooperation between RIM Yambol (Stefan Bakardzhiev, Todor Vulchev) and the Institute of Classical Archaeology, Prague (Petra Tušlová, Viktoria Čisťakova). The report of the field season has not yet been published.

of all these three settlements. Additionally, Orudisza ad Burgum, a road-station placed in the section running from Kabyle to Hadrianopolis (*TIR* 2012, 274), is supposed to be located near the village of Karavelovo. Another Roman period scatter was detected ca. 2 km south-west from the same village, north of the Gerenska River (i.e. in the area not investigated by TRAP). The collected material has, however, not been further evaluated yet.

An already well-known Roman settlement is situated 1.5 km south of Yurta-Stroyno, at the south-eastern edge of the Stroyno village, in the area called St. Iliya. The site was excavated in 2014, 2020 and 2021 (Agre – Dichev – Hristov 2015, 208–211; Agre – Dichev – Hristov 2021) and in 2018 it was investigated by the means of a geophysical prospection (Dichev 2018, 724–726). A rectangular villa-like structure with rooms along the perimeter walls was detected there with a circular building with an outer diameter of 30 m placed in the middle of a central open square. According to investigators, two construction phases might be detected: 1st dated to 13/12 BC – AD 12; 2nd dated to the end of the 1st c. and to the 2nd c. AD.[6] I had a chance to observe some of the material from the site prior to its excavation.[7] Based on this observation it is possible to conclude that, at least in some period(s), it was contemporary with Yurta-Stroyno as well as with the previously mentioned sites near Karavelovo and Robovo.



Map 2: Settlement of Yurta near the village of Stroyno with marked Roman period sites in its hinterland, including rural settlements and excavated burial mounds.

6 During the pre-print corrections of this paper, the 2020 excavation report of the site near St. Iliya was published. The foundation of the settlement is approximated there to the 1st c. AD, while its decline to the mid-3rd c. AD (Agre – Dichev – Hristov 2021, 879).

7 The site at St. Iliya was, as well as Yurta-Stroyno, disturbed by looters leaving piles of material (mainly pottery and glass) on the field surface. Comparing these objects to the ones from the other sites in the area (Yurta, Karavelovo and Robovo), there is a clear overlap based on which we may suppose these four settlements were active during the same period, likely in the 2nd and 3rd c. AD.

Late Antiquity (5th–6th c. AD) was a turbulent period during which the settlements in Thrace moved from the flat lowlands to elevated positions, their dimensions decreased, and they were heavily fortified. Since the area along the middle stream of the Tundzha River is mostly flat, the concentration of Late Antique settlements in the area is scarce.[8] A great example is, however, the Dodoparon hillfort located about 21 km west from the Tundzha River, about 30 km south-west from Yurta-Stroyno, which is dated to the 6th c. AD, the only elevated Late Antique settlement (or *refuge*) from the district which was comprehensively published. Dodoparon was well fortified settlement, with its inhabitants engaged in agriculture, metal production (iron smelting) and regional trade. An important sanctuary of Apollo was likely located nearby (Sobotkova – Longford – Bakardzhiev 2018).

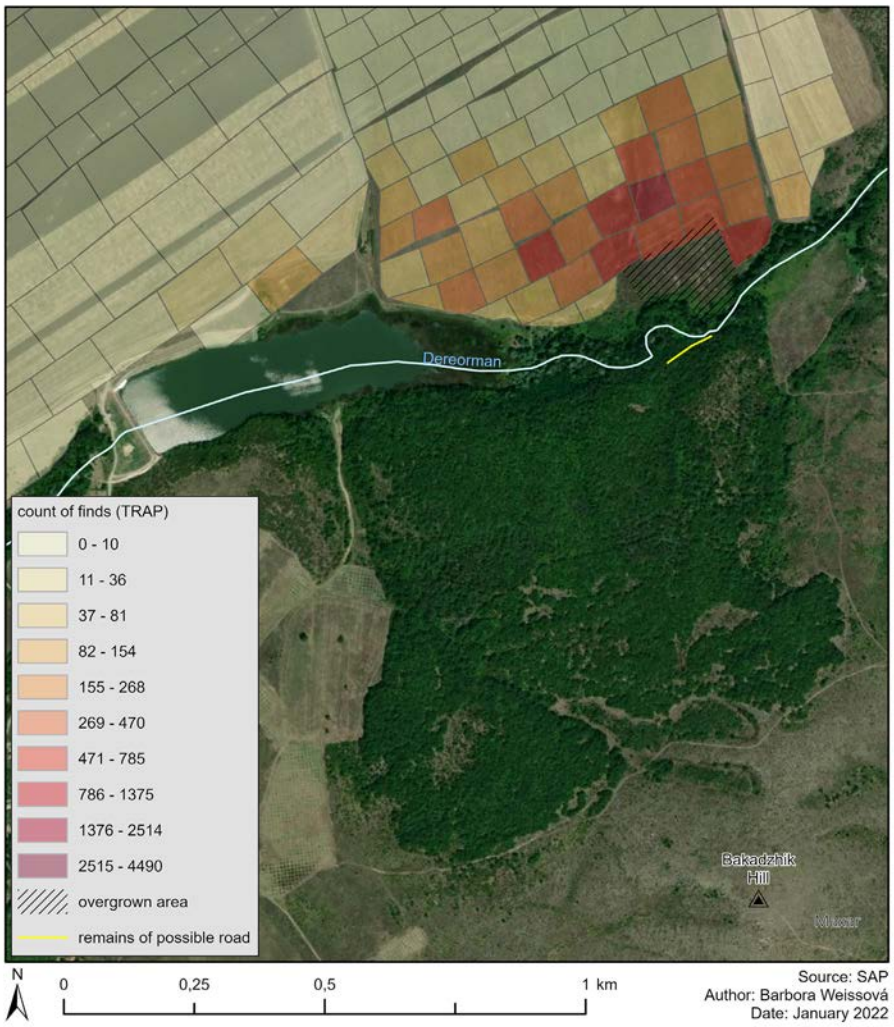
Around the mid-5th c. AD Kabyle lost its role as a major urban settlement in the area. Despite being inhabited till the 6th c. AD (and later again during the Medieval period), it became a city of low importance, and the main administrative and religious centre moved to Tuyda, a fortress located in elevated position under the Stara Planina Mountains in Sliven District, overlooking the Tundzha River and the flat lowlands of the Tundzha River catchment (*TIR* 2012, 72–73). Regarding the rural areas located along the middle stream of the Tundzha River, they are not that densely populated as they were before, and the previously mentioned settlements near Yurta-Stroyno do not seem to be permanently inhabited in the Late Antiquity.

THE PHYSICAL SETTING OF YURTA-STROYNO

The settlement of Yurta-Stroyno itself is located on the northern part of the Elhovo municipality, about 12 km east from the Tundzha River and ca. 1.5 km north-east from the village of Stroyno. Since there are several other Roman period archaeological sites near the village (e.g. St. Iliya), the connection Yurta-Stroyno is used for its designation as the expression 'Yurta' was used for the settlement identification already in the gazetteer of archaeological sites at the Yambol District created in the 70s of the 20th century (Dimitrova – Popov 1978, 26, no. 162). The gazetteer mentions that several stone wall foundations were uncovered in the location during ploughing, together with architectural ceramics, pottery and several coins dated up to the mid-3rd c. AD.

Currently, the exact location of the archaeological site might be recognized only by the surface pottery scatter covering about 30 ha and spreading along the right bank of the Dereorman River which delimits the southern border of the settlement. The Dereorman River is about one to three meters wide and up to one meter deep; it empties into the Tundzha River and its course is nowadays controlled by three dams. Further south, right next to the river, the rocky Bakadzhik Hill (282.7 m.a.s.l.) is located, creating a natural barrier for the river flow, and pushing its waters towards the settlement when the river is flooded. This natural phenomenon causes damage to the settlement and many stones from architectural structures, roof-tiles and pottery fragments have been found fallen in the river or washed by the river flow along its banks. At the north-western side of Bakadzhik Hill – facing to the settlement – a visible notch is cut in a rock, placed in a slightly elevated position, stretching about 200 m from east to west. It is locally believed this is a rest of a road which was running along the

8 There are, in total, ten known Late Antique settlements (pottery scatters dated to that period) in the Yambol District listed in the catalogue of Dimitrova – Popov 1978 under the following numbers: 5, 12, 23, 41, 59, 65, 82, 83, 114 and 166.



Map 3: Based on TRAP data: polygons marking the surface scatter spreading into the cultivated fields from the Yurta-Stroyno settlement; the nucleus of the site remained unsurveyed. On the south, over the Dereorman River, we may note the road cut in the slope of Bakadzhik Hill.

river. No precise chronology of this road was determined[9] and although it is tempting to date it to the Roman period, it might date as well to the Ottoman times.

The majority of the settlement spreads along the right bank of the river. The first 100–180 metres from the river are overgrown with vegetation represented by grass, scrubs, and small- to middle-size trees. The area featuring surface material continues further north-west and reaches into agrarian fields which are ploughed on a yearly basis. The location of the northern part of the settlement in agriculturally cultivated areas causes the spread of the surface material over vast fields for another 400 m further inland, however, the original settlement seems to be much smaller, located towards the river. Based on higher concentration of the surface finds as well as of construction material (both stones and roof-tiles) detected by surface survey of the TRAP, the original settlement size was approximated to be up to 3.5 ha (**Map 3**).

9 The original plan of cutting the road in half was abandoned due to the time restrictions. There was no surface material found on the road or around, nor any previous investigations taking place.

The current land use of Yurta-Stroyno surroundings is surprisingly reminiscent of the ancient one. The whole middle stream of the Tundzha River catchment underwent extensive deforestation during the middle to late Bronze Age periods when forests seem to have been replaced by grazing areas, mainly for stock breeding, less for agricultural purposes. During the Iron Age, both pastoral and agricultural aspects developed into the landscape devoted to grain cultivation and stock breeding, with limited areas of woodlands on hills and nearby rivers as we may still see today (Connor – Herries – Mooney 2018, 138–143). Dedication of the surrounding land of Yurta-Stroyno to agriculture and stock breeding might be confirmed by finds from the settlement itself – see, especially, the milling equipment (Weissová – Haubenthal – Doležálková 2022) and the osteological finds (Nývltová Fišáková 2022), both in this volume.

CREATION MYTH OF YURTA-STROYNO AND OTHER ROMAN SETTLEMENTS IN ITS HINTERLAND

The beginning of the permanent Roman presence in the middle stream of the Tundzha River is still unclear. The first objects clearly classifiable to the Roman material culture appear in the burial graves, tentatively dated to the end of the 1st – beginning of the 2nd c. AD. In a line of villages Boyanovo – Stroyno – Borisovo (Elhovo municipality), several such burial mounds were excavated, and individual graves uncovered, by Daniela Agre. Specifically, one burial mound was excavated in the location Koz Bunar near Boyanovo, about 4 km south-west from Stroyno village (Agre 2010, Agre 2013); a Roman grave was uncovered in so-called Raykova mogila 1 km south from the same village (Agre 2007); and several other mounds were excavated in the western suburbs of Borisovo, about 2.5 km east from Stroyno village (Agre 2009; 2013) (see **Map 1**). The uncovered finds were published in the form of preliminary or short reports with some elemental description without focusing on specific parallels and detailed chronology of the individual findings. Items from the rich burial mound of Borisovo, where a chariot with yoked horses *in situ* was found, are to be seen in the Ethnographic-archaeological Museum in Elhovo. The chronology of the exhibited finds can stretch, indeed, from the end of the 1st c. AD, however, the items can also be dated to the 2nd or even 3rd c. AD. Further detailed studies of the material and architecture structures found in these graves are necessary to establish their precise chronology and consequent classification to the end of the 1st c. AD / beginning of the 2nd c. AD.[10] Putting these data into the context, burial mounds with such early chronology would predate the foundation of the military camp in Kabyle (founded in AD 135/136). If we accept such chronology, an important question is raised. Who are the

10 Rare cases of burial mounds well dated to the 1st c. AD are indeed known from Ancient Thrace. In Karanovo village in the Stara Zagora municipality (126 km as the crow flies from Stroyno village), the so-called Eastern Mound was excavated in 2008. The exceptionally rich grave goods yield variable materials and items imported from the Roman Empire including iron armour, long and short swords, curved knives, iron spearheads, silver buckle and silver fibulae, glass, bronze, and clay vessels, candelabrum, bronze lamp, silver plate with embossed decoration, three gold rings with gems and several coins, with the three latest once minted during the reign of Emperor Tiberius (AD 14–37). The grave goods also included two silver gilded cups with embossed decoration identified as Boscoreale type, produced in Roman ateliers at the beginning of the 1st c. AD. Based on the rich variability of different materials and types of items, the grave was dated to the mid-1st c. AD, representing one of the earliest well-datable finding context of Roman imports in Ancient Thrace (see Ignatov – Gospodinov – Borisova 2010, 247–249).

people buried in these graves? Are these local Thracian aristocrats with connections to the Roman Empire and the found items are pure imports from Italy or/and other Roman provinces; or are they newcomers, already settled in the area, familiar with the Roman material culture, possessing and utilizing items produced locally? To try to answer this question, it is necessary to combine typological, stylistic, and archaeometric studies of individual items, and to focus on sampling of raw materials and production wastes found on the settlements for comparison. The first such studies start to appear, with one good example of the detailed stylistic description as well as elemental analysis of a *balsamarium* found in the burial mound Kral Mezar near Boyanovo (Agre – Dichev – Agre 2019). The *balsamarium*, as well as the burial mound, is dated to the very end of the 2nd c. – 1st half of the 3rd c. AD. Although it does not contribute to the studies of the early years of the Roman presence in Thrace, the detailed and interdisciplinary approach to the object found in a grave represents a turning point in the approach to material studies.

The date of the foundation of Yurta-Stroyno is one of the main research questions of the SAP. As outlined above, the Roman material culture in the area seems to appear towards the end of the 1st – beginning of the 2nd c. AD. However, the existence of a settlement with a strong Roman character at the place of Yurta-Stroyno or in its immediate vicinity during this period remains an open question. It is not an impossible thought as during the reign of Emperor Vespasian, around AD 70, veterans of Legio VIII Augusta founded the *colonia* Flavia Pacis Deultensium (Deultum) on the Black Sea coast, about 70 km east of Yurta-Stroyno as the crow flies (*TIR* 2012, 93). Deultum quickly become an important city and gave rise to many villas, *vici* and necropolises in its hinterland (Balabanov 2011, 107). In our case, not having a central settlement nearby during this early period, we would have to expect that the rural settlements were founded there prior to the construction of a major administrative or military centre.

Another possibility, in the Roman world rather typical, is a boom of rural habitations caused by construction of a major city or military camp nearby. Applying this pattern to the area under discussion, the central settlement would be represented by the military camp in Kabyle, founded in AD 135/136 and located about 34 km north from Yurta-Stroyno as the crow flies. During the first half of the 2nd c. AD Roman Thrace witnessed major investment in accordance with the administrative and political changes. New urban and rural settlements were founded; the inner infrastructure of the province was either maintained or newly built. Here, we should remember the north-south running road passing by Kabyle following the stream of the Tundzha River to Hadrianopolis and Ainos/Aenos. Even if we consider the possible existence of a previous connection in this direction (as Kabyle was previously also a well-connected Thracian city and sanctuary), the road seems to be maintained, if not newly-built, during the Trajan-Hadrian reign (Madzharov 2009, 32, 223, 237), facilitating the movement along the middle stream of the Tundzha River. Consequently, it is tempting to group these mentioned building activities altogether: the construction of the military camp in Kabyle, the maintenance/construction of the road connecting the camp with the Aegean area and the foundation of rural settlements along the road likely supporting Kabyle with its products, as a part of bigger changes happening from the Trajan-Hadrian period towards the 2nd half of the 2nd c. AD. If we fall for this interpretation, the 30s of the 2nd c. AD seem to represent an appropriate starting point for extended building activities taking place along the middle stream of the Tundzha River.

THE MODERN HISTORY OF YURTA-STROYNO AND ITS HINTERLAND

The settlement in Yurta-Stroyno is scientifically known at least from the 70s of the 20th century when it was put on the gazetteer of archaeological sites from the Yambol District (Dimitrova – Popov 1978), but very likely even for a longer period. The first discoveries from the settlement are random finds 'accidentally' uncovered at its territory, nowadays stored in the archives of the Regional Historical Museum of Yambol. There are over 50 known items, but three of them offer greater informative value concerning the interpretation, classification, and chronology of the settlement. The first is a Roman-Doric capital of type I according to Dimitrov (2004, 221), dated to the end of the 1st – beginning of the 2nd c. AD with a direct parallel from the *villa rustica* in Chatalka, dated to the 2nd half of the 1st century AD (Dimitrov 2004, 222, fig. 42). This capital is made of marble and its quality of execution is exceptional compared to other capitals and column bases discovered at the settlement (Weissová 2022, fig. 5:27). Based on its chronological classification, it represents the oldest datable item uncovered on the site, which opened a discussion about the early foundation of Yurta-Stroyno (approximated to the second half – turn of the 1st/2nd c. AD). The second item is the bronze military diploma of a Classis Misenensis veteran, dated by Boyanov to AD 152–158 (Boyanov 2006, 239; 2007, 69–74). This find put a basis on identification of the settlement as Roman *vicus*, a village of the Roman army veterans. The third item is a lower part of a marble slab likely depicting a Thracian horseman (or at least his feet) with an inscription mentioning a Roman family name written in Greek: *Avilius* (Bakardzhiev 2008, 472; Boyanov 2008, 214; Heřmánková 2022, pl. 4/1:2). In Kabyle, an inscription with the same family name was found, which initiated a theory of a direct connection between Kabyle with Yurta-Stroyno (Boyanov 2008, 214). Regarding the relatively short distance between these two installations, we may even consider Yurta-Stroyno being located within the administrative territory of Kabyle.

Besides the chance finds, extensive looting activities affected the settlement in 2004 causing it severe damage. As a reaction to the disruption, the Regional Historical Museum of Yambol conducted a rescue excavation in the years 2006 and 2007 to assess the damage and to provide the first-hand observation of the settlement, its chronology and material culture (Bakardzhiev 2007, 238–241; 2008, 471–473). Several wall foundations of houses were uncovered and the general stratigraphy described. Besides the more common finds, silver *antoninianus* of emperor Gallienus (AD 253–260) was retrieved, as well as the iron head of a spear (Bakardzhiev 2008, 472, обр. 2) and a bronze human mask attachment on a bronze perforated rod (Bakardzhiev 2007, 240, обр. 3). The chronology of the settlement was approximated to be the 1st–4th c. AD (Bakardzhiev 2007, 240).

In the years 2009–2010, the Tundzha Regional Archaeological Project (TRAP) surveyed the area between Gerenska and Dereorman rivers bringing the attention back to Yurta-Stroyno. The site was surveyed and newly documented under TRAP no. 6018 (Sobotkova – Ross – Iliev 2018; Iliev *et al*. 2012, 21–22). It was noted during the survey that the looting activities are still in progress, further damaging the settlement.

A team from the Institute of Classical Archaeology, Charles University in Prague regularly participated in the TRAP activities, learning about the archaeology, history, and landscape of the Yambol District. Consequently, the next project concerning the investigation of the Yurta-Stroyno settlement was initiated in cooperation of the Regional Historical Museum of Yambol and the Institute of Classical Archaeology in Prague.

MAIN RESEARCH QUESTIONS AND AIMS OF THE YURTA-STROYNO ARCHAEOLOGICAL PROJECT

The Yurta-Stroyno Archaeological Project was designed for three years of field works and included three years of excavation (2014–2016) and one year of surface survey (2016).[11] The decision was made to focus on the presumed nucleus of the settlement, previously identified by TRAP and located near the Dereorman River.

By the initiation of the project in 2014, no other Roman rural settlements had been systematically investigated along the middle stream of the Tundzha River / in the Yambol District. Consequently, the main objectives of SAP investigation started with rather general questions focused on description of the chronological development of this specific settlement, identification of its architectural characteristics and possible layout, and description of its material culture, its specifics and variability. Additionally, more concrete questions were asked, especially concerning the foundation date of the settlement and its possible relation to the nearby burial mounds presumably dated to the end of the 1st – early 2nd c. AD, and to the military camp in Kabyle. Answering the foundation question would facilitate our understanding about the settlements' development along the middle stream of the Tundzha River in the early years of the Roman period and it might hint at the strength of the influence as well as availability of the Roman material culture to the local Thracian elite by that time. Besides the foundation date, through the variable material culture and language (inscriptions), we aimed to understand the origin and character of the inhabitants.

Several obstacles stood in the way of proper examination of the settlement. They were location specific and should be mentioned here for an explanation of the factors limiting the usage of particular archaeological approaches and methodologies during the research. One of the main problems was the dense vegetation covering the site, persisting even into the late autumn, and the trees covering the area close to the river. Major problems were also caused by the extensive trenches made by looters who excavated all around the settlement into considered depth (ca. 1 m) and dimensions (up to 2.5×2.5 m), as well as the excavated soil full of stones and architecture ceramics pilling up next to them, overgrown by vegetation. The resulting moon-like surface combined with dense vegetation cover proved unsuitable for geophysical prospection or other non-destructive under-ground penetrating measurements which in general limited our understanding about the settlement disposition and architecture. The mentioned conditions also complicated the surface survey since every examined polygon had to be extensively cleaned from vegetation using the scythe. With this point, we also touched the last major problem we faced, the lack of workers. The nearby villages are not very populated and despite offering reasonable financial conditions to the remaining inhabitants in the villages, we were very often unsuccessful in hiring them on a day-to-day basis, and consequently left to work in lower numbers than planed and expected. For any further field work in the area, it is necessary to bring workers from more populated areas, either from Elhovo or even from Yambol.

The illegal excavations and damage caused to the settlement was very severe already when SAP started in 2014. The destruction of the whole site is hard to assess, but based on the excavated area, the disturbance exceeds 50%. The settlement is hidden under the Bakadzhik Hill far from sight of any village and as such suitable for such kind of activity. Consequently,

11 Excavation reports were regularly published in journal *SH*: Tušlová – Weissová – Bakardzhiev 2014; Tušlová *et al.* 2015; Tušlová – Weissová – Bakardzhiev 2017; Tušlová – Weissová – Bakardzhiev 2018; and in *AOR*: Bakardzhiev – Kozarev 2015, 2016, 2017.

the excavations conducted by SAP were rather understood by us as rescue excavation than a long-term project. After all, besides all the above-mentioned reasons, another aim of SAP was to investigate as much as possible about the settlement before the looters entirely hinder its' further scientific explorations.

Not to conclude on an entirely pessimistic note, the robbers' trenches represented small test pits bringing interesting information above the ground from areas we did not manage to excavate in a proper manner. Consequently, among small finds and variable items originating from their trenches, the excavated soil revealed concentrations of iron slags, pieces of raw glass and glass-making waste and parts of architectural components. Due to this specific surface condition, the systematic total pickups could be applied over the nucleus of the settlement with a great success, not only recovering wide range of specific items but also assigning them into their approximate spatial context (see Weissová – Tušlová – Bakardzhiev 2022).

ABBREVIATIONS

AB = Archaeologia Bulgarica
AOR = Археологически открития и разкопки
JRA = Journal of Roman Archaeology
SH = Studia Hercynia
TIR = Tabula Imperii Romani (Ivanov ed. 2012)

BIBLIOGRAPHY

Agre 2007 = Агре, Д. 2007: Археологически проучвания на могила в землището на с. Стройно, община Елхово, Ямболска област. *AOR през 2006 г.*, 76–77.

Agre 2009 = Агре, Д. 2009: Археологически разкопки на могила в землището на с. Борисово, Елховска община. *AOR през 2008 г.*, 279–282.

Agre 2010 = Агре, Д. 2010: Археологическо проучване на две могили в землището на с. Бояново, Елховско. *AOR през 2009 г.,* 251–253.

Agre 2013 = Агре, Д. 2013: Археологически разкопки на могили нр. 3 и нр. 4 в землището на с. Борисово, община Елхово. *AOR през 2012 г.*, 164–166.

Agre, D. – Dichev, D. – Agre, G. 2019: Roman balsamarium shaped as a male head in feline-skin cap from the territory of southeast Bulgaria. *AJA* 123:4, 687–698.

Agre – Dichev – Hristov 2015 = Агре, Д. – Дичев, Д. – Христов, Х. 2015: Археологически разкопки на селищен обект в м. Манастирчето – Св. Илия, край с. Стройно, община Елхово. *AOR през 2014 г.*, 208–211.

Agre – Dichev – Hristov 2021 = Агре, Д. – Дичев, Д. – Христов, Х. 2021: Трако-римски селищен обект в м. Св. Илия в землището на с. Стройно, обш. Елхово. *AOR през 2020 г.*, 875–880.

Archibald, Z. 1998: *The Odrysian Kingdom of Thrace: Orpheus Unmasked*. Oxford.

Bakardzhiev 2007 = Бакърджиев, С. 2007: Сондажни археологически проучвания в м. Юрта при с. Стройно, община Елхово, област Ямбол. *AOR през 2006 г.*, 238–241.

Bakardzhiev 2008 = Бакърджиев, С. 2008: Сондажни археологически проучвания в м. Юрта при с. Стройно, община Елхово. *AOR през 2007 г.*, 471–473.

Bakardzhiev – Kozarev 2015 = Бакърджиев, С. – Козарев, М. 2015: Спасителни археологически проучвания на антично Селище в м. Юрта, с. Стройно, Община Елхово. *AOR през 2014 г.*, 570–572.

Bakardzhiev – Kozarev 2016 = Бакърджиев, С. – Козарев, М. 2016: Едовни археологически проучвания на антично селище в м. Юрта, с. Стройно, общ. Елхово. *AOR през 2015 г.*, 633–635.

Bakardzhiev – Kozarev 2017 = Бакърджиев, С. – Козарев, М. 2017: Редовни археологически проучвания на антично селище в м. Юрта, с. Стройно, Общ. Елхово. *AOR през 2016 г.*, 450–453.

Balabanov, P. 2011: Mortuary Archaeology in Roman Thrace: The Helikon funerary complex (Debelt Archaeological Reserve). In: I.P. Haynes (ed.): *Early Roman Thrace. New evidence from Bulgaria*. JRA Suppl. 82. Portsmouth, 106–114.

Bouzek, J. – Graninger, D. 2015: Geography. In: Valeva – Nankov – Graninger (eds.) 2015, 12–21.

Boyanov 2006 = Боянов, И. 2006: Римските ветерани от района на Кабиле. In: И. Илиев (ed.): *Поселищен живот в Тракия* 4, 235–242.

Boyanov, I. 2007: Two fragments from a military diploma in Yambol Museum. *AB* XI/3, 69–74.

Boyanov 2008 = Боянов, И. 2008: *Римските ветерани в Долна Мизия и Тракия (I–III в.)*. София.

Connor, S. – Herries, A. – Mooney, S. 2018: Paleoecology of the Middle Tundzha Plain. In: Ross – Sobotkova – Nekhrizov – Tzvetkova – Connor (eds.) 2018, 134–145.

Delev, P. 2015a: Thrace from the Assassination of Kotys I to Koroupedion (360–281 BCE). In: Valeva – Nankov – Graninger (eds.) 2015, 48–58.

Delev, P. 2015b: From Koroupedion to the Beginning of the Third Mithridatic Ware (281–73 BCE). In: Valeva – Nankov – Graninger (eds.) 2015, 60–74.

Dimitrova – Popov 1978 = Димитрова, Д. – Попов, Ж. 1978: *Археологически паметници в Ямболски окръг*. София.

Dimitrov 2004 = Димитров, З. 2004: Типология на архитектурните детайли в Долна Мизия и Тракия през римската епоха (I-II в сл. хр.). *Археология на Българските земи* 1, 203–256.

Dichev 2018 = Дичев, Д. 2018: Геофизични проучвания на обект в м. Манастирчето св. Илия в землището на с. Стройно, Общ. Елхово. *AOR през 2019 г.*, 724–726.

Dumanov, B. 2015: Thrace in Late Antiquity. In: Valeva – Nankov – Graninger (eds.) 2015, 91–105.

Graninger, D. 2015: Ethnicity and Ethne. In: Valeva – Nankov – Graninger (eds.) 2015, 22–32.

Haynes, I.P. 2011: Early Roman Thrace. In: I.P. Haynes 2011 (ed.): *Early Roman Thrace. New Evidence from Bulgaria*. JRA Suppl. 82. Portsmouth, 7–14.

Heřmánková, P. 2022: The Epigraphic Finds from Yurta-Stroyno in a Regional Context. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 118–132.

Ignatov – Gospodinov – Borisova 2010 = Игнатов, В. – Господинов, К. – Борисова, С. 2010: Спасителни археологически разкопки на надгробна Източната Могила, с. Караново, община Нова Загора. *AOR през 2009 г.*, 247–249.

Iliev *et al*. eds. 2012 = Iliev, I. – Ross, S. – Sobotková, A. – Bakardzhiev, S. – Connor, S. (eds.) 2012: *The Tundzha Regional Archaeological Project. Elhovo Survey* [Регионален археологически проект Тунджа. Проучване в Елхово]. Yambol.

Ivanov, R. ed. 2012: *Tabula Imperii Romani. K-35/2-Philippopolis*. Sofia.

Lozanov, I. 2015: Roman Thrace. In: Valeva – Nankov – Graninger (eds.) 2015, 75–90.

Madzharov, M. 2009: *Roman Roads in Bulgaria. Contribution to the Development of Roman Road System in the Provinces of Moesia and Thrace*. Veliko Turnovo.

Nývltová Fišáková, M. 2022: Analysis of the Osteological Material from Yurta-Stroyno. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 259–269.

Ross *et al*. eds. 2018 = Ross, S. – Sobotkova, A. – Nehrizov, G. – Tzvetkova, J. – Connor, S.E. (eds.): *Tundzha Regional Archaeological Project, Surface Survey, Palaeoecology, and related Studies (2009–2011) Final Report*. Oxbow.

Sears, M.A. 2013: *Athens, Thrace, and the Shaping of Athenian Leadership*. Cambridge.

Sobotkova, A. – Ross. S. – Iliev, I. 2018: Yambol survey results. In: Ross – Sobotkova – Nekhrizov – Tzvetkova – Connor (eds.) 2018, 146–156.

Sobotkova, A. – Longford, C. – Bakardzhiev, S. 2018: Excavations at Dodoparon, Yambol province. In: Ross – Sobotkova – Nekhrizov – Tzvetkova – Connor (eds.) 2018, 200–210.

Theodossiev, N. 2011: Ancient Thrace during the First Millenium BC. In: G.R. Tsetskhladze (ed.): *The Black Sea, Greece, Anatolia and Europe in the First Millenium BC*. Leuven, 1–60.

Tušlová, P. – Weissová, B. – Bakardzhiev, S. 2014: Stroyno Excavation Project, Introduction to the Site of Yurta–Stroyno and Report on the 2014 Season. *SH* XVIII/1–2, 16–24.

Tušlová *et al.* 2015 = Tušlová, P. – Weissová, B. – Bakardzhiev, S. – Čisťakova, V. – Frecer, R. – Janouchová, P. 2015: The Stroyno Archaeological Project, Report on the Season 2015. *SH* XIX/1–2, 243–261.

Tušlová, P. – Weissová, B. – Bakardzhiev, S. 2017: Yurta-Stroyno Archaeological Project. Preliminary Report to the Final Season of 2016. *SH* XXI/2, 99–112.

Tušlová, P. – Weissová, B. – Bakardzhiev, S. 2018: Excavations at the Roman site of Stroyno-Yurta (2014–2015): An interim report. In: Ross – Sobotkova – Nekhrizov – Tzvetkova – Connor (eds.) 2018, 191–199.

Valeva, J. – Nankov, E. – Graninger, D. 2015 (eds.): *A Companion to Ancient Thrace*. Malden – Oxford – Chichester.

Velkov, V. 1977: *Cities in Thrace and Dacia in Late Antiquity (Studies and Materials)*. Amsterdam.

Weissová, B. 2022: Shedding Light on Architecture of Roman Rural Settlements in Thrace. Ceramic and Stone Building Materials from Yurta-Stroyno. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 70–89.

Weissová, B. – Haubenthal, C. – Doležálková, V. 2022: The Milling Equipment. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 90–105.

Weissová, B. – Tušlová, P. – Bakardzhiev, S. 2022: Systematic Selective Survey of Yurta-Stroyno. A Methodological Approach to Sites Heavily Disturbed by Looters. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 53–69.

Zahrnt, M. 2015: Early History of Thrace to the Murder of Kotys I (360 BCE). In: Valeva – Nankov – Graninger (eds.) 2015, 35–47.

Petra Tušlová
Institute of Classical Archaeology
Faculty of Arts, Charles University
Celetná 20, CZ-11000, Prague 1
petra.tuslova@ff.cuni.cz

The Final Excavation Report

Petra Tušlová – Barbora Weissová – Stefan Bakardzhiev

ABSTRACT
The three-year excavation of the settlement of Yurta-Stroyno focused on uncovering foundation walls of a five-room house, located at the south-western edge of the settlement. The house was placed near the Dereorman River and in recent history it was looted by treasure hunters. Both these elements influenced its current state of preservation, hindering its proper investigation and interpretation. Nevertheless, abundant information could still be obtained from the house foundations itself, from the anthropogenic material associated with it, as well as from the behaviour of the looters. This article brings together several already published excavation reports to offer a final interpretation of the uncovered structure and its approximate chronology.

KEYWORDS
Bulgaria; Roman Thrace; rural settlement; *vicus*; excavation report; house construction.

INTRODUCTION

The investigation of the settlement of Yurta-Stroyno took place in the years 2014–2016 as a part of the Yurta-Stroyno Archaeological Project (SAP). The settlement itself was badly damaged in the past by looters and due to its remoteness, the illegal excavations are still ongoing. Consequently, the whole area of the settlement is covered by ditches and piles of soil and stones, suggesting heavy damage to the prime contexts. Bearing in mind possible difficulty with the stratigraphy, we have chosen an area with a visible part of a wall for the excavation, which was uncovered by the looters at the south-western edge of the settlement, near the Dereorman River. This selection guaranteed at least some results – identification and description of solid architecture connected to rural settlement in Roman Thrace along the middle stream of the Tundzha River. The selection proved to be correct, and a five-room house with courtyard on the north was uncovered in the course of the three-year project. The individual rooms of the house were marked by A–E from west to east, and they were gradually excavated together with the surrounding area, especially north of the house, where a courtyard has been detected. The excavation started from Room C, whose southern foundation wall was the one visible in terrain before the excavation. In the first year, 2014, parts of Rooms B, C, D + squares 90E_105N NE, 95E_105N NW were investigated (for excavation reports see Tušlová – Weissová – Bakardzhiev 2014; Bakardzhiev – Kozarev 2015); in 2015, excavation of the previously mentioned rooms continued, while the investigated area was extended towards the east, to Room E, and north, to square 100E_105N N + NE (see Bakardzhiev – Kozarev 2016; Tušlová *et al.* 2016; Tušlová – Weissová – Bakardzhiev 2018); in 2016 Room E was further excavated together with the area along the north running wall [SU083] and the courtyard in squares 105E_105N and 100E_110N SE (see Bakardzhiev – Kozarev 2017; Tušlová – Weissová – Bakardzhiev 2017). The investigation in the final year raised several questions about the continuation of the uncovered structure and its relation to another wall/house which appeared on the north over the courtyard. Unfortunately, these questions cannot be satisfactory answered without

further excavation. Consequently, our proposed interpretation of the house disposition and appearance is built on the current state of research, and we need to bear in mind that the overall picture might change based on results of further investigations.

NAMING SYSTEM AND THE DOCUMENTATION STRATEGY OF THE EXCAVATIONS

Prior to the excavation a 5×5 m grid of the settlement was created and placed according to the cardinal directions. The central square of the grid was marked as 100E_100N. Every other square placed on north, south, east and west was marked by another 5 m either added or taken off the original number of 100 according to the cardinal direction. E.g. one square of 5 m placed north from the central one was marked 100E_105N, one square south 100E_95N, one square east 105E_100N and the one on the west 95E_100N. This naming system provides flexibility and the possibility to expand in all possible directions. If needed, the 5×5 m square was divided into smaller unites, marked as sectors or sub-squares, most commonly to 2.5×2.5 m NW, NE, SW or SE sector of the individual square, e.g. 100E_100N NW referring to the 2.5×2.5 m north-western sector of at the given square.

The excavations were conducted stratigraphically. However, a big part of the investigated area proved to have been affected by the looters. Consequently, a different system had to be applied in these areas. The illegally excavated soil was assigned to the individual square and/or sector and throughout the excavation marked as treasure-hunters/looters soil (RT) and numbered as [SU001]. By default, RT soil [SU001] and with it associated material, does not carry any stratigraphical information and the material is possible to assign only to the specific area in which it was found (and which does not necessarily represent its original location). The same applies to the chronology of the finds, which are solely dated based on the parallels from different settlements or necropolises.[1]

Regarding the excavated area, which was not recently disturbed, context numbers were used for different situations. Within the text, they are presented in square brackets together with a shortcut for stratigraphical unit (SU): e.g. [SU023], starting by number 002. Subsequent context numbers were given to layers, ditches, fills of the ditches, and stone walls/structures (for the SU overview see **Tab. 1**). In several cases, the SU numbers were re-evaluated and joined together into one context; also, several numbers might have been used for the same layers/contexts over the excavated area, see **Tab. 2** for a simplified overview of SU in individual squares and sectors.

All the archaeological material from the excavation was collected. Bulk items such as architecture ceramics (AC),[2] bones and production wasters (i.e. slags) were washed (except the bones), counted, weighed, described as a group, and photographed in bulk. From the pottery and AC, a selection was made for further evaluation as the same forms/types repeated. Small finds were processed individually. They were described into an excel database, drawn and photographed.

1 In general, RT soil [SU001] contained mostly fragmented pottery, AC, and bones. Different material was rarely found, confirming this soil was carefully checked, and, with only few exceptions, any valuable objects were retrieved.

2 AC = architecture ceramics, including mostly fragments of roof-tiles, both *tegulae* and *imbrices*, only few bricks were found.

Several parallel numbering systems were applied for different types of finds. Small finds,[3] pottery, architectural ceramics, quern stones and organic finds (mostly charcoal) had an individual naming system following a similar pattern. For small finds shortcut SF + year of the excavation + serial number was used, each year starting with 001; i.e.: SF14_001, SF15_001 and SF16_001. For pottery, the Stroyno-Yurta shortcut SY was used, followed by the excavation year and by the serial number: SY14_001, SY15_001, SY16_001. For the rest of the material, the same shortcut as before (SY) was used + type of find, followed by the usual. i.e.: SY14_ AC_001 for architectural ceramics, SY14_QS_001 for quern stones, etc.

The bulk finds (pottery, AC, bones) are currently at the archaeological base in Kabile. The most significant small finds were given yet another different inventory number following the numbering system of the museum and are, together with all the small finds from the settlement, kept at the Regional Historical Museum of Yambol.

During the excavation, drawing and photographical documentation was kept on a daily basis. The site drawings as well as the finds drawings were scanned and kept in two copies, one in Yambol, one in Prague; so were the photos, excavation diaries and all adjacent documents, which were uploaded to external hard drives for each of the team to possess a copy of the complete documentation.

SU	Trench	Sector	Type	Short description
SU001	everywhere	×	fill, layer	soil excavated from the treasure hunters/looters trenches; the no. applies for the whole excavated area
SU002	110E_100N, 105E_100N, 100E_100N, 95E_100N	S	wall	the southern wall of the structure in the direction W–E
SU003	100E_100N	W	wall	eastern wall of Room B, in the direction N–S, connecting [SU018] and [SU002]
SU004	100E_100N, 105E_100N	W, E	wall	eastern wall of Room C, in the direction N–S, connecting [SU018]/[SU074] and [SU002]
SU005	90E_105N	NW, NE	layer	topsoil
SU006	100E_100N (S from the wall [SU002])	S	layer	topsoil
SU007	100E_100N, 95E_100N	Everywhere	layer	virgin soil
SU008	100E_100N (Room C)	SW	fill	fill of a ditch dug in the virgine soil; rich on finds
SU009	100E_100N	S	layer	sandy light grey soil rich in charcoals, under topsoil [SU006]. NOT EXCAVATED
SU010	90E_105N	NE	layer	levelling layer
SU011	90E_105N	NE	layer	continuous layer of middle to biger size stones; part of a pavement or road
SU012	95E_105N	NW	layer	topsoil
SU013	105E_100N (Room D)	SW, NW	layer	floor level - inside of the structure
SU014	105E_100N (Room D)	SW, NW	layer	floor level - inside of the structure

3 Including different materials and objects, such as glass items and vessel fragments, different metal items, coins, worked stone objects of small dimensions, worked bone objects and fragments of terracotta including lamps, spindles, loom weights, etc.

SU	Trench	Sector	Type	Short description
SU015	100E_105N, 95E_105N	SE+NE, S	layer	topsoil
SU016	95E_105N	NW	layer	levelling layer
SU018	100E_105N, 95E_105N, 90E_105N	S	wall	northern wall of the structure in the direction W–E; western section
SU020	105E_100N	N	layer	topsoil
SU021	95E_100N (Room B)	SE	fill	fill of a ditch dug in the virgine soil; rich on finds
SU023	95E_105N, 100E_105N	NW, SE	layer	levelling layer
SU025	95E_105N	NW	layer	virgin soil
SU027	90E_105N	SE	layer	levelling layer
SU028	95E_100N	W	wall	eastern wall of Room A in the direction N–S, connecting [SU018] and [SU002]
SU029	100E_100N (Room C)	NW	fill	fill of a ditch; only partly excavated
SU033	100E_105N	SE	layer	levelling layer
SU034	105E_105N	SW	layer	topsoil
SU035	100E_105N	NE	layer	topsoil
SU036	100E_105N (Room C)	SW	layer	foundation trench of the wall [SU018]
SU037	105E_105N	SW	layer	topsoil
SU038	100E_105N	NE	layer	levelling layer
SU039	105E_105N	SW	layer	topsoil
SU040	100E_105N	NE, NW	layer	levelling layer
SU041	105E_105N	SW	layer	topsoil
SU042	105E_105N	SW	layer	topsoil
SU044	105E_105N	SE	layer	floor level - outside of the structure
SU045	105E_105N	SE	layer	floor level - inside of the structure
SU046	105E_100N	SE	layer	floor level - inside of the structure
SU047	100E_105N	NE	layer	levelling layer
SU049	105E_100N	SE	layer	floor level - outside of the structure
SU050	105E_100N	SE	layer	floor level - outside of the structure
SU052	100E_105N	NE	layer	levelling layer
SU053	105E_105N	SW	layer	floor level - inside of the structure
SU054	105E_105N	SW	layer	floor level - inside of the structure

SU	Trench	Sector	Type	Short description
SU057	100E_105N (Room C)	SE	fill	fill of a ditch
SU058	110E_100N	NW	layer	virgin soil
SU059	100E_105N	NE	layer	levelling layer
SU060	105E_105N	SW	layer	virgin soil
SU061	110E_100N	NW	fill	fill of a ditch dug in the virgine soil
SU062	105E_100N	NE	wall	eastern wall of Room D, in the direction N–S, connecting [SU074] and [SU002]
SU063	105E_100N	NE	layer	floor level - inside of the structure
SU064	100E_110N	SE	layer	topsoil
SU065	100E_105N	NE	layer	virgin soil
SU066	105E_105N	SE	layer	floor level - inside of the structure
SU067	100E_105N	SE	layer	virgin soil
SU073	105E_100N	SW	layer	floor level - outside of the structure
SU074	105E_105N	SW	wall	the northern wall of the structure in the direction W–E; eastern section
SU075	110E_100N (along the wall [SU002])	SE	layer	turned to be RT soil [SU001]
SU076	110E_100N, 110E_105N	E	wall	eastern wall of Room E, in the direction N–S, connecting [SU074] and [SU002]
SU078	100E_110N	SE	layer	levelling layer
SU079	105E_105N	NE	layer	levelling layer
SU082	105E_105N	N	layer	levelling layer
SU083	110E_105N, 110E_110N, 110E_115N	E, Cent, W	wall	the eastern wall in the north direction
SU084	100E_110N	SE	layer	levelling layer
SU085	110E_110N N, 110E_115N S	×	wall	small part of a wall
SU086	110E_110N, 110E_115N (along the wall [SU083])	×	layer	topsoil
SU087	100E_110N	SE	layer	levelling layer
SU088	100E_110N	SE	layer	levelling layer
FA01–FA03	105E_105N	NW	layer	topsoil; mechanical layer of 10 cm
FA04–FA09	105E_105N	NW	layer	levelling layer; mechanical layer of 10 cm
Canceled/merged SU numbers: SU017, SU019, SU022, SU024, SU026, SU030–SU032, SU043, SU047, SU048, SU051, SU055–SU056, SU068–SU072, SU077, SU080–SU081, SU089.				

Tab. 1: List of stratigraphic units (SU) and their basic description.

Trench	Sector	Topsoil	Levelling layer	Different layer(s)	Virgin soil
90E_105N	SE	SU001	SU027		
90E_105N	NE	SU005	SU010	SU011	
90E_100N	×	SU001			SU007
95E_105N	NW	SU012	SU016		SU025
95E_100N	×	SU001		SU021	SU007
100E_105N	NE	SU001, SU015, SU035	SU038, SU040, SU047, SU052, SU059		SU065
100E_105N	S from the wall SU018	SU001		SU029, SU036, SU057	SU007
100E_105N	N from the wall SU008	SU015	SU023, SU033		SU067
100E_100N	S from the wall SU002	SU006		SU009	
100E_100N	N from the wall SU002	SU001		SU008	SU007
100E_110N	SE	SU064	SU078, SU084, SU087		SU088
105E_105N	NE	SU001	SU079		
105E_105N	N from the wall SU074	SU001, FA01–FA03	SU082, FA04–FA09		
105E_105N	S from the wall SU074	SU034, SU037, SU039, SU041, SU042		SU045, SU046, SU053, SU054, SU066	SU060
105E_100N	N from the wall SU002	SU020		SU013, SU014, SU063	SU060
105E_100N	SE from the wall SU002	SU020		SU044, SU049, SU050	
105E_100N	SW from the wall SU002	SU020		SU073	
110E_100N	NW	SU001		SU061	SU058
110E_100N	SE along the wall SU002	SU001 = SU075			

Tab. 2: Overview of stratigraphic units in individual squares and sectors. Topsoil represents the upper most layer while virgin soil the lowermost layer. The column 'Different layer(s)' may include floor level (both inside or outside of the house) or fills of the ditches (see Tab. 1).

RESULTS OF THE EXCAVATIONS

THE FIVE-ROOM HOUSE

Prior to our investigation, a small part of an uncovered stone wall (about 30 cm long) was spotted at the south-western part of the settlement. This area was chosen as the starting point for the excavation, and the central square = the central trench, **100E_100N**, was placed here.

Within the three years of excavation, the initial investigated area was extended revealing wall foundations of a five-room structure (Rooms A–E) with attached courtyard on the north. The uncovered structure is oriented almost in an east-west – north-south direction with about 10° inclination of the walls (**Figs. 1–2**). The western room of the structure is not fully complete as it was disturbed by the Dereorman River (Room A) and the east-west length of the preserved foundation wall in this area is only up to 3.55 m. Regarding the other rooms, their dimensions in the east-west axis differ considerably: Room B: 4.40 m, C: 4.15 m, D: 3.10 m, E: 4.77 m. Vice versa, the dimensions of the north-south running perimeter walls and walls which separate the individual rooms, are almost the same everywhere, measuring 4.75–4.85 m in each room. The maximal preserved dimension of the whole structure from west to east is ca. 23 m. The eastern wall of Room E continues another 7.5 m north over the structure, measuring, together with the length of the room, about 13.5 m. The north running wall ends abruptly as it was excavated by the looters, and its possible continuation could not be confirmed.

The foundation walls of the structure are preserved up to 80 cm below the ground (see **Fig. 4** wall [SU003]). They are made of fine-grained low-grade marble which was locally quarried (see Haubenthal 2022, sample no. 4). The outer facing stones of the wall foundations are bigger than the stones in the middle; however, all are quarry stones and none of them is worked. The width of the wall measured on the upper line of stones stretches from 50 to 70 cm. The perimeter walls of the whole house structure and the walls dividing the individual rooms do not significantly differ in width. Since the structure is placed on a gentle hill, sloping from north to south, the depth of the foundation varies, with deeper ones on the south, shallower ones on the north. We may notice the intention of keeping the upper line of the foundation wall of the whole house in one elevation. The eastern part of the house, including the northern tip of the wall [SU083] and the northern and southern walls of Room E ([SU004] + [SU002]) is in one line, with a constant height of the upper part of the foundation wall around 214.84 m.a.s.l. The northern, east-western wall ([SU018] + [SU074]) also maintains a similar elevation, however, the southern, east-western wall [SU002] drops about 50 cm down from the turn of Room E/D towards the west, to the beginning of Room B.[4] A drop about 20 cm in height from north to south might be also noticed on the inner north-south placed walls, especially on [SU003] and [SU004]. This movement of the whole structure is likely caused by the vicinity of the Dereorman River, which seems to disturb the western part of the house causing its slight sinking.

There is no mortar or any other solid binding material holding the individual stones together. Nevertheless, there might be soil with a few pottery fragments, or some small finds, spread among the individual stones. In several cases, broken quern stones were incorporated into the upper layers of the foundation walls (see Weissová – Haubenthal – Doležálková 2022), in one case, also fragment of a horse rider relief was found (see Heřmánková 2022a,

4 We are counting here the height of the eastern corner of Room B – the cross section of wall [SU002] and [SU003], from here further west the stone wall still drops for another 20 cm, but we can clearly see this area is secondarily damaged.

pl. 4/1:3). Regarding the quern stones, their chronological classification is difficult as similar forms and types were used during the Hellenistic period. However, the fragment of the horse rider relief can be clearly dated to the Roman period. The same chronology applies to the finds from the soil spread among the stones of the foundation walls. Consequently, we may assume, spolia and soil related to previous Roman period habitation were used for building the foundation walls.

We can say little about the original inner surface of the individual rooms since they proved to be almost fully excavated by the looters below the floor level. However, there is one exception, Room D. This room was (only) slightly disrupted by the looters and trees, and gravel and pebbles were found spread over its inner space in a height several centimetres below the top stone layer of the foundation walls (see below). If we consider the same set up for the whole structure, the biggest part of the foundation walls would be buried underground with only several centimetres visible above the ground.

There were very few fired bricks found on the site. Consequently, we may expect the upper part of the walls was of a half-timbered adobe construction. No wood beams were found; however, fragments of mudbrick were identified in several of the ditches located inside the rooms, and on several places over the investigated area were attested fired fragments of clay with imprinted wood beams. Additionally, several pieces of plaster painted white and one decorated by a red colour were uncovered, giving us an idea how the above-ground construction could have been treated. In the levelling layer several fragments of flat marble plates of different thickness were also found, likely an interior decoration (Weissová 2022, tab. 5:31–33, pl. 1/3:31–33).

Within the excavations, only roof tiles (*tegulae*) of Laconian type were found. The most common *imbrices* were semi-oval in shape. Despite none of these being fully complete, many were preserved into considerable dimensions, with the best examples of *tegulae* measuring 593+ mm in length and 406–420 mm in width and of *imbrices* with 244+ mm in length (see Weissová 2020, 71).

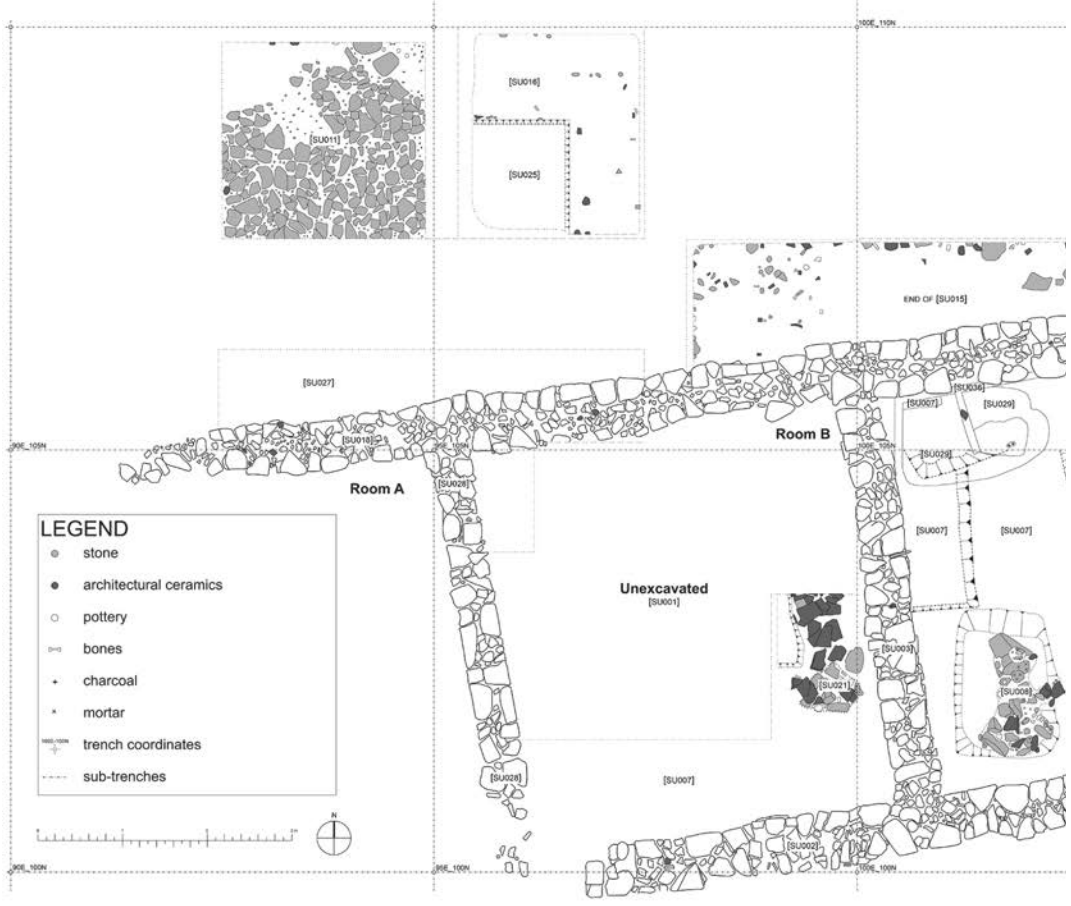
INDIVIDUAL ROOMS OF THE HOUSE

As mentioned above, the inner space of the house was almost fully excavated by the looters. Their work was surprisingly professional, as they first found perimeter walls of the whole structure, identified outside/inside, and excavated only the inner space – the individual rooms. The depth of their excavations varied room to room, and except Room D, it reached well below the floor level, wall to wall. In this manner, Rooms A, B, C and E were excavated by the looters, leaving the remains of some (original?) contexts either in greater depth, or just along the foundation walls (**Fig. 3**).

Room A is the westernmost room of the structure. Only parts of its foundation walls were preserved, as the Dereorman River, and a grown tree on its bank, create its western border and either limited its further excavation (as for the northern wall [SU018]) or damaged part of it (as for the southern wall [SU002] which seems to be taken down by the river). Only the eastern part of the inner space of the room was excavated. Here, the yellow virgin soil [SU007] was reached; no ditches were found.

Room B is the second westernmost room, which is divided from Room A by the inner wall [SU028], from Room C by the inner wall [SU003] and delimited by the perimeter wall [SU018] on the north, and [SU002] on the south. The inner space of the room was fully excavated by

Fig. 1: Final ground plan of the excavated house at Yurta-Stroyno, in scale 1:20. Drawn by SAP team, digitized by M. Kobierská.



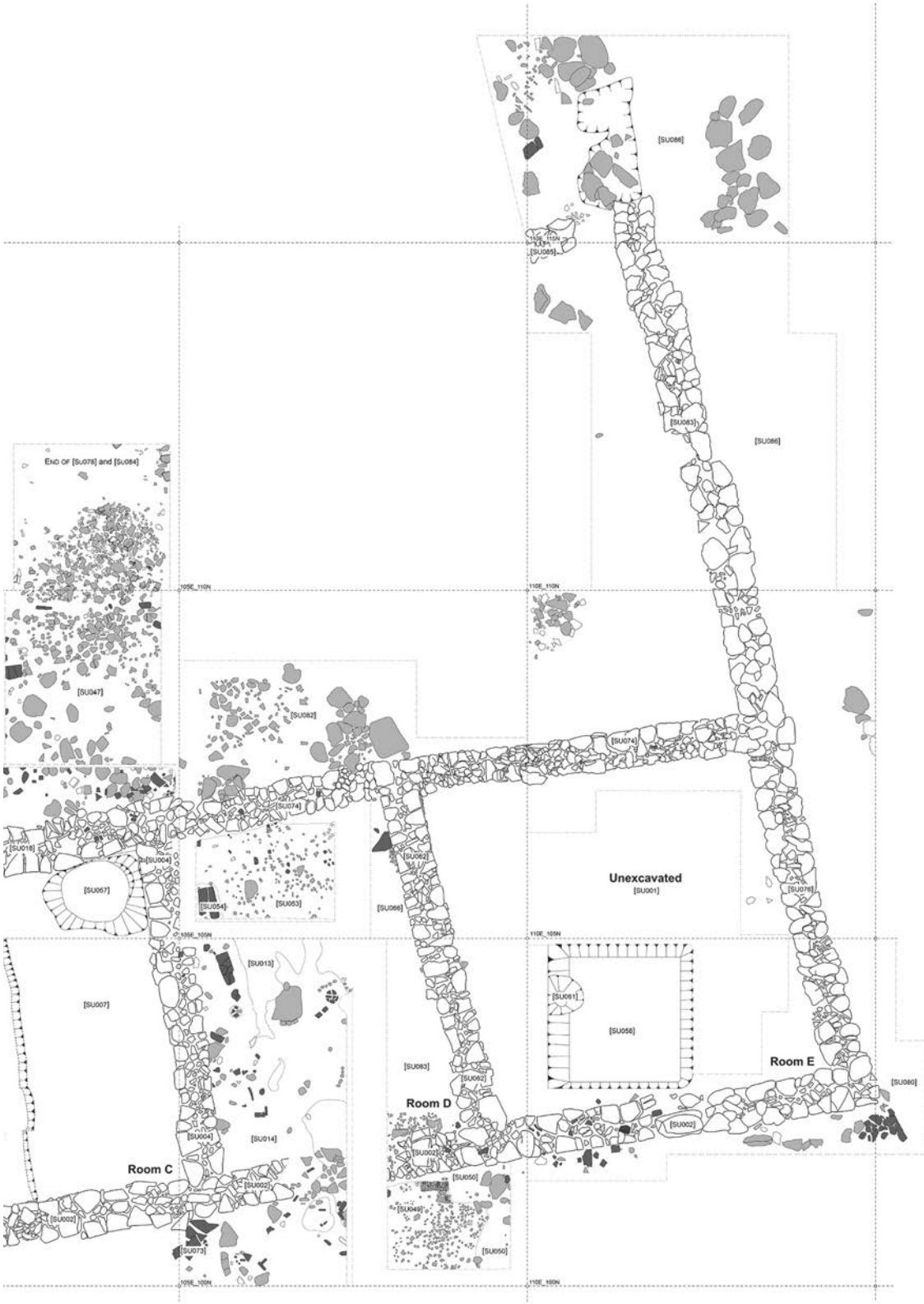

[SU086]
[SU085]
[SU083]
[SU086]
End of [Su078] and [Su084]
105E_110N
110E_110N
[SU047]
[SU082]
[SU074]
[SU074]
[SU016]
[SU004]
[SU062]
[SU067]
[SU054]
[SU053]
[SU066]
Unexcavated
[SU001]
[SU078]
105E_105N
110E_105N
[SU013]
[SU007]
[SU061]
[SU058]
[SU063]
[SU062]
Room E
[SU080]
Room D
[SU004]
[SU014]
[SU002]
[SU002]
Room C
[SU050]
[SU049]
[SU002]
[SU073]
[SU050]
105E_100N
110E_100N

Fig. 2: Photo mosaic combining a drone photo after the excavation season in 2015 and orthophotos of 2014 and 2016. By O. Trhan and P. Tušlová.

the looters to the virgin soil [SU007]. A big fallen tree was lying on the south-eastern corner of the room, preventing a small part of the area from the illegal excavation (see **Fig. 3**). Here, under the topsoil, a ditch of dimension 70×45 cm, about 20 cm deep was found, which was dug directly into the virgin soil. The fill [SU021] of this ditch was rich on finds, featuring a mixture of different pottery classes, including amphorae fragments of Dressel 24 Family. Several of the pottery fragments had ancient breaks which joined together. Further, several terracotta lamps were retrieved (Frecer 2022, tab. 1:1, 6–8, 20); one blue hexagonal glass bead (Čisťakova – Zlámalová Cílová 2022, tab. 6:1); one spacer bobbin (Weissová 2022, fig. 4:26); and several iron nails from roof construction and door decoration. There was very small amount of animal bones (Nývltová Fišáková 2022, tab. 2).

All the material from the fill [SU021] was comparably less fragmented than the one normally retrieved from RT soil [SU001]. Because it also preserved several complete finds, we may quite confidently state, it escaped the modern looters attention. Its mixed character and placement (under the original floor) however suggest it might have been connected to some older ditch, which could have been made any time after the house destruction. Regarding the character of the finds found in the ditch, this does not seem to be a looting trench, unless it would be done in antiquity, when terracotta lamp and glass bead would not have had a value for the finder, who was looking for more precious items such as non-ferrous metals, gold/silver coins, jewellery, etc.

Fig. 3: Division of Room B and C with the RT soil [SU001] covering the remaining contexts dug under the inner floor of the house. On the left of the wall [SU003], in Room B, we may see the surface of [SU021] originally covered by a branch of a tree. In the same room, the reverse stratigraphy may be noticed, with roof tiles and other heavy objects placed on the bottom of the RT soil [SU001].

Room C is the central room of the structure, which is divided from Room D by the inner wall [SU004], with a perimeter wall [SU018] on the north and [SU002] on the south. This room preserved the most complex archaeological situations with several ditches uncovered under the RT soil [SU001] dug into the virgin soil [SU007], specifically [SU008], [SU029], [SU036] and [SU057] (**Fig. 4**).

[SU008] is a fill of a ditch, which seems to have similar character as [SU021] in Room B, but it is much bigger (145×105 cm) and deeper (65 cm). Among the diverse pottery classes, several fragments of Dressel 24 Family and Kapitän II amphorae were uncovered (Tušlová 2022, SY14_070, SY14_071); also quite high diversity of animal bones was identified (Nývltová Fišáková 2022, tab. 2). From the small finds is especially notable the marble head of bearded man broken off a small statuette (Minaříková 2022, tab. 1:1); further three blue glass beads, two hexagonal, of the same type as found in [SU021] (Čisťakova – Zlámalová Cílová 2022, tab. 6:2–3), and one of rounded form (Čisťakova – Zlámalová Cílová 2022, tab. 6:8); complete bone pin (Minaříková 2022, tab. 1:8) and many iron nails from roof construction as well as from door decoration.

[SU029] is a fill of a ditch located on the north-western corner of Room C. It was partly excavated the first year (2014) when, over it, the mass of a northern profile of square 100E_100N was laid. Only a triangular-shaped corner was visible under the profile. The corner was excavated to the bottom – to a depth of 54 cm. There were very few finds, including one body fragment of a glass vessel and a few undiagnostic pieces of pottery and AC. The soil was grey,

Fig. 4: Room C with photos of individual situations in various states of excavation – [SU008], [SU029], [SU036], [SU057]. Up: after removing the RT soil [SU001] – northern profile; [SU029] with an excavated corner, [SU057] before excavation. Middle: before removing the RT soil [SU001] – northern profile, with [SU008] excavated to virgin soil [SU007]. Down: an example of the foundation wall [SU003] running in a slight inclination in north-south direction dividing Room B and C. Photos by P. Tušlová.

loose with gravel and pebbles. In 2015, after the northern profile of the square 100E_100N was removed, the feature was cleaned on the surface to define its borders (ca. 173×100 cm) and left unexcavated.

[SU036] represents a tiny strip of brownish layer preserved close to the stone wall, the foundation trench. This is the only place from the whole Room C where the foundation trench was identified. It seems it was preserved due to the movement of the upper stone layer of the foundation wall towards south, slightly overhanging the lower stone layers, and protecting their vicinity from the looter's pickaxes and shawls. This tiny strip of brownish colour proved to be quite significant for the whole excavations. Besides several tiny pottery sherds and glass fragments, it also revealed one bronze coin, which was literally stuck to the foundation wall. The coin is dated to Severan Dynasty, and it is a rare issue of Diadoumenian minted in Cyzicus in AD 217–218 (Heřmánková 2022b, pl. 5/1:8) which gives us *terminus post quem* for construction of the foundation walls.

[SU057] is an up to 1.22 m deep fill of a ditch ca. 1.45×1.12 m located in north-eastern corner of Room C. The soil here was of dark-grey colour, characteristic for high amount of charcoal including tiny to several centimetres big pieces which were spread in all levels of the fill. Several bigger stones were found on its upper half together with fragments of roof-tiles and two big chunks of mudbricks (**Fig. 4**). There was quite a small amount of fragmented pottery and glass, some bones (Nývltová Fišáková 2022, tab. 2), pieces of mortar and iron items – especially nails from a roof and door decoration. Among the pottery are tiny fragments of fine ware and cooking ware, often very fragmented with ancient breaks joining together, such as the case of a frying pan reconstructed out of 11 small pieces or of a clay unguentarium base, put together out of five fragments (Tušlová 2022, SY15_340, SY15_338). Among the small finds we may find one clay token made from Dressel 24 Family amphora; one hexagonal glass bead (Čisťakova – Zlámalová Cílová 2022, tab. 6:4); two worked bones (Minaříková 2022, tab. 1:11, 13); and again, as in all ditches so far, several iron nails from a roof and door decoration. Also of interest is the amber coloured glass fragment of a mould blown vessel, dated to the 4th–6th c. AD (Čisťakova – Zlámalová Cílová 2022, pl. 7/6:144),[5] and another coin of the Severan Dynasty, this time of Ioulia Domna minted in Anchialos in AD 193–217 (Heřmánková 2022b, pl. 5/1:6). The high amount of charcoal, many tiny fragments of mortar, several pieces of mud bricks and very fragmented pottery give a different character to this fill comparing to [SU008] and [SU021]. It seems to be rather connected to some remains of destruction. For its interpretation, the fragment of the amber coloured glass, likely dated to the Late Antiquity, which is mixed with other material dated to the 2nd–4th c. AD, such as the token made of Dressel 24 Family amphora, the hexagonal bead, or the coin of Ioulia Domna, might also be of importance. This mixture could have been created by a ditch dug through the cultural layer above the floor level of Room C during the Late Antiquity (or later), subsequently filled with the excavated material mixed with some destruction layer and occasional objects of later chronology.

Room D is the second easternmost room of the structure. The room perimeter walls are [SU074] on the north and [SU002] on the south. The division from Room C is provided by the inner wall [SU004], and from Room E by [SU062]. Being 3.10 m in width, it is the narrowest room in the structure. Besides that, there are several other specific phenomena of this room. The northern foundation wall [SU074] seems to be considerably shallower than the other

5 There were in total four fragments of the amber coloured glass identified in Yurta-Stroyno, the other three were found during the surface survey (see Čisťakova – Zlámalová Cílová 2022, pl. 7/6:141–143).

Fig. 5: Photos of Room D. Up, left: the inner pebble floor partly damaged by roots of trees with the terracotta tube *in situ*; up, right: the outer area south of the wall [SU002]. Middle: a fragment of the horse rider relief incorporated into the wall [SU002] (left). Down: the comparatively shallow northern wall [SU074] of Room D. Photos by P. Tušlová and J. Tlustá.

walls of the structure,[6] featuring (only) 2–3 layers of stone (around 30 cm) (**Fig. 5**). Another interesting phenomenon of this room is the lack of interest of the looters in its excavation, as they have dug only several small trenches up to/or just slightly below the floor level. There does not seem to be an obvious reason for this behaviour, there were no main obstacles limiting the access or covering the surface (besides three small-size trees on the northern part of the room). Additionally, on each of its sides, a fully excavated room is located. We may try to

6 Not all the foundation walls had been excavated below the lowest stone layer, consequently, we cannot state that this is the only place of the whole house, where the wall is shallow. However, we can compare it with Room C, where parts of the foundation walls ware partly uncovered in all cardinal directions including the northern wall [SU018], to which the wall [SU074] is a continuation. The walls for comparison are the western wall [SU003], the southern wall [SU002], and the eastern wall [SU004] of Room C. The height of all these walls is in a range of 70–85 cm.

look for the reason in the character of the room itself. Perhaps the looters found out through several small sondages that the room is not as rich in finds as the other ones and left it further unexcavated. The truth is, that we have indeed retrieved a very small number of finds from the room. Regarding its stratigraphy, below the topsoil, scattered fragments of roof tiles were hit, placed on a compact grey soil compound of gravel and pebbles, the floor level [SU013].[7] Additionally, one big stone of roughly square shape was set in the floor close to the centre of the room and a terracotta tube was found sunk *in situ* running almost in parallel with the western wall [SU004]. Under the floor level, the yellow virgin soil was hit [SU060].

Within the gravel and pebbles, very fragmented pottery was spread, including pieces of Dressel 24 Family amphorae, red-slipped pottery dated to the 2nd–4th c. AD, several glass fragments including one with relief snake-thread decoration dated to the 3rd c. AD (Čisťakova – Zlámalová Cílová 2022, tab. 5:100), one round glass bead with dotted decoration (Čisťakova – Zlámalová Cílová 2022, tab. 6:13) and one terracotta figurine (Minaříková 2022, tab. 1:4).

While cleaning the southern foundation wall [SU002] of Room D, part of a marble relief of a horse rider was found incorporated into the upper stone layer, placed by the worked side up (Heřmánková 2022a, tab. 1, pl. 4/1:3) (**Fig. 5**). In the same section of the wall [SU002] a big, worked stone (ca. 56×28 cm, 25 cm in height) was laid on the upper layer of the foundation wall, placed in north-south direction covering all its width. It is interesting that this stone has the same elevation of 214.84 m.a.s.l. as the eastern (not sunken) part of the house, while the wall [SU002], on which it is sitting, is already 35 cm below this number. Perhaps the stone was compensating for the height of the wall at the time the house was already sinking into the ground.

Since the ground conditions in this area were favourable (i.e. no trees nor trenches), we have extended the excavated area south from Room D outside of the structure (105E_100N SE). Here, under the topsoil [SU020], layer[8] with the similar characteristic as the floor level [SU013] inside of Room D was uncovered. The outer area was compound of compact grey soil covered by gravel, pebbles, and tiny fragments of AC; it was also located in the same height (elevation) as the floor level inside Room D. We can quite confidently assume this is a walking surface. No finds, besides the AC fragments, were uncovered on the surface.

Room E is the easternmost room of the structure, separated from Room D by the inner wall [SU062], with the perimeter wall [SU074] on the north, [SU002] on the south and [SU076] on the east. Before any investigation, we could see an unnaturally looking heap of soil on this place. After cleaning the surface from vegetation, it was quite clear, this area had also been excavated by the looters (**Fig. 6**). To confirm our assumption, a 2×2 m sondage was placed in the NW section of square 110E_100N. The sondage was led to the yellow virgin soil [SU058]. A ditch of dimensions 56×50+ cm, 84 cm deep, was found within the sondage, under the RT soil [SU001], dug directly into the virgin yellow soil. Its fill [SU061] was rich in AC, especially in rooftiles, and in big-size stones. Besides that, it contained several fragments from three different vessels, including ten fragments of one casserole (creating about 60% of the whole vessel); three body fragments of Dressel 24 Family amphora (Tušlová 2022, SY15_349, SY15_348); and five body fragments of a small jug. Many fragments had old breaks which joined together. The character of this fill is similar to the material accumulation of [SU021] in Room B and [SU008] in Room C. No other features were found in the sondage, and it was indeed

7 See **Tab. 2**: [SU013] = [SU014] = [SU045] = [SU046] = [SU053] = [SU054] = [SU063] = [SU066].
8 Composed of [SU044] + [SU049] + [SU050].

confirmed, that the inner space of the room had already been excavated by the looters. The RT soil [SU001] covering the trench was loose, full of vegetation matter and occasional butts from cigarettes, with heavy rooftiles and stones accumulated at the bottom of the RT trench (**Fig. 6**). The reverse stratigraphy and modern material in the soil is very clear proof of recent human activity, to us already well known from the other rooms. In accordance with the already disturbed character of the room it was decided to follow only the foundation walls *via* narrow trenches cut on both sides along their course, to reconstruct the shape and dimension of the whole structure. This objective was met, and Room E proved to be indeed the last room of the structure. However, the story was not over yet as the most eastern wall [SU076] of Room E turned north [SU083] and continued another 7.5 m after which it was interrupted by a ditch dug by the looters directly into the wall. This north heading wall [SU083] creates the eastern delimitation of the inner courtyard of the structure.

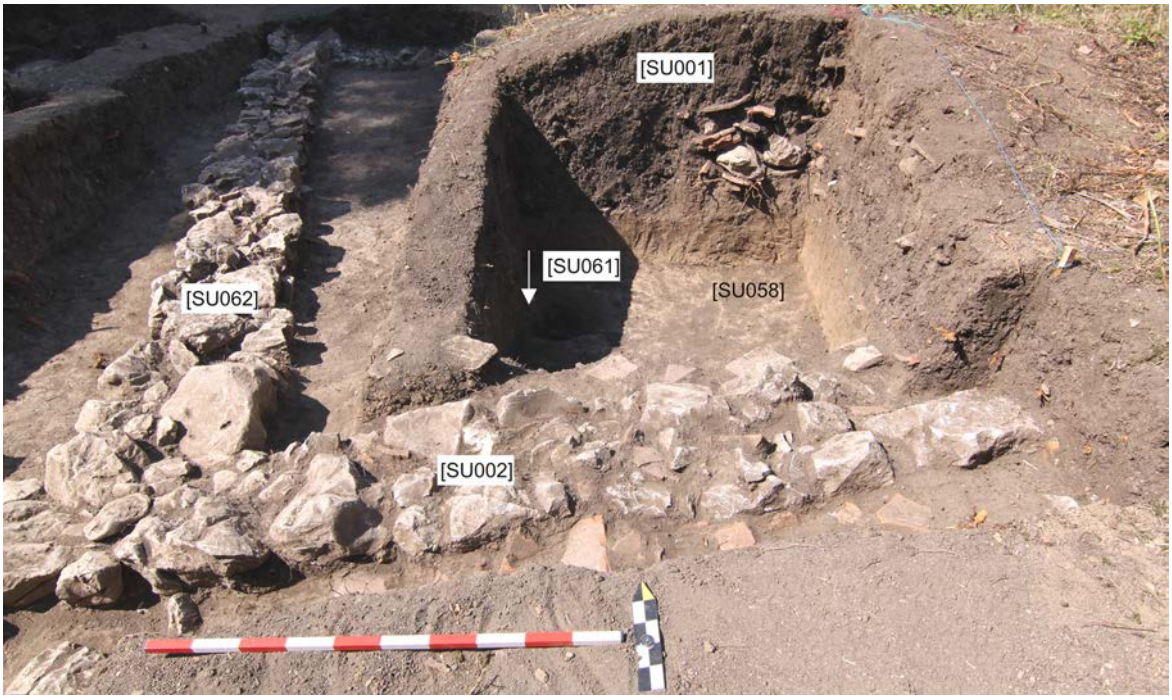


Fig. 6: Room E with a heap of RT soil [SU001] and accumulation of heavy objects (AC and stones) in its centre. Photo by B. Weissová.

THE NORTHERN COURTYARD

The area on the north from the five-room structure was less affected by the looters, with only a few ditches made prior to our excavations. Several squares were opened there: 90E_105N NE; 95E_105N NW, SE; 100E_105N SE, SW, NE; 100E_110N SE; 105E_105N N as well as several smaller trenches along the walls with [SU018], [SU083], and [SU085] (**Fig. 1**). The stratigraphy of this area, with few exceptions, followed the same pattern (from top to bottom): black coloured topsoil (up to 55 cm deep), compact grey layer rich on heterogenous archaeological material and stones (other 35–40 cm), and the yellow virgin soil at the bottom (**Figs. 7–8**).[9] The

9 More detailed stratification was provided during the excavation when small differences in the layers were noticed (different density of finds, colour, stones, etc.). However, many layers were re-

topsoil preserved a mixture of quite fragmented heterogeneous material. The yellow virgin soil had a sandy character which, together with its light colour, hints at its origin as an alluvium from the nearby Dereorman River. The grey compact layer in the middle of these, however, proved to be the most important source of data. It seems to be an original layer, which was laid down within a single action as numerous pottery fragments retrieved from different excavated trenches/areas and from various heights of this thick layer joined together. It is very rich in material, including a high number of stones, architecture ceramics, pottery, animal bones, production wasters, and fragments of small finds. Because of its characteristics, it was marked as 'levelling' layer in the previous excavation reports, composed of the settlement waste mixed with stones and AC, which was spread over the courtyard in one action, perhaps for some land elevation purposes or as a drainage.

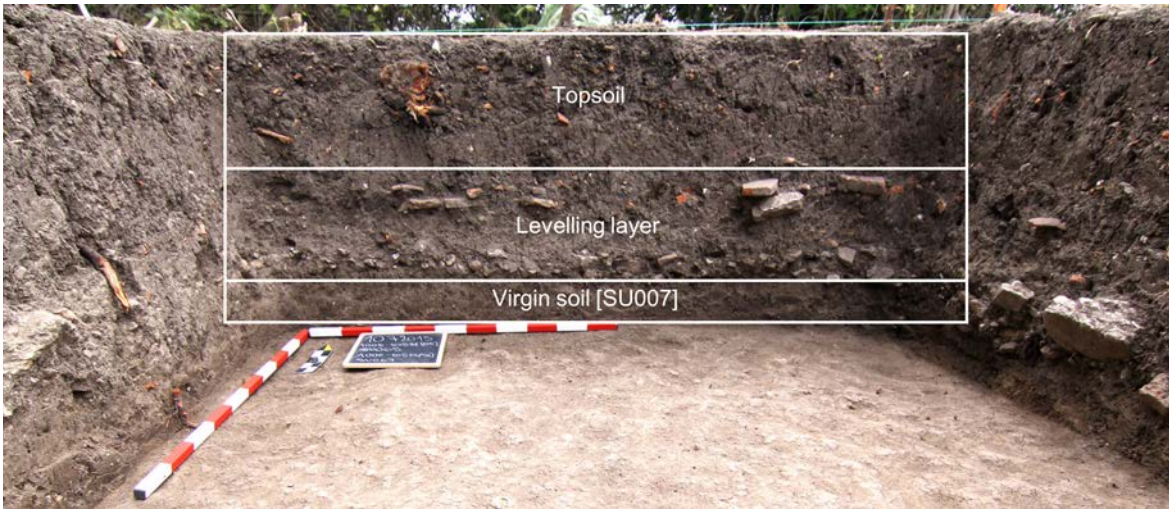


Fig. 7: Photo of northern profile of the sector 100E_105N NE with marked layers. The levelling layer might be even visually divided into several smaller sub-layers. Photo by P. Tušlová.

The exception to the described stratigraphy is a sector 90E_105N NE, north of Room A, where, under the topsoil [SU005], the levelling layer [SU010] was covering a solid surface made of bigger-size stones [SU011] (**Figs. 1**, **2**). Consequently, we may count here one more layer – the stone layer [SU011] – which seems to be residue of some road or path. The stones are closely laid next to each other without space for any other material. It is strange that in the trench 95E_105N NW, which is just next to it on the east, no stone layer was found at all, and the levelling layer [SU016] was laid there directly on the virgin soil [SU025].

The most interesting situation concerning the courtyard appeared north of Rooms C and D, in sectors 100E_105N NE, 100E _110N SE and 105E_105N N. This area proved to be the richest one on finds, with the majority of pottery and the small finds located just north of the structure (i.e. close to the foundation walls [SU018] and [SU074]). The stratigraphy in the whole area followed the typical pattern: topsoil, levelling layer, virgin soil. Towards the yellow virgin layer, the stones in the levelling layer grew bigger and more abundant. They were, however, still mixed

-evaluated after the material processing, as many fragments (of various materials) from different layers joined together. Their separation was however important to understand they might have been laid down in several rounds, as in the case of the levelling layer (see below). For the stratigraphical overview see **Tab. 2**.

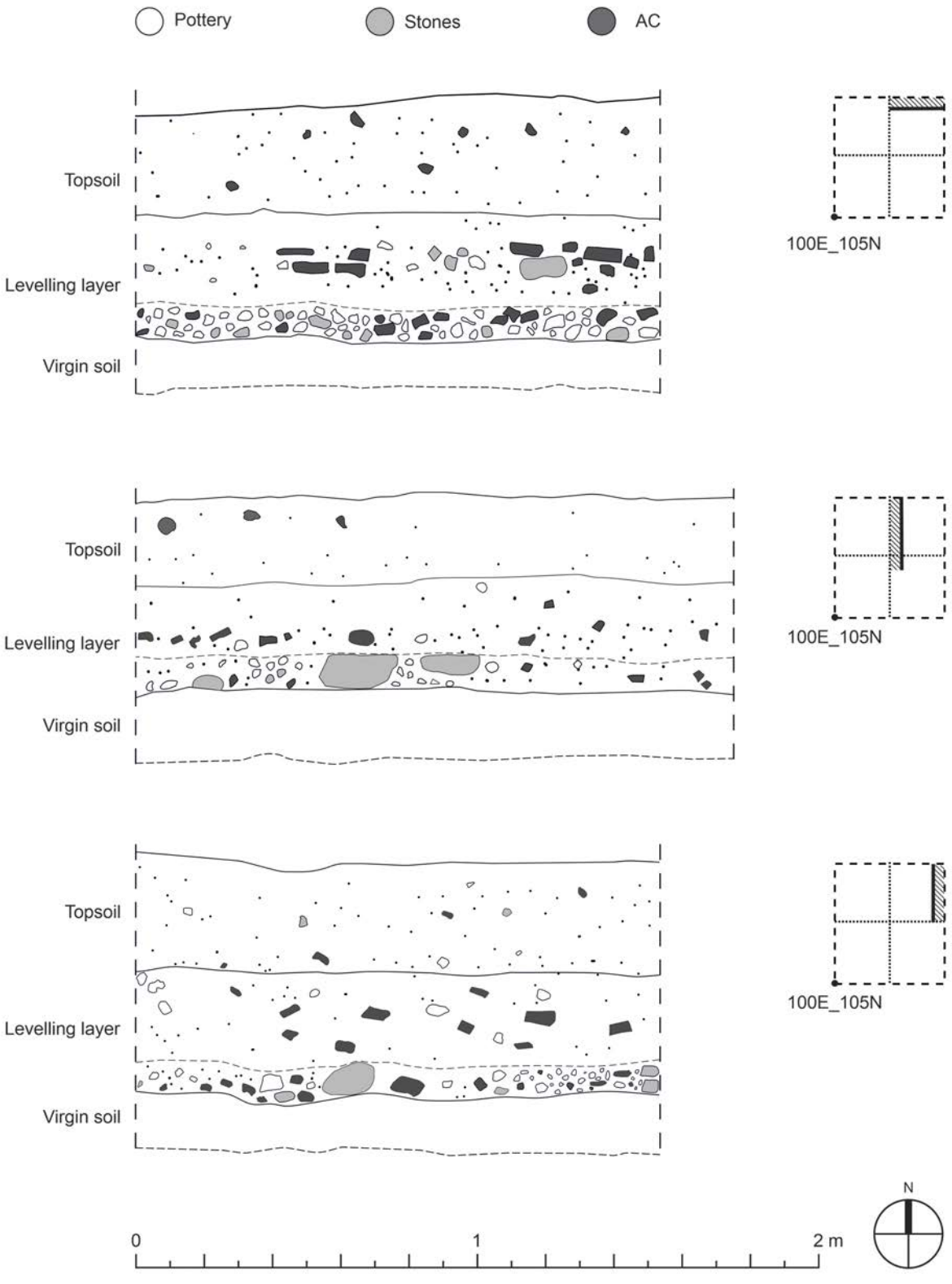


Fig. 8: Drawing of western, northern, and eastern profiles of the sector 100E_105N NE. Drawn by B. Weissová, digitized by M. Straka.

with the same anthropogenic material[10] which was present in the levelling layer, and not that closely spaced as in the case of the sector 90E_105N NE mentioned above. Consequently, we may conclude, these stones were still part of the levelling layer and not a separated feature.

The levelling layer is a compound of several sub-layers which have slightly different characters (c.f. **Figs. 7**, **8**). Bigger stones and bulky material (AC, bones) were placed on the bottom, mixed with a little pottery and broken objects of different materials; on top of it, soil containing smaller stones mixed with an abundant amount of pottery and other material was laid; this was covered with a several centimetres thick layer of soil without much material; covered again by mixture of pottery, architectural ceramics, smaller size stones and broken objects of different materials as before. This layering seems to be intentional as the material found in all the sub-layers comes from one place, while it is artificially mixed on demand with bigger stones or soil.

The levelling layers of these three mentioned sectors (100E_105N NE, 100E_110N SE, 105E_105N N) yield a high number of finds, which are useful for setting up its chronology, as well as offering a nice overview of the material variability. Selection of the finds follow:

Square 100E_105N NE contained 101 small finds, a mixture of glass fragments, amorphous bronzes and irons, several iron nails, one bronze nail, one vessel attachment (Čisťakova – Kmošek 2022, tab. 4:45, 67), fragments of terracotta lamps, including the beautiful depiction of Athena on a discus (Frecer 2022, tab. 1:4, pl. 6/1:4), one flat glass bead (Čisťakova – Zlámalová Cílová 2022, tab. 6:9), handle of a stone mortarium (Weissová – Haubenthal – Doležálková 2022, tab. 1:14), a bone spoon and two fragments of a bone pin (Minaříková 2022, tab. 1:12, 16, 20).

Square 100E_110N SE featured 73 small finds, besides the common mixture, also one flat blue glass bead (Čisťakova – Zlámalová Cílová 2022, tab. 6:10), two hexagonal blue glass beads (Čisťakova – Zlámalová Cílová 2022, tab. 6:4–5), one worked bone pin (Minaříková 2022, tab. 1:9), and two fragment of marble plates, likely part of an interior decoration (Weissová 2022, tab. 5:31–33).

Square 105E_105N N/NW has a more complicated history, as not a whole sector was excavated. First, the area along the wall [SU074] was uncovered (N) and additionally, a smaller sector 1.2×1.2 m was opened at the north-west (NW) (**Fig. 9**).[11] As the excavated area was smaller, there is also a smaller number of finds, featuring 40 pcs. Among them are fragments of glass and metals, iron nails, one fragment of a marble plate, and two bronze coins. The first coin is of Caracalla, issued in Traianopolis in AD 211–217. It was found in the middle of the levelling layer (FA06). The second coin was found deeper, just above the big size stones placed over the virgin soil (FA09). This markings on the coin are not very legible, but it seems to be minted by Marcus Aurelius, i.e. during the 2nd half of the 2nd c. AD (Heřmánková 2022b, pl. 6/1:5, 7).

There are several bigger stones set in the levelling layer outside the structure. An exceptional one is located in front of the inner wall [SU062] of Rooms D and E. It is a rectangular worked stone, ca. 40 cm long, 30–35 cm wide and 20 cm in high (see **Fig. 9**). It attracts attention as it is one of two worked stones in the area,[12] similar by its character and dimensions to the stone placed close to the centre of Room D, which is however not worked. The larger

10 pottery, bigger pieces of AC, animal bones and fragments of broken worked stones such a mortarium or marble slabs.

11 The original purpose of this square was to systematically collect soil samples for phosphate analyses, which were taken every 10 cm on 16 places of the surface of the next mechanical layer. The trench was named FA (Phosphate Analysis), and it was excavated *via* mechanical layers 10 cm thick. There were in total nine mechanical layers (FA01–FA09).

12 The second one was already discussed; it is located directly on the foundation wall [SU002] at Room D.

Fig. 9: Photo of the area north of Room D. A peculiar object here is the big square stone, one of few from the excavation which was intentionally worked. The rounded object in [SU082] is a broken mortarium. Photo by P. Tušlová.

dimensions and convenient locations of all these three (i.e. worked + unworked) stones either close to the centre of a room, directly on the foundation wall or at a courtyard just in front of a room, might suggest their function as a support of some upper structure (see the discussion).

The last situation of the northern courtyard which needs to be discussed is the north running wall [SU083] and the nearby stone accumulation(s). The wall runs 7.5 m north from Room E until when it is interrupted by a two meter long trench, leading directly to the foundation wall, in the direction of its presumed continuation (**Fig. 10**). On the north and west from the trench are concentrated stones, likely originating at the foundation wall. However, they do not seem to be a continuation of the wall as they are spread randomly.[13] The wall [SU083] is very shallow (25–30 cm deep) in this northern part, composed of only two rows of stones. This modification of the depth of the house foundations reflects its placement into a gentle hill, sloping from north to south, as at the southern end of the wall [SU083] depth of ca. 65 cm is reached.

Going back to the northern tip of the foundation wall [SU083], 85 cm to the west of it, another wall [SU085] appeared during cleaning of the area. It has one row of stones in a height of 15 cm and it is 43 cm wide. It was uncovered only in a length of 55 cm. Attached to the northern part of the wall [SU085], a solid mudbrick layer was revealed, partly dug by the looters. Some mudbricks were preserved *in situ*, some, previously removed, were visible only at the western profile above the wall [SU085] (**Fig. 10**). These mudbricks are very likely from its upper construction. The

13 Due to the time restrictions, it was impossible to continue with the excavation further north to clear up the situation.

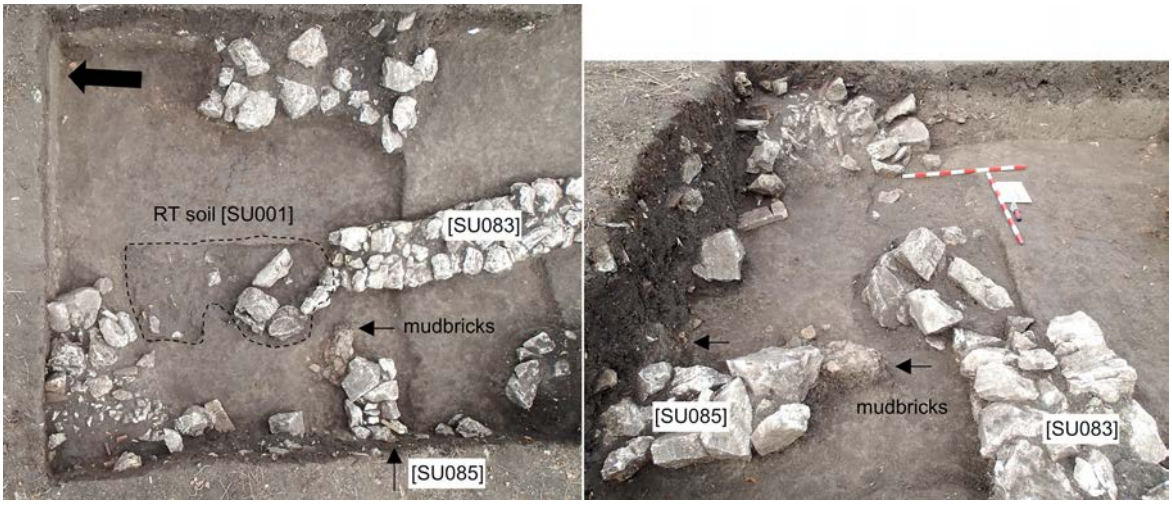


Fig. 10: Detail of the situation at the northern end of the wall [SU083]. The RT trench interrupted the continuation of the wall [SU083], while 85 cm to the west of it, a smaller wall [SU085] appeared. The mudbricks, likely originally placed on the wall, can still be seen on the north of the wall and at the western profile of the trench. Photo by P. Tušlová.

relation of these two walls is not very clear as the situation was disturbed. However, it seems that the two walls did not connect and that the space of 85 cm in between the two walls could have served as an entry to the northern courtyard. The wall [SU085] is parallel to the long walls of the whole structure [SU018] + [SU074] / [SU002] and the elevation of all these three east-west running foundation walls is around the same absolute height of 214.84 m.a.s.l.[14] Consequently, both structures seem to be a part of one construction phase, built around the same period.

DISCUSSION

THE HOUSE

The uncovered structure belongs to a five-room house with courtyard on the north, single delimiting wall on the east, and small wall on the north over the courtyard whose closer identification (structure × single wall) is unclear. The western part of the house is very close to the Dereorman River and despite its course changing in time, the river would always be dangerously close. Consequently, it seems very unlikely there would be another line of habitations located further west.

Regarding the complex structure, the house was built on a gentle hill sloping from north to south, which is reflected in the depth of the foundations, shallower on the north, deeper on the south, otherwise originally keeping the same elevation of the upper line of stones. The upper construction of the five-room structure was very likely from half-timbered masonry. Regarding the smaller width of the house (and the sandy subsoil), it seems to have only one floor, which was crowned by a gabled roof (**Fig. 11**).[15]

14 Comparing the elevation of the walls at the eastern part of the five-room structure, as the southern wall [SU002] of the house sinks towards its western end.

15 The construction of the house and its floor was consulted with an architect, Barbora Janů (Studio acht, Prague).

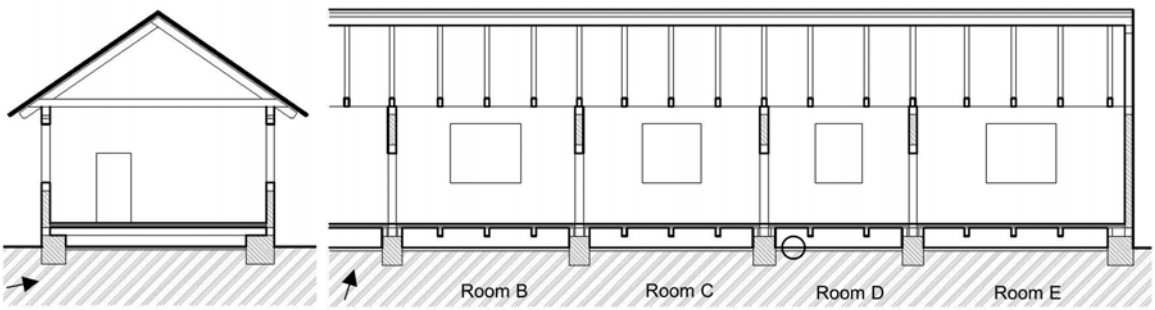


Fig. 11: Drawing reconstruction of the excavated house built directly on its ground plan. This reconstruction works with a hypothesis of an elevated wooden floor placed on the stone foundations (however, with necessary support); another possibility would be placing the wooden beams of the floor directly on the ground lined with pebbles which would require no additional support. Notice the terracotta water tube running in parallel to the western wall of Room D. Reconstruction by B. Janů.

The foundation walls do not bear any signs of interruption for entering the individual rooms (neither from outside, nor from room to room). The one room with a preserved inner floor (Room D) shows, that the foundation wall was slightly elevated in comparison to the floor level. This combination seems to suggest the application of an elevated wooden floor resting on the foundation walls, as well as using wooden threshold beams over the foundation walls for entering and passing from room to room. Since the area which is necessary to bridge with the wooden floor in each room is quite large (min. 3.1×4.7 m, max. 4.77×4.85 m), it had to be either laid on some type of support (such as bigger stones or small columns)[16] as known, e.g., from Dichin (Poulter 2019, 69–77) or the beams supporting the floor would have been directly placed on the inner floor. The second possibility seems to be plausible in our case, as the beams supporting the floor could be resting directly on the inner gravel and pebble floor which, by its character, avoids moisture absorption.[17] Additionally, the wood beams could be smeared with clay for protection. Structurally, the support beams would be laid from north to south while individual beams of the floor would be laid from east to west (**Fig. 11**).

This hypothesis of an elevated floor (and its layout) is supported by the position of the terracotta tube running in parallel to the wall [SU004] which would be hidden under the floor next to one of the supporting beams. In the uncovered floor scenario, the terracotta tube would be half protruding from the inner floor which would make it more vulnerable for breakage and unpleasant for walking. The terracotta tube seems to be part of a drainage system, diverting the water from the room, as its location near the Dereorman River and on a gentle slope might cause flooding.

Unfortunately, we cannot compare the situation with the other rooms of the house, whose floor levels are not preserved. Additionally, there might even be a possibility that Room D, on which we build our hypothesis, might have served a different function. Room D is the only room with bigger worked stones placed on, or nearby, its long walls. Combining this

16 Room D, on which we build our interpretation, features one bigger unworked stone placed close to the centre of the room. This stone could have played the role of the floor support; however, more frequent distribution of support features would be necessary to hold the entire floor.

17 If the floor would be only from a beaten soil, placing the beams directly on the ground would enable the moisture to soak easily into the wood.

observation with other characteristics of the room, such as its smaller dimensions and very small number of finds uncovered above the floor level, we may think of its specific function. The well worked rectangular stone outside of its northern wall [SU074] might have served as a step, placed in front of the entrance to the room. The other stone on the south of the room, directly sitting on the wall [SU002], might have several explanations. Regarding the drop of the height of the house, it might have been an attempt to raise the foundations, or to elevate the entrance. It could have been also originally placed on the wooden threshold beams, somehow reinforcing the entrance to the room. These are, of course, just hypotheses, which would allow us to interpret Room D not only as the entrance room to the whole structure, but also as interconnecting room from which it could be possible to entry Room C (and thus also A and B) and Room E.[18] Consequently, it would be possible to enter/exit the room on the north, from the courtyard, and likely also on the south, in the possible direction to another house, or a side street.

The western end of the house was heavily disturbed. A big part of the foundation walls of Room A is completely missing; however, the stones are not concentrated around, as in the case of the northern wall [SU083], nor is there a hole dug in the foundations by the looters. The whole situation looks old and clean. We may speculate, that the walls were flooded, and the stones taken by the river in the past. This action could have also caused waterlogging of the area and sinking of the south-western corner of the house. Whether this event might have happened during the Roman period or later is impossible to judge.

The resulting disposition of the excavated house looks similar to the so-called long-/strip-houses, which are known from civilian settlements, as well as from *vici* located nearby military camps. These are elongated houses with separated living quarters of the family members at the back of the house with a yard, and with a room facing the street, which was used as a craft workshop, *tabernae*, or for storing and selling diverse goods. These houses had solid perimeter walls, while the interior walls were light, easy to move and remodel (Wilson 2019; Sommer 2012, 82, 84).[19] The inner width of the biggest room of our house is 4.85 m, adding the thickness of the foundation walls (52–68 cm), we get almost 6 m house width. The current length of the house is ca. 23 m, however, it is not fully preserved and we may expect it to be originally up to 24–25 m. These dimensions fit well into the range of the strip-houses of Continental Europe[20] described by Sommer, which are dated from the Flavian period or later, and whose width is in the range of 6–9 m and the length of 22–40 m (Sommer 2006, 125).

If we accept such an interpretation, it would be Room E which would be facing the street/road. We could also expect another entrance to the room from outside as it would act as independent subject. Room E is the biggest room of the house, which is separated from the other three rooms of similar dimensions by the smallest room of all – Room D. This separation could suggest its different use. Even though this interpretation seems plausible, we do not have any proof of the street located on the east, as this area was not excavated.

18 Since there are no preserved thresholds, this is just a speculation which is, however, based on a disposition of the strip-/long-houses, where it is common to have one entrance from the long side and one from the room facing the street (c.f. Sommer 1997, Abb. 10).

19 For the strip-house visualisation see the military *vicus* in Ruffenhofen: https://de.wikipedia.org/wiki/Datei:Limeseum_-_Modell_Ruffenhofen_5.jpg; https://de.wikipedia.org/wiki/Datei:Limeseum_-_Modell_Ruffenhofen_3.jpg and a reconstruction in Housesteads: https://www.english-heritage.org.uk/visit/places/housesteads-roman-fort-hadrians-wall/history/research/ (visited 8/2/2022).

20 The strip-houses in Great Britain are smaller (4.5–6 m × 15–20 m), so are the Europe Continental ones during the earlier periods (see Sommer 2006, 124).

The courtyard on the north is not a characteristic feature of the strip-houses, which commonly have a yard at the rear of the house. Perhaps in this part of the settlement, near the Dereorman River, it was not possible, or feasible, to have a dedicated backyard at the end of the structure and the area on the side of the house could have been used for diverse activities instead.

THE LEVELLING LAYER

The northern courtyard of the house was covered by the so-called levelling layer, which is about 40 cm thick, composed of anthropogenic material mixed with stones and soil. It was spread intentionally, at once, although in several layers, mixing different ratios of soil, stones, and the material.

The anthropogenic material for these sub-layers was originally taken from one source, as many fragments, found in different trenches excavated over the courtyard and in different sub-layers, joined together. Based on the character of the finds, we may suppose the source was settlement waste/dump. Even the method of layering seems to be intentional, placing heavy and bulky items into the lowest layers. Considering again the nearby presence of the Dereorman River, a suitable interpretation of the layer seems to be an intentional elevation of the area and drainage, which would help the fast absorption of excess water – as in the case of flooding, but as well as in a case of rain, since the gentle hill on which the house is built slopes from north to south – towards the five-room house. This interpretation would also support the suggestion that the worked rectangular stone found north of Room D functioned as a step to the door of the house, elevating the entrance and separating it from the area of the courtyard prone to floods.

THE CHRONOLOGY

The material uncovered in relation to the house is not very chronologically sensitive. Combining this fact with disturbed and mixed contexts, either recently by the looters (the RT soil [SU001]), or in antiquity (the levelling layer), the chronological classification of the finds had to be based mainly on other material published from Bulgaria and elsewhere.

Evaluating the material from the excavation, objects dated into the time span of the 1st–6th c. AD have been found. The majority of them, however, seem to be related with the period of the 2nd–4th c. AD with some overlaps into the earlier and later periods (see Čisťakova – Zlámalová Cílová 2022; Heřmánková 2022a, 2022b; Frecer 2022; Tušlová 2022). Nevertheless, there are several fragments of vessels among the pottery and glass which seem to be even later, dated from the 4th/5th to 6th/7th c. AD (Čisťakova – Zlámalová Cílová 2022, tab. 5:35, 50–51, 93–94; Čisťakova – Kmošek 2022, tab. 4:7; Tušlová 2022[21]).

Regarding the excavated house, a hint to its construction period seems to be the coin of Diadoumenian, minted in Cyzicus in AD 217–218 (see Heřmánková 2022b, pl. 5/1:8), discovered in the foundation trench of the northern wall [SU074] of the house. In general, coins might have stayed in circulation for very long time and despite Diadoumenian issues being replaced shortly after his death in AD 218 by mintage of Elagabalus, some of his coins could

21 The latest well attested chronology is of the transport amphora SY15_237 classified as type Keay LXIIQ / Albenga 11–12 from Northern Africa, which can be dated from the mid-5th c. AD till the mid-6th c. AD (see Tušlová 2022 and other later amphorae: SY14_126, SY15_216, SY15_427, SY15_547, SY16_H13_NW_03).

have been still around. In all cases, the foundations of the house were built either at the time of the coin deposition, i.e. at the end of 20s of the 3rd c. AD, or later. The area had to be already inhabited at the time of the house construction, as parts of broken quern stones (Weissová – Haubenthal – Doležálková 2022), fragment of the horse rider relief (Heřmánková 2022a) and pieces of Roman pottery were incorporated into the foundation walls of the house. Putting this information together, we may conclude that the excavated house was built at or nearby the already established Roman settlement at the end of the 20s of the 3rd c. AD or later.

The levelling layer, spread up over the house's northern courtyard, featured a great mixture of material of wide chronology, mostly substituted by the fragments of objects dated to the 2nd–3rd c. AD (see Čisťakova – Zlámalová Cílová 2022; Heřmánková 2022a; Heřmánková 2022b; Frecer 2022; Tušlová 2022). There were however several other fragments, which seems to suggest the *terminus post quem* of the layer placement. These are fragments of fine red-slipped vessels and cooking vessels of types dated from the 4th or 5th c. AD to 6th/7th c. AD (Tušlová 2022),[22] the terracotta lamp depicting Athena dated to AD 300–325 (Frecer 2022, tab. 1:4, pl. 6/1:4), and the rim of an African transport amphora dated from the mid-5th c. AD to mid-6th c. AD (Tušlová 2022, SY15_237). These objects suggest the layer was spread during the 4th or even 5th c. AD.[23] If we assume the house construction took place not long after the death of Diadoumenian, it would be a difference of one or two centuries between these two actions. Of course, if the construction of the house took place later in time, it would shorten the gap between these two events or make them even simultaneous. The need for a raised floor at the courtyard might be a consequence of floods, change of flow of the Dereorman River, or just adjustment of the house layout which might have happened any time during its lifespan.

The 4th and 5th c. AD were unstable times in Thrace, connected with persisting raids of gothic tribes and Huns, leading to several major events happening in Thrace, including the Battle of Hadrianopolis at AD 378 and to major devastation of settlements around the mid-5th c. AD (Velkov 1977, 38–42). In light of these historical data, the levelling layer, interpreted as a compound of settlement waste, might have been also created by destruction debris, reflecting these events and the house/settlement clean up. We should, however, also point out, there is no direct evidence of violent conflict uncovered on the area of the house or among the processed material from the settlement.

When did the existence of the house come to an end remains an open question. We may expect the courtyard adjustment in the 4th–5th c. AD had to be beneficial for someone, so the act of laying down the levelling layer itself seems to suggest continuation of the house, and perhaps as well of the settlement, after these proposed dates. However, since just a low amount of material retrieved from the settlement dates from the 5th c. AD on, the house / settlement existence does not seem to continue for that long to accumulate a significant cultural layer.

The ditches [SU008], [SU021], [SU057] had to be made after the house abandonment, as they reach under the floor level of the inner rooms, and they combine a similar mixture of material as the levelling layer – the majority of earlier fragments with single later-dated pieces – and as such include the complete chronology of the house and the levelling layer. These ditches could have been made any time after the house abandonment and before the modern looting activities.

22 Pottery fragments nos.: SY15_263, SYP16_108, SY15_485, SYP16_127, SYP16_117, SY15_356, SYP16_114, SY15_254, SYP16_128.

23 There is enough material attested for the 4th c. AD. There are less, but still some, finds dated to the 5th c. AD or later.

CONCLUSION

The three-year excavation uncovered a five-room house with a courtyard on the north protected by a wall on the east. The house was built on foundations of locally available quarry stone without a solid binder, which were holding an upper structure of half-timbered adobe construction, covered by a gabled roof made of Laconian type rooftiles. Based on the house's outer dimensions (ca. 6×24–25 m), it probably had only one floor, which, however, does not exclude the possibility of an attic. The upper walls were very likely covered by white-red plaster, protecting the construction made of the organic material from destructive weather conditions.

The excavated house does not seem to be much different from the provincial architecture. The closest parallel to its disposition are the so-called long-/strip-houses which are extremely common for *vici* type of settlements. They combine living quarters at the rear part of the house and industrial/commercial areas facing the street. If this parallel is correct, we may expect the biggest room of all, Room E, to be facing the street running on the east of the house in the north-south direction.

At the time of the house construction there was already a Roman settlement existing in the area as pieces of quern stones, a horse rider relief, and fragments of Roman pottery were incorporated into the foundation walls. The coin of Diadoumenian minted in Cyzicus in AD 217–218 was found in the wall foundation trench, dating the construction of the house to the late 20s of the 3rd c. AD or later.

The northern courtyard of the house was covered by a 35–40 cm deep levelling layer, very rich in material, likely referring to settlement waste or destruction debris. The levelling layer was intentionally spread in several sub-layers containing material from the same source as many fragments over the sub-layers and from many metres apart joined together. The material was mainly dated to the 2nd–4th c. AD with several fragments extending the chronology into the 5th/6th c. AD. The layer seems to function as elevation/drainage, likely connected with the proximity of the Dereorman River as well as with the fact, the house was located on a gentle hill sloping from north to south. Consequently, the courtyard on the north of the house might have absorbed the rainwater before reaching the house.

The construction of the house in relation to the levelling layer is inconclusive. What we can clearly state is, that the house was constructed after the year AD 217–218, and the layer was spread in an unspecific time during the 4th or 5th c. AD. Two scenarios might appear in relation to how much weight we give to the find of the Diadoumenian coin in the house foundations and its suggested short circulation. First, the house was built around the time of the coin deposition, and the levelling layer was spread about one or two hundred years later; second, the house was built together with the levelling layer in a course of the 4th or 5th c. AD. Elaborating on the second possibility and considering the number of datable finds, the 4th c. AD seems to be much likely than the 5th c. AD which is represented by single finds only. In all probability, we will never be able to say which of these scenarios is correct, however, what we can say, is the approximate chronology of the area of the excavated house at Yurta-Stroyno based on the density of finds and their chronological classification. The majority of all objects from variable materials might be dated to the 2nd–4th c. AD, when the settlement was at its peak. Much less of the finds might be dated into the time range of the 5th–6th c. AD, suggesting some activity was taking part on the settlement, or its hinterland, also during the later period, however to a limited extend.

ABBREVIATIONS

AOR = Археологически открития и разкопки
SH = Studia Hercynia

BIBLIOGRAPHY

Bakardzhiev – Kozarev 2015: Бакърджиев, С. – Козарев, М. 2015: Спасителни археологически проучвания на антично Селище в м. Юрта, с. Стройно, Община Елхово. *AOR през 2014 г.*, 570–572.

Bakardzhiev – Kozarev 2016 = Бакърджиев, С. – Козарев, М. 2016: Едовни археологически проучвания на антично селище в м. Юрта, с. Стройно, общ. Елхово. *AOR през 2015 г.*, 633–635.

Bakardzhiev – Kozarev 2017 = Бакърджиев, С. – Козарев, М. 2017: Редовни археологически проучвания на антично селище в м. Юрта, с. Стройно, Общ. Елхово. *AOR през 2016 г.*, 450–453.

Čisťakova, V. – Kmošek, J. 2022: Metal Finds and Traces of Metallurgical Activities at Yurta-Stroyno. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 155–183.

Čisťakova, V. – Zlámalová Cílová, Z. 2022: Archaeological and Archaeometric Study of the Roman and Late Antique Glass. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 184–244.

Frecer, R. 2022: The Terracotta Lamps. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 145–154.

Haubenthal, C. 2022: Thin-Section Analysis of Selected Stone Objects from Yurta-Stroyno. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 106–117.

Heřmánková, P. 2022a: The Epigraphic Finds from Yurta-Stroyno in a Regional Context. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 118–132.

Heřmánková, P. 2022b: The Numismatic Finds. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 133–144.

Minaříková, A. 2022: Selected Small Finds. In**:** P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 245–258.

Nývltová Fišáková, M. 2022: Analysis of the Osteological Material from Yurta-Stroyno. In**:** P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 259–269.

Poulter, A. 2019: Area E, the granaries, store rooms and the western defences. In: A. Poulter (ed.): *The transition to Late Antiquity on the Lower Danube. Excavations and survey at Dichin, a late Roman to early Byzantine fort and a Roman aqueduct*. Oxford, 63–135.

Sommer, C.S. 1997: Kastellvicus und Kastell – Modell für die Canabae legionis? *Gesellschaft Pro Vindonissa, Jahresbericht* 1997, 41–52.

Sommer, C.S. 2006: Military *vici* in Roman Britain revisited. In: R.J.A. Wilson (ed.): *ROMANITAS, essays on Roman archaeology in honour of Sheppard Frere on the occasion of his ninetieth birthday*. Oxford, 95–145.

Sommer, C.S. 2012: Newstead: the occupation around the forts. In: F. Hunter – L. Keppie (eds.): *A Roman Frontier Post and its People newstead 1911–2011*. Edinburgh.

Tušlová, P. – Weissová, B. – Bakardzhiev, S. 2014. Stroyno Excavation Project, Introduction to the Site of Yurta–Stroyno and Report on the 2014 Season. *SH* XVIII:1–2, 16–24.

Tušlová *et al.* 2015 = Tušlová, P. – Weissová, B. – Bakardzhiev, S. – Čisťakova, V. – Frecer, R. – Janouchová, P. 2015: The Stroyno Archaeological Project, Report on the Season 2015. *SH* XIX:1–2, 243–261.

Tušlová, P. – Weissová, B. – Bakardzhiev, S. 2017: Yurta-Stroyno Archaeological Project. Preliminary Report to the Final Season of 2016. *SH* XXI:2, 99–112.

Tušlová, P. – Weissová, B. – Bakardzhiev, S. 2018: Excavations at the Roman site of Stroyno-Yurta (2014–2015): An interim report. In: S. Ross – A. Sobotkova – G. Nehrizov – J. Tzvetkova – S.E. Connor (eds.): *Tundzha Regional Archaeological Project, Surface Survey, Palaeoecology, and related Studies (2009–2011) Final Report*. Oxbow, 191–199.

Tušlová, P. 2022: *The Yurta-Stroyno Archaeological Project. Pottery Studies*. SH Monographs 3. Praha.

Velkov, V. 1977: *Cities in Thrace and Dacia in Late Antiquity (Studies and Materials)*. Amsterdam.

Weissová, B. 2022: Shedding Light on Architecture of Roman Rural Settlements in Thrace. Ceramic and Stone Building Materials from Yurta-Stroyno. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 70–89.

Weissová, B. – Haubenthal, C. – Doležálková, V. 2022: The Milling Equipment. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 90–105.

Wilson, K. 2019: A World Full of Things: A Narrative on a Roman Vicus in The Hague. In: R.J. van Zoolingen (ed.): *AB HARENIS INCVLTIS, Artikelen voor Ab Waasdorp*. Den Haag.

Petra Tušlová
Institute of Classical Archaeology
Faculty of Arts, Charles University
Celetná 20, CZ-11000, Prague 1
petra.tuslova@ff.cuni.cz

Barbora Weissová
Ruhr-Universität Bochum
Institut für Archäologische Wissenschaften
Am Bergbaumuseum 31, D-44791 Bochum
barbora.weissova@rub.de

Stefan Bakardzhiev
Regional Historical Museum of Yambol
Byalo more 2, BG-8600, Yambol
&
University of Library Studies
and Information Technologies
Tsarigradsko Shose Blvd. 119, BG-1784, Sofia
st_bakarjiev@abv.bg

Systematic Selective Survey of Yurta-Stroyno. A Methodological Approach to Sites Heavily Disturbed by Looters

Barbora Weissová – Petra Tušlová – Stefan Bakardzhiev

ABSTRACT
The last season of the Yurta-Stroyno Archaeological Project focused on a systematic surface survey of the settlement. The survey was conducted on two levels, the first one including a thorough exploration of all the finds in selected areas using total pick-ups, and the second one, surveying the remaining overgrown areas aiming to detect architectural and material remains visible among the thick vegetation. The survey explored 1.64 ha within 41 polygons of 20×20 metres, the total pick-ups covered 0.32 ha within 32 squares of 10×10 metres. The explorations brought to light considerable amounts of material, which was quantified and evaluated in its spatial context and further processed within the individual material studies. The survey design applied at Yurta-Stroyno helped us to develop and adjust the methodology suitable for sites with surfaces heavily disturbed by treasure hunters.

KEYWORDS
Systematic survey; total pick-ups; quantification; functional analysis; survey methodology.

INTRODUCTION

The Yurta-Stroyno Archaeological Project (henceforth SAP) was originally designed as an excavation project only.[1] The first two seasons were conducted in 2014 and 2015 and focused on the excavation of a house located in the south-western part of the settlement (Tušlová – Weissová – Bakardzhiev 2022). However, besides the excavated area, surprisingly large amounts of archaeological finds were detected haphazardly all around the expected settlement. Among the more interesting discoveries made within these two years belong the finding of melted glass fragments together with a few pieces of raw glass, several concentrations of slag, and a single find of a simple shaft of a column without fluting (Tušlová *et al.* 2015, 249, pl. 10/6).

The reason for the richness of the surface finds at Yurta-Stroyno is the poor preservation of the settlement as it had been extensively explored by looters searching for precious objects using metal detectors and excavating vast trenches, leaving behind many open digs of different sizes and depths. The disruption of Yurta-Stroyno can even be seen on the satellite images such as on the one captured in 2015 (**Map 1**). Although the imagery enables the quantification of the looting based on the number of visible robbers' trenches at that time, this number offers only a minimal disruption of the settlement. As the excavations proved, the areas with no disruptions detectable on the surface often revealed reverse stratigraphy caused by illicit

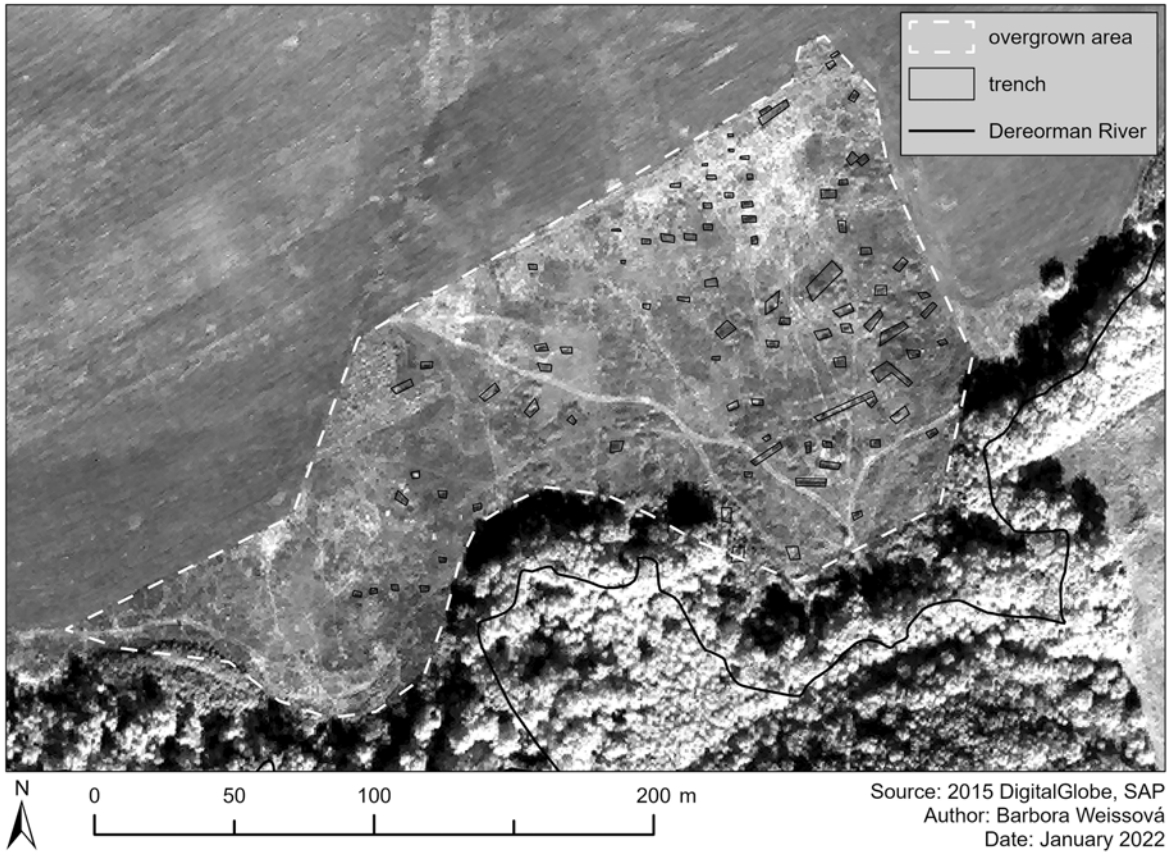
1 The settlement of Yurta-Stroyno had already been explored by a systematic pedestrian survey in the framework of the Tundzha Regional Archaeological Project in 2009–2010 (Ross *et al.* eds. 2018).

excavations. This phenomenon comes about due to the longevity of the looting process, with older trenches being filled with soil excavated from the newer ones.

Despite the alarming state of the settlement's preservation which might be without exaggeration described as catastrophic, our observations suggested that the surface finds were not moved far from their original locations. Firstly, the excavated material was either used to fill the nearby trenches or piled right next to the illegal digs and, secondly, the gradient of the surface is minimal and induces only negligible erosion processes. These conditions make the settlement suitable for a systematic surface survey, aiming for the detection of diverse material concentrations over the area, setting up the chronology of the settlement and discerning different phenomena including the character and function of the finds. Without such a heavily disturbed surface, with trenches often reaching a depth of 100 cm, i.e., well below the topsoil, analogical aims would only be possible with proper excavations.

METHODOLOGY

The survey design was based on the previous works conducted in the area, careful observations of the distribution of the finds identified in 2014 and 2015, thick vegetation cover and, last but not least, the manpower offered by our team.



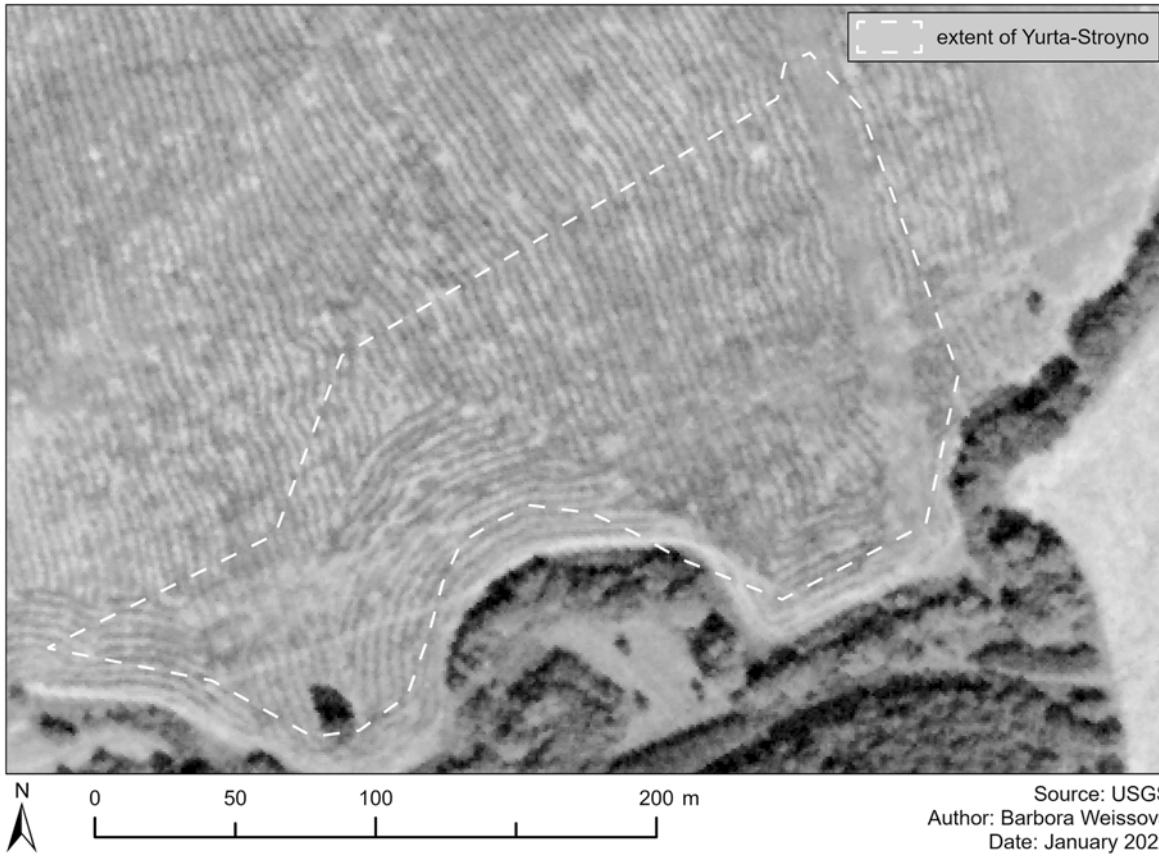
Map 1: Satellite imagery captured in 2015 with marked looting trenches showing the alarming yet only minimal degree of disruption of Yurta-Stroyno.

Yurta is situated some 1.5 km north-east of the modern village Stroyno and it lies between a vast ploughed area to the north and the densely overgrown Bakadzhik Hill to the south. The settlement is situated just at the foot of the hill, on a surface gently sloping towards the Dereorman River, with a gradient not exceeding 4.5 percent.

According to the gazetteer of archaeological sites in the Yambol District (Dimitrova – Popov 1978, 26), the settlement of Yurta was already known in the late 1970s when its surface was disrupted by ploughing and revealed the foundations of walls, architectural ceramics and Roman pottery. The satellite image from 1975 (**Map 2**) confirms the surface of the settlement was indeed ploughed at that time.

The extent of the settlement was archaeologically documented not earlier than during the systematic pedestrian survey conducted by the Tundzha Regional Archaeological Project (TRAP) in 2009 (Iliev *et al.* 2012, 21–22, site no. 6018; Sobotková – Ross – Iliev 2018, 146–156). The debris of material connected with the settlement was detected distributed over a vast area covering 30 ha. Unlike in the 1970s, only the northern part of the associated surface concentration was reported as located in the harrowed field with good surface visibility. The southern part was described as overgrown with vegetation and studded with robbers' trenches to the point that it proved very difficult to walk.

As follows from these reports, the agricultural activities were at some point limited, most likely because the nucleus of the site revealed far too many stones from the building foundations as well as large loose architectural stones which efficiently prevented the surface from being further ploughed.



Map 2: Satellite imagery captured in 1975, the extent of Yurta-Stroyno is entirely ploughed over.

If not already known before, during the ploughing the settlement fully revealed its potential and it is feasible that herewith it became the target of the extensive looting activities. The illicit excavations were facilitated by its location, well hidden from the eyes of passers-by, as only dirt roads known to locals connect the area with the official road network. It is also possible that the whole area was intentionally ploughed in order to reveal the extent and potential of the site, as random finds pointed to its existence already before it was cultivated.[2] Either way, Yurta-Stroyno underwent a period of at least 40 years of intensive disturbances of its surface, be it due to agricultural activities or illicit excavations.

To create a possible precise snapshot of the distribution of the finds excavated by the looters, we decided to concentrate our survey on the overgrown nucleus of the site. By the end of the excavation season 2015, for the purpose of systematic explorations planned for 2016, the nucleus of the settlement was divided into a regular grid. The almost impenetrable vegetation of thistles and tall grasses covering its surface at some points reached above our heads, entirely impeding our vision. Therefore, even laying out the survey grid was a challenging task we managed only thanks to the invaluable help and expertise of our colleagues from the Slovak University of Technology.[3] The overgrown surface was divided into 65 polygons, each 20×20 metres, thus the planned survey encompassed some 2.6 hectares. We outlined those squares using wooden poles driven deep into the surface and highlighted their tops with a red colour to be able to find them in 2016.

The initial aim for the 2016 season was to survey the entire area outlined by the grid, but the vegetation covering the expected nucleus of the settlement as well as the arduous and time-consuming method of total pick-ups forced us to adjust our plans. Even though we conducted the survey in the late autumn in order to ease the expected struggle with the thick growth, the vegetation remained very resistant, entirely preventing the examination of the

Fig. 1: Total pick-up of the square H14 NW, Jakub Havlík thoroughly examines the surface with a trowel. Photo by B. Weissová.

2 Among the earliest reported finds from the settlement belong several coins. The first coin find reported to the Regional Historical Museum of Yambol was a silver *denar* of Emperor Tiberius, which was discovered in 1961 near the village of Stroyno. In 1968, a bronze *sestertius* minted in Rome during the reign of Emperor Trajan was uncovered directly at the site of Yurta-Stroyno (for more information on the numismatic evidence discovered in the 1960s, see Heřmánková 2022b).

3 Tibor Lieskovský, Alexandra Rášová and Ondrej Trhan.

surface. In order to be able to examine the targeted areas, they had to be laboriously cleared with a scythe and surveyed using a trowel, getting rid of the remnants of the vegetation (**Fig. 1**).

For the purpose of the total pick-ups, we further divided the targeted polygons into sectors of 10×10 metres according to the ordinal directions (NE, NW, SE, SW). Each sector was surveyed and processed as a separate unit, representing materials from an area of 100 sq. metres. Finds within the sectors such as the remains of walls were recorded not only as part of the sector but also with a total station in order to enable a more precise spatial analysis. The aim of the survey was to collect and process all the material detectable on the surface to gain a picture of all the groups of finds present in the delimited area. Such a procedure brought to light even the smallest objects but it was also tedious and time consuming, allowing each surveyor to explore one sector a day at most.

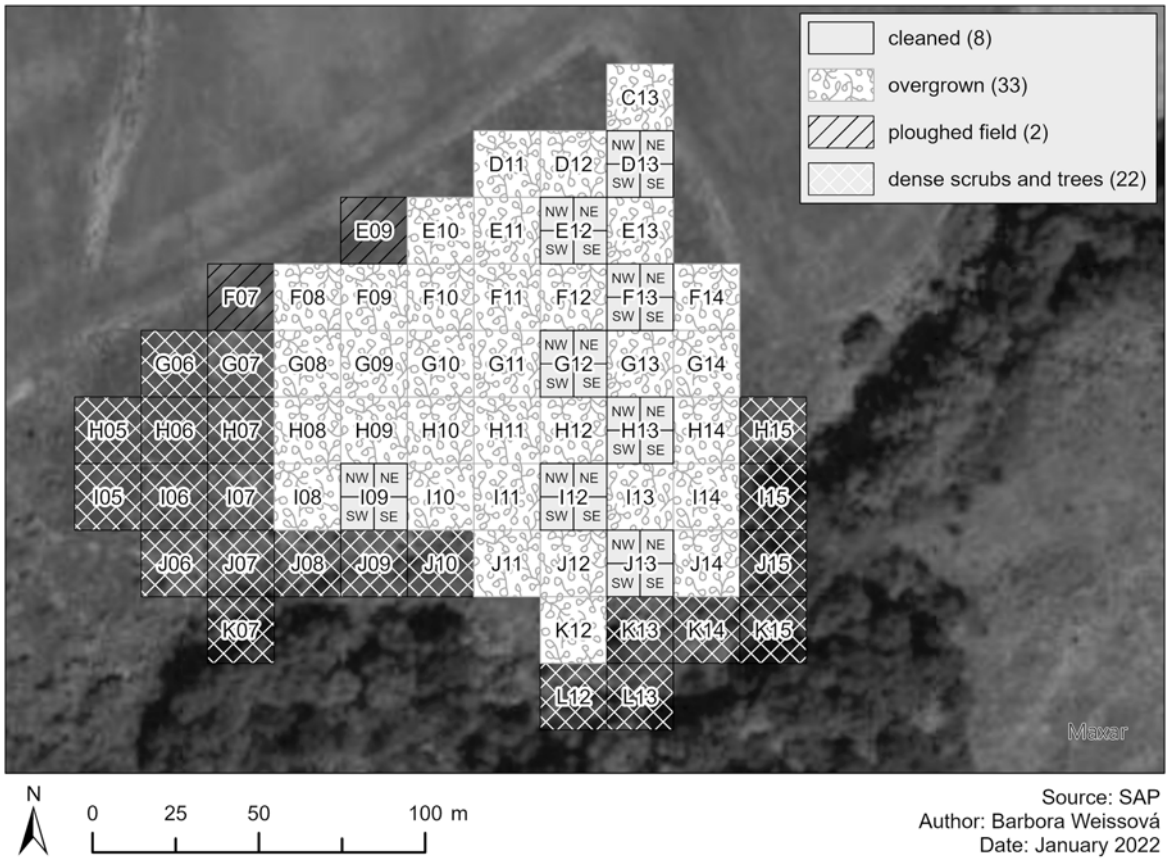
Since we worked in a group of four to five people, we had to adjust the survey design and apply the total pick-ups only to selected polygons. In order to gain a representative sample from the nucleus of the settlement, we developed a sampling strategy, surveying its entire N–S extent, covering the axis in a checkerboard pattern, alternating the polygons in order to explore as large a W–E area as possible (**Map 3**). The coverage of the W–E axis was planned as a secondary step, only if time allowed. As we had to reduce the extent of the area surveyed by total pick-ups, we decided to examine the remaining polygons at least extensively, systematically exploring the overgrown surface, aiming to find architectural remains or finds freshly dug up by looters and lying on not yet overgrown piles.

The total pick-ups were conducted in the following manner. Each sector was photographically documented and the surface described, including the positions and sizes of the robbers' trenches and piles of soil, dispersions of stones and other remains of architecture. The surface was then surveyed by total pick-up and all the finds piled up in one corner of the sector. When the collecting had finished, the surveyors divided the finds in the field into the main groups represented by architectural ceramic, pottery and others. The finds were photographed *in situ* in order to be tagged to the pertinent sector (**Fig. 2**). We further documented the architectural ceramics in the field, including quantification and weighing, taking only exemplary pieces with preserved measurements or of odd shapes. All the other finds were transported to the base for further processing. In general, washing, quantification, weighing, typological division and photographic documentation were applied to all of them. When processed, architectural ceramics and pottery were brought back to the site and distributed into the pertinent squares and polygons respectively, always piled in their SW corner.

Fig. 2: left: Clarissa Haubenthal sorting the finds from the square I12 SE; right: already sorted finds from the square I12 SE. Photo by B. Weissová.

NAMING STRATEGY

The grid of polygons was laid in the cardinal directions, the x-axis, running from west to east, was named with numbers and the y-axis, running from north to south, with letters. The beginning of the grid is situated some 40 metres to the north and 80 metres to the west of the actual beginning of the overgrown area in order to allow for the enlargement of the grid if necessary. The polygons are named based upon their south-western corner. Each intensively surveyed polygon is further divided into four sectors named based on the ordinal directions: NE, SE, SW and NW (**Map 3**).



Map 3: The grid of polygons laid over the Yurta-Stroyno settlement with marked areas of different types of surface cover.

RESULTS

Some 65 polygons were placed on the uncultivated area of the settlement encompassing the territory defined as the nucleus of Yurta-Stroyno (**Map 3**). Of these, 24 were not investigated as 22 of them were impassable due to dense trees and scrub covering the surface and two were partially situated on the cultivated field with the surface material moved and contaminated by regular ploughing. The remaining 41 polygons were surveyed in two different manners. Eight of them were fully cleared of vegetation and further divided into four sectors according to the ordinal directions. Each of the sectors was investigated in detail using the method of

Square		Architectural ceramics		Storage vessels		Amphorae		Coarse wares		Fine red-slipped wares		Grey wares		Handmade		Common wares	
Pol.	Sect.	Pcs.	Wgt. (kg)	Pcs.	Wgt. (g)	Pcs.	Wgt. (g)	Pcs.	Wgt. (g)	Pcs.	Wgt. (g)	Pcs.	Wgt. (g)	Pcs.	Wgt. (g)	Pcs.	Wgt. (g)
D13	NE	576	16.5	0	0	12	191	238	1377	149	300	25	138	77	667	381	2401
D13	NW	690	24.5	0	0	62	765	565	2672	441	713	48	243	125	1098	901	7300
D13	SE	695	42	1	146	62	912	354	2219	339	859	37	262	181	2102	859	7278
D13	SW	1100	85	1	676	94	2200	331	2424	289	699	48	346	104	1125	757	7020
E12	NE	330	21	0	0	25	322	164	965	84	226	10	56	50	477	173	1150
E12	NW	415	9	0	0	16	143	159	718	93	168	27	122	34	279	191	876
E12	SE	551	37	1	0	38	1160	189	1123	146	373	15	80	93	1344	296	2588
E12	SW	580	25	0	0	49	423	301	1742	167	416	58	286	62	457	337	2173
F13	NE	590	20	3	45	14	162	163	938	100	270	28	175	32	301	202	1291
F13	NW	660	37	2	1381	52	623	135	1243	152	384	12	145	62	687	264	663
F13	SE	1070	118	1	0.5	45	1047	134	1043	85	379	3	64	58	379	208	1981
F13	SW	740	43	0	0	20	421	85	681	63	196	15	127	41	416	205	1367
G12	NE	2070	228.5	28	18500	94	1991	116	1143	158	614	19	190	36	378	584	8210
G12	NW	870	105	4	1984	13	496	44	402	91	363	0	0	26	280	142	1515
G12	SE	430	19	7	100	16	205	49	398	99	251	9	56	26	274	269	1485
G12	SW	750	50.5	3	780	20	206	464	1803	145	297	12	77	64	500	134	1476
H13	NE	1320	105.5	0	0	60	1388	169	1931	152	353	6	27	20	165	301	3691
H13	NW	540	27	0	0	34	362	48	851	134	343	0	0	20	182	188	1401
H13	SE	1497	185.5	29	9355	47	1136	99	1380	98	569	8	94	18	287	195	2820
H13	SW	1400	32.5	2	1533	42	553	202	1131	253	579	0	0	64	527	218	2436
I09	NE	373	6.5	0	0	9	100	104	537	61	102	1	6	50	376	165	753
I09	NW	402	23	2	100	18	228	139	768	72	190	12	57	37	394	260	1371
I09	SE	490	28	1	369	29	346	117	955	67	168	3	5	37	407	249	3061
I09	SW	706	95.5	2	100	18	314	82	555	49	80	3	12	41	878	217	1597
I12	NE	610	14	0	0	12	145	46	244	11	24	0	0	1	13	63	408
I12	NW	1000	14	2	2740	5	30	67	466	40	55	0	0	5	64	152	786
I12	SE	1366	185	2	1300	40	1081	52	466	31	106	0	0	26	302	135	1260
I12	SW	390	37.5	2	900	30	500	68	456	133	396	0	0	16	243	85	2037
J13	NE	155	13	2	11000	9	242	30	240	30	145	1	18	11	235	92	1182
J13	NW	310	22	1	2000	8	98	41	208	55	110	0	0	13	140	46	360
J13	SE	115	11	1	36	23	306	17	145	38	166	1	7	27	262	154	1406
J13	SW	370	31.5	14	5000	20	237	34	188	59	200	1	11	5	70	98	1180

Tab. 1: Total numbers and weights of architectural ceramics (kg) and pottery (g) detected by total pick-ups; wgt. = weight.

total pick-ups. The last 33 polygons were walked overgrown, without any further division into sectors.

The eight polygons surveyed by total pick-ups include D13, E12, F13, G12, H13, I12, J13 placed in the north to south direction and I09 on the west-east axis. When divided into four sectors, they revealed 32 total pick-ups covering 0.32 ha. Each single sector was evaluated as one unit, disclosing detailed information about the preservation of the surface and the amounts, weights, and characters of the finds. **Tab. 1** shows the total numbers and weights of the architectural ceramics and pottery, with the pottery divided based on several criteria into groups of storage vessels, amphorae, coarse wares, red-slipped fine wares, grey fine wares, common wares and handmade pottery. The percentage stacked bar chart (**Fig. 3**) shows the relative frequency of each pottery group in each specific polygon and sector, allowing for the comparison of their distribution.

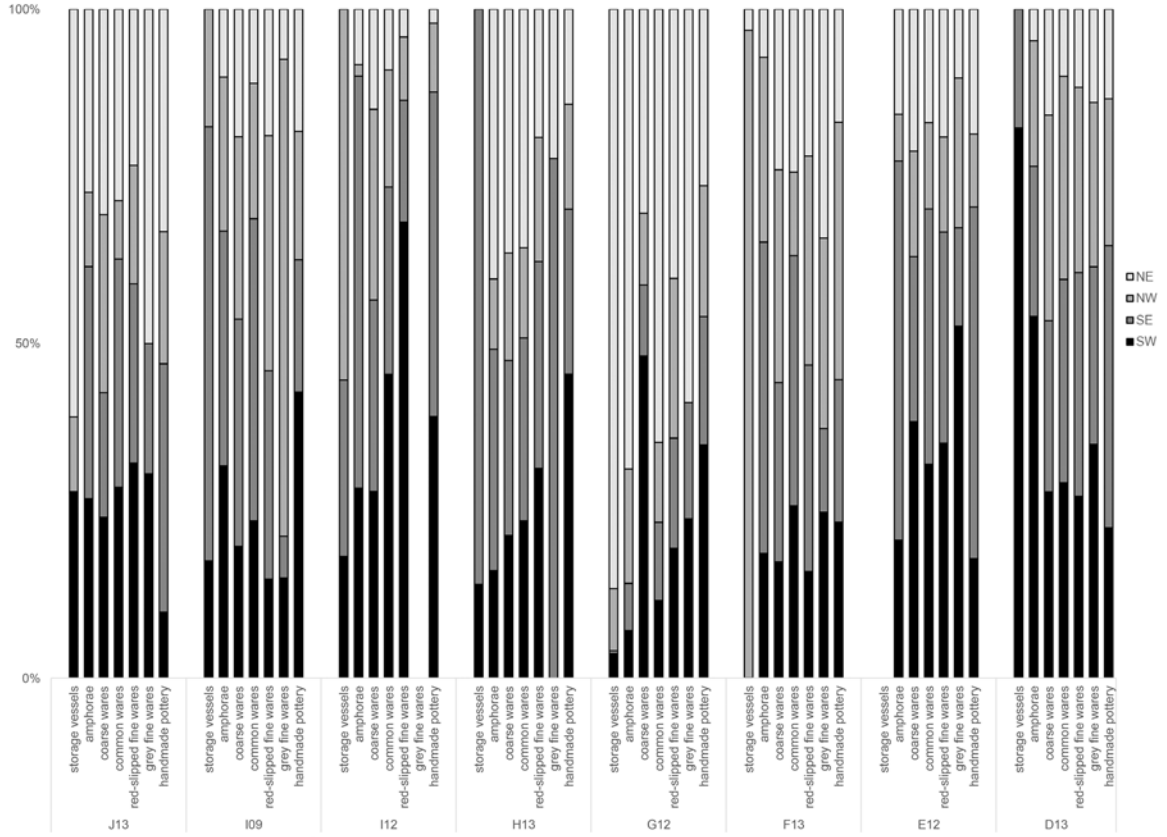
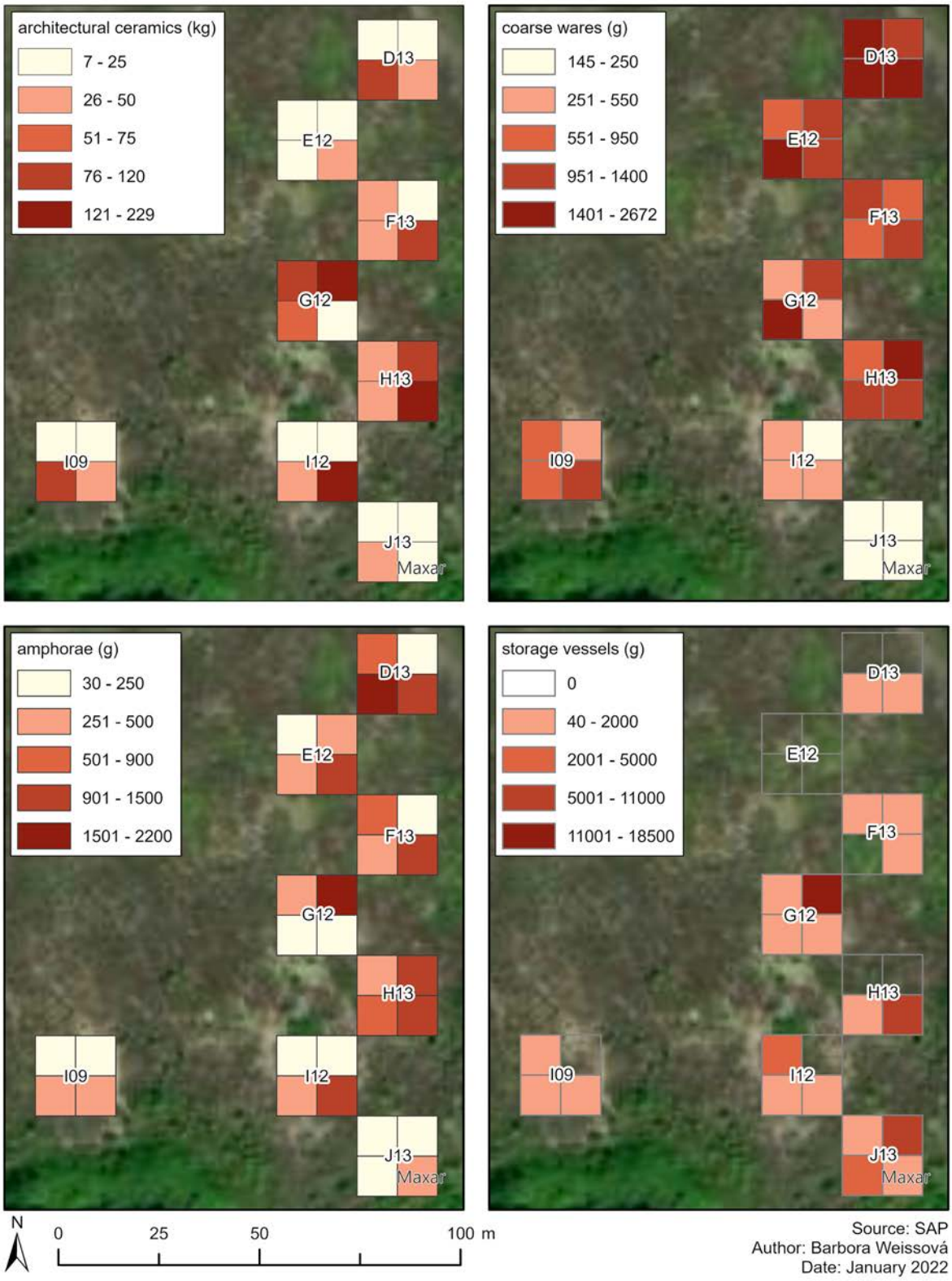


Fig. 3: Relative frequency of the pottery groups within the polygons and sectors.

In order to identify clusters of particular pottery groups, aiming for a functional analysis of the settlement, we plotted some of the results in their spatial environment. **Map 4** shows the densities of architectural ceramics, coarse wares, amphorae and storage vessels. The classes are based on natural breaks rounded to the nearest ten. In this division, the chronology of the material is not considered, as the majority of all the finds date to the 2nd–4th c. AD, i.e., conforms with the main chronology of the settlement.

The character of the detected groups over the whole examined area is as follows. Architectural ceramics are for the most part represented by roof tiles of the Laconian type and



Map 4: Weights of architectural ceramics (kg), coarse wares (g), amphorae (g) and storage vessels (g) detected using the total pick-ups.

imbrices, bricks are only rare articles. Coarse wares include different forms of cooking wares (pots, frying pans, casseroles and their lids); transport amphorae are mainly represented by body fragments, from the diagnostic finds, amphorae of the Dressel 24 family and Kapitän II are the most frequent ones. Storage vessels encompass dolia, for the most part body fragments and their thick rims, however, some bases and lids made of worked tiles were also found.

The quantified spatial analysis of the pottery groups visualised on **Map 4** shows a repeating pattern of several clusters, especially visible in the sectors D13 SW, F13 SE and G12 NE. Although the amounts of the finds per 100 sq. metres feature striking differences between the lowest and highest densities, a detailed examination shows that they can be directly associated with the presence, numbers, sizes and depths of the robbers' trenches and piles of materials. For instance, the highest amounts of almost all the materials were identified in G12 NE, with its surface entirely destroyed by illicit looting, revealing three robbers' trenches extending over 20 sq. metres with a depth reaching one metre and with piles of stones and soil covering more than 25 sq. metres. Contrariwise, the lowest amounts of all the materials were detected in the sector I09 NE which was not destroyed by any trenches and did not reveal any piles.

Despite the fluctuating densities depending on the disruption of the terrain, the survey also revealed several outliers, such as the second largest concentration of storage vessels in J13 NE, a sector of minimal disruption, revealing rather insignificant amounts of other kinds of pottery. Although it is tempting to interpret it as a cluster of storage facilities, leaving a visible imprint on the surface, the high weight is caused by the generally great weight of dolia. When considering their quantification, the outlier in J13 NE is represented by a single rim and a fitting body fragment and as such points to the existence of a single dolium within the sector.

Diagnostic pottery sherds including rims, bases and decorated body fragments were documented separately. The whole pottery assemblage from the surface survey was compared with the material found during the house excavation. The same functional classes as well as the majority of wares were identified among them. Regarding the table vessels, the majority of the whole material included red-slipped ware and also grey ware, both possibly of local (eastern Balkan peninsula) production, but also Çandarlı ware / Eastern sigillata C (F13 SW, F13 NE), the so-called Colour coated ware (D13 SE, F13 SE) and Thin-walled red-slipped ware (E12 SE, G12 NE, G12 NW, D13 SE) was identified. Wheel made and handmade cooking vessels were present in the same wares and forms as in the excavated area. Regarding the transport amphorae, the most abundant diagnostic fragments are of the Dressel 24 Family (G12 NE, H13 SE/NE, I09 SE, I12 SW, I12 SW), Kapitän II (G12 SE, F13 SW) and Rhodian amphorae (G12 NW, J13 SE), with individual fragments of the type Ephesus 56 (H13 NW), other eastern Mediterranean amphora (D13 NW) and one fragment of an amphora with a possible African origin (H13 SE).[4] The majority of the pottery might be dated to the 2nd–4th c. AD with several fragments with a possible attribution to the 5th–6th c. AD. Among the finds from the surface survey there were also some prehistoric fragments including a triangular horizontal handle of the "Assenovets" type dated to the Late Bronze Age (c.f. Hristova 2019, fig. 12:80).

The survey finds enriched not only the pottery assemblage but also the other material studies (**Map 5**). The architectural ceramics confirmed the utilisation of Laconian tiles and *imbrices* for the roofing systems, bricks appeared to be a rare find all around the nucleus. One interesting brick was however found in G09 SW, bearing a graffiti made before firing. The brick was analysed in the study of the epigraphic evidence (Heřmánková 2022a, pl. 4/2).

4 For the pottery studies from Yurta-Stroyno see Tušlová 2022.

Several robbers' trenches revealed the foundations of houses *in situ*, although most of them were already destroyed and left on the surface in the form of piles of stones. This state of preservation however helped us to notice that the uncovered foundations were made in the same way as the excavated house – by unworked quarry stones put together without any bonding which facilitates their dismantling; further, in the few cases of the preserved foundations *in situ,* we may confirm their walls follow the orientation of the excavated house.

Regarding individual architectural components, besides the random find from 2015 represented by the cylindrical stone (Weissová 2022, no. 30), the survey detected two more fragments of columns (capitals/bases see Weissová 2022, nos. 28–29) and four large worked stones, further examined and interpreted within the study of the ceramic and stone building materials (Weissová 2022) and thin-section analyses (Haubenthal 2022, nos. 1–5).

The collection of milling equipment was enriched by four fragments of rotary querns, of which three were further analysed and identified as two conical and one hemispherical *catillus* (Weissová – Haubenthal – Doležálková 2022, nos. 2, 5, 7, 9).

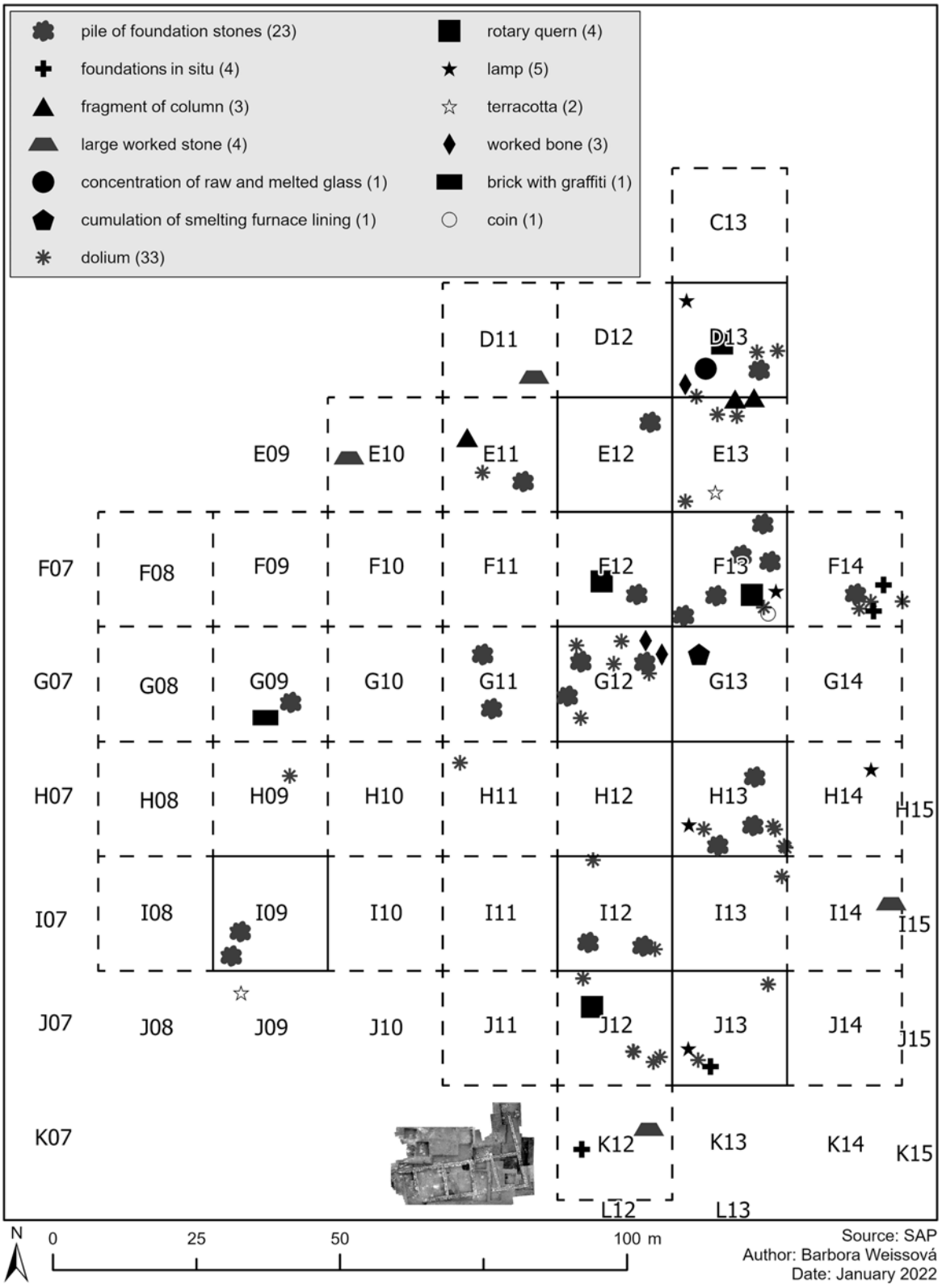
Besides numerous glass fragments detected all around the surveyed nucleus, the total pick-up in D13 SW confirmed the existence of a glass workshop suggested already in 2015 by several incidental finds. The sector revealed a vast collection of glass production waste represented by threads, drops, melted fragments and moils, fragments of raw glass and a cullet for secondary melting (Čisťakova – Zlámalová Cílová 2022, pl. 7/7). Among rare but interesting glass finds belong the amber coloured fragments dated to the 4th–6th c. AD and the rim of a plate/bowl of the same chronology found in F13 SW, H13 NE and D13 SE (Čisťakova – Zlámalová Cílová 2022, tab. 5:93–94, 35) and the two dark blue glass bracelets dated to the Early Medieval period from E12 NW, F13 SW (Čisťakova – Zlámalová Cílová 2022, tab. 6:16–17).

Metallurgical activities taking place at Yurta-Stroyno were confirmed by finds in G13 NW which revealed an accumulation of a smelting furnace lining. Furthermore, sectors I12 SW and F14 NE disclosed smelting slags, and K12 NE and G13 NW forging slags. The most abundant metal finds are of nails of diverse sizes (146 pcs.), the largest concentrations being found in polygons E09 (28 pcs.), G12 (26 pcs.), D13 (26 pcs.) and E12 (17 pcs.) (Čisťakova – Kmošek 2022, nos. 25–47). Besides these, the metal finds from the survey revealed several knives, punches, awls, fragments of chains and two keys (Čisťakova – Kmošek 2022, nos. 11–13, 18–21, 61, 63).

Among the most interesting small metal finds is one Roman period ring found in sector D13 NW and one cross-shaped pendant from F13 SE, dated to the Middle Ages (Čisťakova – Kmošek 2022, nos. 8–9).

Regarding the small finds, we should also mention a bronze coin probably of Tranquillina issued in Anchialos (F13 SE; Heřmánková 2022b, tab. 1:9, pl. 5/1:9); a terracotta wheel from a horse rider toy known from a pottery workshop in Butovo (J09 NW), a bone pin (G12 NE) and a bone distaff decorated with the depiction of a dog (D13 SW) (Minaříková 2022, nos. 5, 17 and 19). The terracotta lamps were very fragmented, out of 46 fragments of lamps identified during the survey only two could be classified into a specific type, both belonging to the group of Bildlampen, Loeschcke types I–V (Frecer 2022, nos. 31–32).

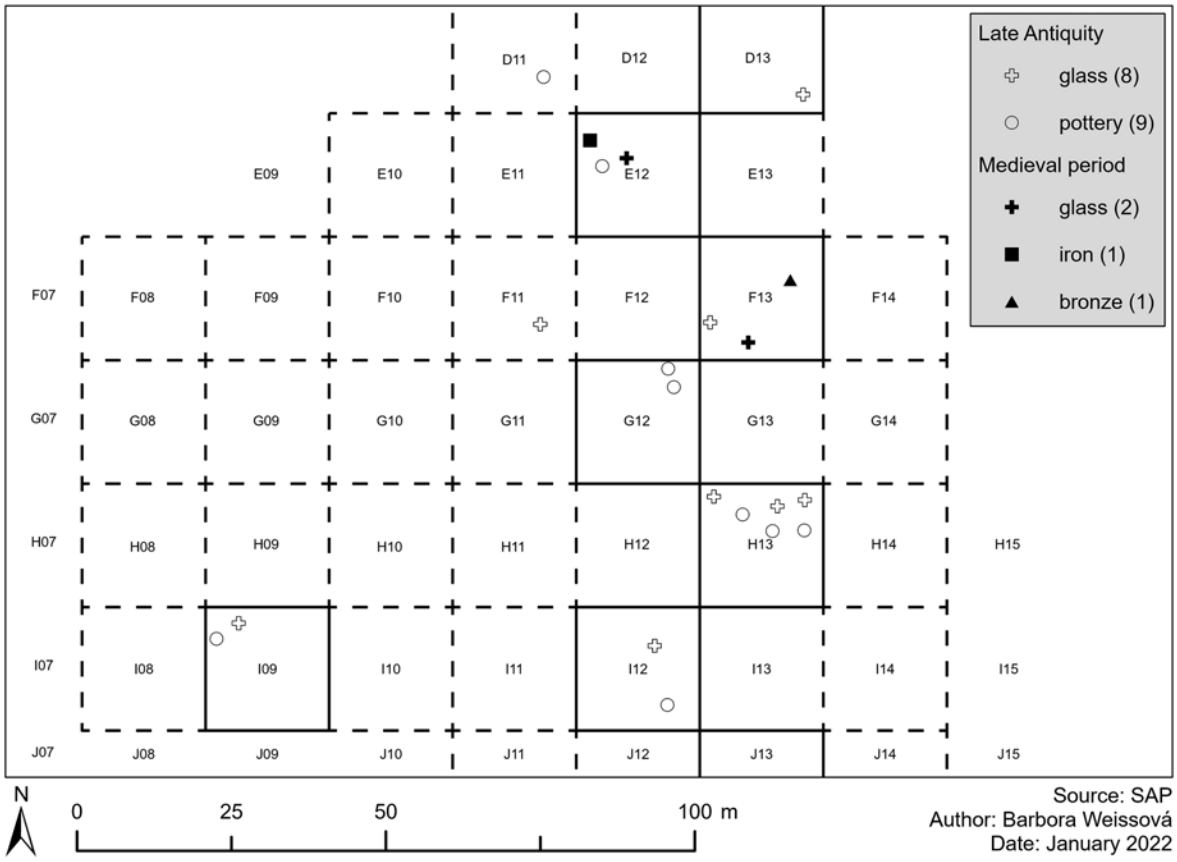
The material studies revealed several chronological outliers not falling within the 2nd–4th c. AD, which is the period represented by the majority of all the finds. **Map 6** depicts the spatial distribution of finds dated to the (possibly) Late Antique and Medieval periods. The Late Antique period is represented by fragments of glass and pottery, which, distributed rather haphazardly in eleven sectors, revealed one detectable small cluster of six pieces within two neighbouring sectors H13 NW and NE. Glass fragments were detected in seven pick-ups and encompass fragments of plates / bowls and the remains of body decorations. A *tessera*, dated very broadly between the Roman and Early Medieval period, constitutes a unique single find.



Map 5: Finds (besides pottery) detected during the total pick-ups as well as whilst surveying the overgrown polygons.

Despite its chronological classification might be wide, it was on the **Map 6** included into the Late Antiquity. Pottery was determined in seven sectors, following a slightly differing distributional pattern than the glass and encompassing several fragments of grey ware dishes, coarse ware pots and transport amphorae. The dispersion of the finds points to some utilisation of the settlement, although at a rather negligible scale when compared with the Roman period.

The Medieval period is represented by four single finds including an iron key, a pendant in the shape of a cross made of bronze and two fragments of glass bracelets. They are all clustered in three sectors or two polygons respectively within the northern part of the nucleus. As they all represent personal items which could have been simply lost whilst travelling, they do not confirm any kind of settlement in the territory of Yurta-Stroyno during the Medieval period but may suggest an existence of a route or road crossing the area during this period.



Map 6: Distribution of finds dated to Late Antique and Medieval periods.

DISCUSSION

The examination of the distributional maps of the pottery did not reveal any clearly identifiable clusters pointing to different uses of the surveyed areas. The fluctuating numbers rather seem to result from the degree of the destruction of the surface but they do not allow us to identify areas with different functions within the settlement, as the numbers of the types

keep rising and declining within each sector nearly analogically, revealing only insignificant variances.

Compared with the finds from the excavation, the survey pottery revealed analogical functional classes as well as ware types. An interesting phenomenon is represented by dolia, as the excavation revealed only one single diagnostic fragment (a rim) with certainty identified as a part of a dolium. The survey, however, brought to light 33 diagnostic fragments represented by rims/bases/lids and many more body fragments. The picture given solely by the finds from the house would hinder any information regarding the storage facilities, however, the survey confirmed the common presence of dolia within the inhabited area.

The field survey confirmed the characteristics and orientation of the stone foundations observed during the rescue excavations conducted in 2006 and 2007 by the RIM (Bakardzhiev 2007, 238–241; 2008, 471–473) and during the excavations of the house by SAP (Tušlová – Weissová – Bakardzhiev 2022, fig. 2). The survey revealed parts of foundation walls scattered all around the surface, in rare cases in the form of complete wall sections uncovered during illicit excavations and still left *in situ*, or, for the most part, in the form of piles of stones dug out by the treasure hunters and situated right next to the illegal digs. The analysis of the architectural remains shows that the foundations of the houses were without exception made from local unworked stones with simple earth bonding. The foundations left *in situ* roughly follow the orientation of the walls documented during the excavation and point to a common architectural plan of the whole settlement, oriented almost in an east-west – north-south direction with about 10° inclination of the walls.

The distribution and density of the architectural ceramics drew a picture comporting with the pottery distribution, fluctuating based on the disturbance of the surface. The basic materials used for the architecture of the settlement were invariable, creating the image of the whole settlement with houses built in *opus craticium* and with roofs covered with Laconian tiles in the *tegula-imbrex* system (Weissová 2022, fig. 2). Besides these uniform architectural components, the settlement revealed three outliers represented by the cylindrical stone situated in E11 NW and the two fragments of columns' heads/base discovered in D13 SE (Weissová 2022, nos. 28, 29, 30).

Furthermore, the surveyed nucleus enclosed two workshops. The finds in D13 SW, situated in the north of the area, include accumulations of glass production waste, raw glass and a cullet for secondary melting. These finds unambiguously point to the existence of a glass workshop in the surveyed sector. Although the relation is not clear, the glass workshop was discovered in the immediate vicinity of the column's head and the head/base.

The sector G13 NW, situated in the eastern part of the area, revealed an accumulation of remnants from a smelting furnace lining, attesting to metallurgical activities. The glass and the metallurgical workshops lie on the north – south axis, some 40–50 metres from each other, and they were both likely integrated into the common architecture of the settlement as inherent parts of the housing.

The study of the finds detected during the survey confirms the main chronology of the settlement, also revealed during the excavations, spanning between the 2nd and 4th century AD. Only sparse finds date to the Late Antiquity and their even distribution over the surveyed area does not show any limited borders of the site in comparison with the previous period. The settlement was rather slowly decaying, with finds roughly spread all around its former territory. Several finds from the Medieval period, characterised by personal items most likely lost when crossing the area, point to the abandonment of the settlement and to the possible existence of a road or route crossing the area.

In light of the results we were able to draw from the collected finds, the applied methodology needs to be deliberated. The collecting strategy we developed assumed a larger functional variability throughout the surface. Our main aim was to cover units of comparable sizes, and 10×10 metres seemed perfectly fitting as they create well comparable surfaces of 100 sq. m. This approach, however, did not allow us to consider the robbers' trenches and piles of materials as closely connected units, since they were naturally dispersed all around the site regardless of the outlined grid. As such, it was a common phenomenon that a robbers' trench was situated in one sector and a pile of material coming from the trench in the neighbouring one. On the one hand, for an overview of materials dispersed on the surface, its assignation to a particular robbers' trench does not play a principal role. On the other hand, for a more detailed functional analysis in the spatial context, it would be crucial to concentrate on the recording of the precise sizes and positions of each trench and pile and collect the materials separately. In this case, the goal would be to calculate the volumes of the piles and trenches, so that they can ideally be assigned to each other.

Considering the sizes of the rooms of the house excavated by SAP, spanning between 3.10 × 4.75 metres and 4.77 × 4.85 metres each (Tušlová – Weissová – Bakardzhiev 2022, 30), a more precise recording could have allowed us to identify the characters and functionalities of particular rooms disturbed by looters. At the same time, however, the division of the surface into a regular grid should not be altered, as it still allows for a uniform recording, quantification and comparison of the data. The resolution of the grid plays a crucial role and there is not a universal one to be recommended as it always needs to be adjusted to local conditions.

CONCLUSION

The systematic survey of Yurta-Stroyno brought to light a substantial body of information, allowing us to see the settlement as a dynamic unit spreading around its whole surface and not only through the considerably limited keyholes produced by the excavations. Especially valuable were the comparisons of the material detected on the surface and the finds from the excavations, as they confirmed the high degree of the site's uniformity and helped us to understand its character.

The homogenous distribution of architectural ceramics and pottery implies that at least the examined part of the site was built up and used in an integrated way. The houses were built in *opus craticium*, with saddle roofs covered in the *tegula-imbrex* system using Laconian tiles.

The survey enclosed two workshops situated in the eastern and north-eastern part of its nucleus, pointing to the metallurgical activities and glass production taking place directly at the site, most likely in the form of small workshops integrated into the common houses.

The chronology and character of the finds point to a slow decay of the settlement during the Late Antiquity and its successive abandonment later on, revealing only accidental finds during the Medieval period, possibly due to a communication crossing nearby its former territory.

From the methodological point of view, the study showed that total pick-ups applied on sites with a high degree of disturbed surface bear a high potential to disclose a considerable amount of information, allowing for functional analyses. However, a more precise recording, reckoning the robbers' trenches and respective piles of materials as interconnected units, could reveal insights into the functionalities of the disturbed rooms, not allowed by the recording considering the sectors of 10×10 metres as the smallest units, used in the present study.

ACKNOWLEDGEMENTS

We would like to thank our colleagues from the Slovak University of Technology, Tibor Lieskovský, Alexandra Rášová and Ondrej Trhan, for helping us set up the survey grid. Our deepest acknowledgements belong to the students who surveyed the sectors and despite very unfavourable weather conditions such as a frozen surface in the morning remained in high spirits. In alphabetical order, they are Clarissa Haubenthal, Jakub Havlík, Hana Havlíková and Adéla Minaříková.

BIBLIOGRAPHY

Bakardzhiev 2007 = Бакърджиев, С. 2007: Сондажни археологически проучвания в м. Юрта при с. Стройно, община Елхово, област Ямбол. *AOR през 2006 г.*, 238–241.

Bakardzhiev 2008 = Бакърджиев, С. 2008: Сондажни археологически проучвания в м. Юрта при с. Стройно, община Елхово. *AOR през 2007 г.*, 471–473.

Čisťakova, V. – Zlámalová Cílová, Z. 2022: Archaeological and Archaeometric Study of the Roman and Late Antique Glass. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 184–244.

Čisťakova, V. – Kmošek, J. 2022: Metal Finds and Traces of Metallurgical Activities at Yurta-Stroyno. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 155–183.

Dimitrova – Popov 1978 = Димитрова, Д. – Попов, Ж. 1978: *Археологически паметници в Ямболски окръг*. София.

Frecer, R. 2022: The Terracotta Lamps. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 145–154.

Heřmánková, P. 2022a: The Epigraphic Finds from Yurta-Stroyno in a Regional Context. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 118–132.

Heřmánková, P. 2022b: The Numismatic Finds. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 133–144.

Hristova, R. 2019: Late Bronze Age Pottery from the Site of Vratitsa, Eastern Bulgaria. Definition, Chronology and its Aegean affinities. In: Horejs, B. – Pavúk, P. (eds.): *Aegean and Balkan Prehistory*. http://www.aegeobalkanprehistory.net/index.php?p=article & id_art=19 (visited 07/02/2022).

Iliev *et al.* eds. 2012 = Iliev, I. – Ross, S. – Sobotková, A. – Bakardzhiev, S. – Connor, S. (eds.) 2012: The Tundzha Regional Archaeological Project. Elhovo Survey [Регионален археологически проект Тунджа. Проучване в Елхово]. Yambol.

Minaříková, A. 2022: Selected Small Finds. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 245–258.

Ross *et al*. eds. 2018 = Ross, S. – Sobotkova, A. – Nehrizov, G. – Tzvetkova, J. – Connor, S.E. (eds.): *Tundzha Regional Archaeological Project, Surface Survey, Palaeoecology, and related Studies (2009–2011) Final Report*. Oxbow.

Sobotková, A. – Ross, S. – Iliev, I. 2018: Yambol Survey Results. In: Ross – Sobotkova – Nekhrizov – Tzvetkova – Connor (eds.) 2018, 146–156.

Tušlová *et al.* 2015 = Tušlová, P. – Weissová, B. – Bakardzhiev, S. – Čisťakova, V. – Frecer, R. – Janouchová, P. 2015: The Stroyno Archaeological Project, Report on the Season 2015. *SH* XIX:1–2, 243–261.

Tušlová, P. – Weissová, B. – Bakardzhiev, S. 2022: The Final Excavation Report. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 24–52.

Tušlová, P. 2022: *The Yurta-Stroyno Archaeological Project. Pottery Studies.* SH Monographs 3. Praha.

Weissová, B. 2022: Shedding Light on Architecture of Roman Rural Settlements in Thrace. Ceramic and Stone Building Materials from Yurta-Stroyno. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 70–89.

Weissová, B. – Haubenthal, C. – Doležálková, V. 2022: The Milling Equipment. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 90–105.

Barbora Weissová
Ruhr-Universität Bochum
Institut für Archäologische Wissenschaften
Am Bergbaumuseum 31
D-44791 Bochum
barbora.weissova@rub.de

Petra Tušlová
Charles University in Prague
Institute for Classical Archaeology
Nám. Jana Palacha 2
CZ-11638 Prague
petra.tuslova@ff.cuni.cz

Stefan Bakardzhiev
Regional Historical Museum of Yambol
Byalo more 2, BG-8600, Yambol
&
University of Library Studies
and Information Technologies
Tsarigradsko Shose Blvd. 119, BG-1784, Sofia
st_bakarjiev@abv.bg

Shedding Light on Architecture of Roman Rural Settlements in Thrace. Ceramic and Stone Building Materials from Yurta-Stroyno

Barbora Weissová

ABSTRACT

The assemblage discussed in this article represents a heterogenous group of architectural ceramic and stone building materials found at the Roman rural settlement of Yurta-Stroyno. All the finds but one were detected during the Yurta-Stroyno Archaeological Project. The one extra find, a marble capital, was discovered prior to the joint project and brought to the Regional Historical Museum of Yambol as an accidental find.

The architectural ceramics include roof tiles, bricks, drainage pipes, and a spacer. The architectural stones encompass three different capitals/bases, a cylindrical stone – possibly a column – and three fragments of stone tiles possibly used as facing for walls.

Most of the examined materials are not chronologically sensitive and their analyses are focused on morphological features, possible functions and reconstructions. Exceptions represent two of the capitals; the one mentioned above, identified as a Roman-Doric capital Type 1 with fluted shaft, possibly dated as early as to the 2nd half of the 1st century AD; and the other one, found during the surface survey, which was determined as a 'simplified version of the Roman-Doric Type 1', dated from the 2nd to 1st half of the 3rd century AD.

KEYWORDS

Thrace; Roman rural settlement; architectural ceramics; architectural stones; capital; base; animal imprints.

INTRODUCTION

Based on a careful examination of all the ceramic and stone building materials, the present study offers an outline of architectural forms appearing in Yurta-Stroyno. The vast majority of the collection originates from the Yurta-Stroyno Archaeological Project (SAP) conducted in cooperation with the Regional Historical Museum of Yambol (RIM) and the Institute of Classical Archaeology of the Charles University in Prague. The excavation was carried out between 2014–2016 (Bakardzhiev – Kozarev 2015, 2016, 2017; Tušlová – Weissová – Bakardzhiev 2014, 16–24; Tušlová *et al.* 2015, 243–261; Tušlová – Weissová – Bakardzhiev 2017, 99–108; Tušlová – Weissová – Bakardzhiev 2018, 191–199) and the collection was further enriched with finds located during the systematic surface survey in 2016 (Tušlová – Weissová – Bakardzhiev 2017, 108–110). The most spectacular of the presented finds, a column head with a fluted necking, was brought to the RIM by locals already prior to the SAP.

Savage looting of the settlement caused displacements of most of the studied materials, resulting either in a reverse stratigraphy, or simply in piles of stones and architectural ceramics placed right next to the illegal digs. As a result, the contexts are pointed out only when relevant / they can be specified. When not stated otherwise, the finds come from unstratified contexts or layers disrupted by looters. While all the survey finds belong to this group, in case of excavations this concerns mainly the RT soil [SU001]. Despite this obvious deficiency of the material, the presented collection still allows for a definition of architectural types rep-

resented within Yurta-Stroyno, and, broadly considered, for an outline of architectural types represented within Roman rural settlements situated in South-Eastern Thrace.

CERAMIC BUILDING MATERIAL

The group of architectural ceramics includes roof tiles, bricks, drainage pipes and one solitary spacer. All the architectural ceramics found during the archaeological works were individually examined and the following text describes the characteristic finds as well as the outliers. The finds from the territory of the excavated house and from the survey all around the settlement do not feature any traceable differences in types, sizes or cumulations.

ROOF TILES (TEGULAE AND IMBRICES)

All the studied tiles are fragmentary; some of them were destroyed already during antiquity, some later in the frame of the looting activities, as witnessed by considerably recent breaks. The identified roof tiles, hereinafter *tegulae*, are of the Laconian type, which is characterised by a concave body without obvious flanges or rims (Ginouvès 1992, 182–187, pl. 82). The width of the tiles varies between 406 and 420 mm, the thickness between 22 and 32 mm. The height of the concave body spans between 70 and 80 mm. The longest preserved fragment reaches 593 mm, but none of the *tegulae* revealed fully a preserved length. Since the *tegulae* were not standardized and each region produced its own types (Adam 2001, 213),[1] the reconstructed length has to be based on local parallels.[2] In the territory of Bulgaria, most of the published Laconian *tegulae* found were only fragmentary.[3] An exception are *tegulae* identified in the context of the *villa rustica* at Preslovo, as they revealed complete measurements of 690×390×25 mm (Sultov 1964, 57). As the width of the *tegulae* from Preslovo (390 mm) is slightly smaller than the average width of the *tegulae* found in Yurta-Stroyno (between 406 and 420 mm), their length rather represents the minimum possible dimensions. It follows that the *tegulae* used in Yurta-Stroyno should have reached about 700 mm in length in the case that they had similar proportions.

The surfaces are in general even and smoothed. Only several fragments show markings of finger grooves on the convex sides, each varying between 12 and 14 mm in average width. The detected shapes of finger grooves are depicted in **Fig. 1**.[4] The convex sides of several *tegulae* preserved traces of mortar. One of the *tegulae* revealed remains of mortar with imprints of wooden beams, witnessing its attachment to the wooden roof construction.

The joints between the *tegulae* were covered with semi-cylindrical roofing tiles called *imbrices* in order to create a waterproof roofing system. Identified *imbrices* show varying shapes and measurements when considering their heights and widths. The outer surfaces are decorated with shallow parallel grooves with an average width of about 12–13 mm. The grooves run over the whole length of the *imbrices*, covering their surfaces. The inner surfaces

1 As example, Adam (2001, 213) lists highly differing measurements of *tegulae* recorded in Ostia (480×720 mm, 450×600 mm, 410×570 mm, 405×530 mm), Rome (490×660 mm, 390×460 mm) and Pompeii (690×475 mm, 525×660 mm, 475×640 mm, 500×590 mm, 480×590 mm).

2 Compare with finds from Roman Britain where *tegulae* only exceptionally overreach 500 mm in length (Brodribb 1987, 12).

3 As, for instance, at the Late Antique fortress at the hill Hisarlik in Kyustendil (Ruseva-Slokoska 2016, 94), or in Oescus (Ivanov 2006, 151).

4 For comparative examples of grooves detected on bricks and tiles along the Lower Danube, see Ivanov 2006, 156, figs. 46 and 47, 166, figs. 57 and 58.

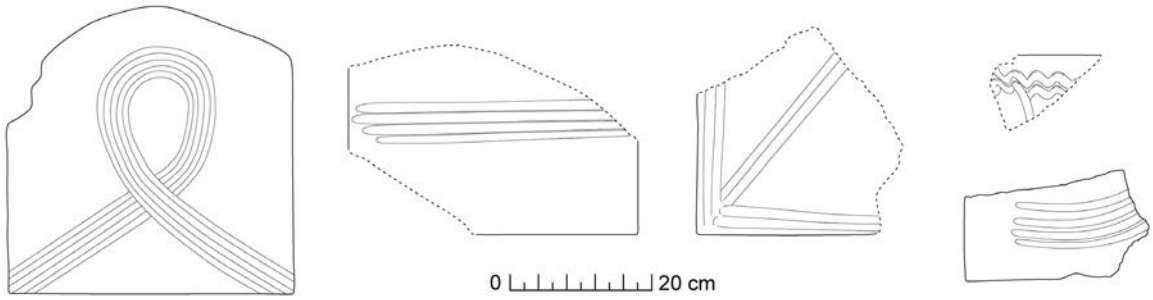


Fig. 1: Finger grooves detected on convex sides of *tegulae*. Drawings by V. Doležálková.

are functional, only roughly treated with deep grooves in order to adhere the sealing mortar. No antefix or attachment of antefix were detected. Analogically as in the case of *tegulae*, none of the *imbrices* was preserved in its entire length. The longest fragment reaches a mere 244 mm.

Distinctive shapes allowed for the definition of two main groups of the *imbrices*, semi-oval (1) and flat (2), further divided based on their sizes to small (a), middle (b) and large (c) respectively. For their measurements, see **Tab. 1**.

Group	Descriptive shape	Size category	Size mark	h.	w.	Medium h. / w.
1	semi-oval	small	a	50–52	106–120	51 / 114
1	semi-oval	middle	b	59–71	129–149	63 / 137
1	semi-oval	large	c	81	165	81 / 165
2	flat	small	a	51–56	141–143	54 / 142
2	flat	middle	b	60–65	157–177	62 / 170

Tab. 1: Typology of *imbrices* from Yurta-Stroyno based on their dimensions. All measurements in millimetres; h. = height, w. = width.

Since the *imbrices* always narrow down / widen towards their ends respectively and the assemblage does not offer any *imbrex* which would reveal both of its ends in one piece, it is possible that the different sizes are a mere product of the high fragmentation, and the categories could be reduced to semi-oval (**Tab. 1**, Group 1) and flat (**Tab. 1**, Group 2). Nevertheless, **Fig. 2:1–5** provides possible variants of combinations considering all the shapes as well as sizes of the *imbrices* combined with the *tegulae* into the *tegula-imbrex* system in order to examine all the options. A closer look at these reconstructions reveals the impression that the combinations using middle semi-oval (**Fig. 2:2**) and small as well as middle sizes of the flat types of *imbrices* (**Figs. 2:4** and **2:5**) sit more safely on the *tegulae* than the small and large semi-oval *imbrices* (**Figs. 2:1** and **2:2**). When we look at only two types – semi-oval and flat – of largely fragmented *imbrices*, they both fulfil their function and perfectly sit on the *tegulae*.

The last two reconstructions depict combinations of two different systems: the *imbrex-imbrex* or Monk and Nun system (**Fig. 2:6**), using two *imbrices* represented by the large semi-oval type 1c as the lower tile and the small semi-oval type 1a as the covering tile; and the *tegula-tegula* system (**Fig. 2:7**). Although both systems fit perfectly, their widespread utilisation would eliminate or at least drastically reduce the occurrence of *imbrices* or *tegulae* on the site, which is not the case of the assemblage from Yurta-Stroyno. The proportional representation of the *imbrices* and *tegulae* in Yurta-Stroyno supports the common use of the *tegula-imbrex* system all around the site.

As the assemblage did not reveal any *imbrices* of special shapes to provide sockets at the junctions of *tegulae*, the roof-ridges should have been made of the usual type of *imbrex* with a filling of mortar to ensure the bonding (Adam 2001, 214). Looking for the *imbrices* suitable to be used as the ridge tiles, the large semi-oval and the middle flat type (**Tab. 1**; **Fig. 2:3** and **5**) represent the most practicable examples, especially due to their sizes.

Some of the *imbrices*, however, might be also ascribed to the wide range of their utilization, as they are far from being bordered to the roofing system. Finds from undisturbed sites confirm their function as drains, hearths, or columns of a *hypocaustum* (Brodribb 1987, 26, fig. 43).

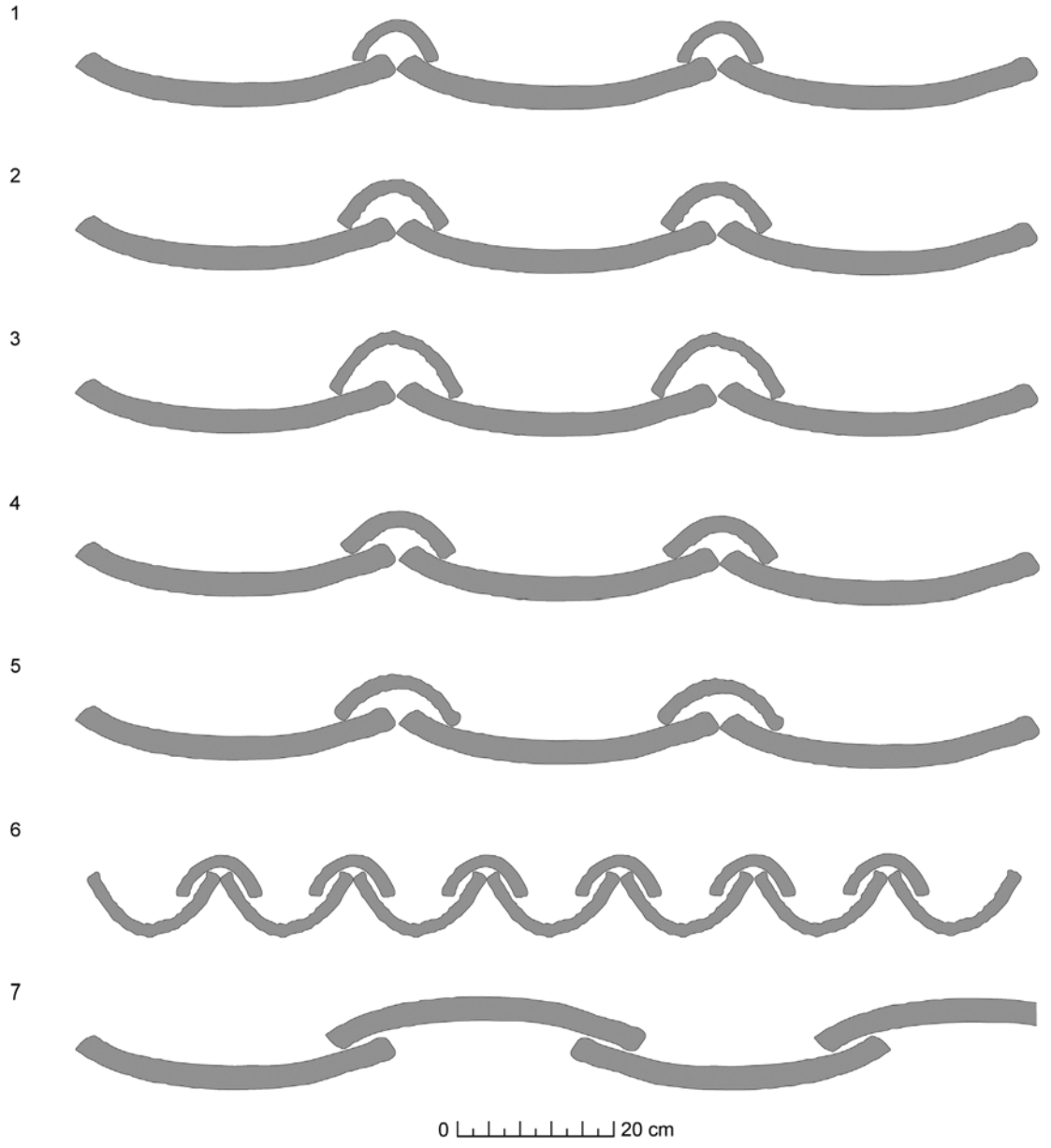


Fig. 2: Reconstructions of feasible roofing systems used in Yurta-Stroyno; 1: *tegula* and *imbrex* type 1a; 2: *tegula* and *imbrex* type 1b; 3: *tegula* and *imbrex* type 1c; 4: *tegula* and *imbrex* type 2a; 5: *tegula* with *imbrex* type 2b; 6: *imbrex* type 1c and *imbrex* type 1a; 7: *tegula* and *tegula*. Drawings by V. Doležálková.

BRICKS

The assemblage revealed a relatively small number of fired bricks, as the houses were built on stone foundations, with upper half-timbered adobe construction *opus craticium* (for the technique, see Lancaster – Ulrich 2013, 161, fig. 9.1, for the excavated house, see Tušlová – Weissová – Bakardzhiev 2022). Consequently, the fired bricks should have been used for special purposes such as pavement, facing, heating system, hearths etc.

The measurements of the detected bricks suggest two main types and two outliers. The two main types are represented by square bricks of 315×315 mm and their halves, measuring about 315×155 mm. Their thickness varies between 45 and 55 mm. The square bricks are local variants of *pedales*, as they measure some 20 mm more than the standard Roman foot which equalled 295.7 mm (Brodribb 1987, 3, 36–37). Based on the study of architectural ceramics from the Lower Danube region (Ivanov 2006, 141), the common deviations from the standard Roman foot in the area equal 10–20 mm. Even though the local products from the Lower Danube region are usually smaller than the standard Roman food, larger exemplars were also encountered. Concerning their function, *pedales* were usually used as parts of columns in *hypocaustum*, or within the domestic architecture.

The first group of outliers is represented by very massive bricks of thickness between 70 and 80 mm, with no other complete measurements preserved. When consulting assemblages of finds from Oescus (Ivanov 2006, 141–149) and Novae (Ivanov 2006, 163–186), bricks of this thickness appear among all the represented types and shapes. Reconstruction of standard measurements of the massive bricks from our assemblage is therefore impossible. Based on the parallels, their function does not differ from the more common bricks of thicknesses between 45 and 55 mm; the bricks of the thickness between 70 and 80 mm were detected in the bath in Oescus as parts of the walls, columns of *hypocaustum* (*pilae*) and the *hypocaustum* system (Ivanov 2006, 159).

The second outlier is a single fragment of a brick with one fully preserved side measuring 420 mm and the fragmented one of 250 mm. Due to the fact that the preserved part of the fragmented side measures more than half of the whole one, it is highly probable it was a square brick, with measurements of 420×420 mm. Considering the common deviation, the brick can be identified as *sesquipedalis* which equals 1.5 feet or 443–444 mm (Brodribb 1987, 40–41; Adam 2001, 147, fig. 347). The thickness of the brick reaches 65 mm. *Sesquipedales* were commonly used as floorings to support the columns of a *hypocaustum*, floorings, parts of walls and arches.

Bricks of similar proportions, at least regarding the common types for Yurta-Stroyno, and the first group of the outliers, can be also found at the *villa rustica* near Prisovo (about 120 km north-west from Yurta-Stroyno as the crow flies). Sultov (1964, 57) describes two main groups of bricks found at the *villa rustica*, although of slightly larger measurements (340×340×50 mm and 340×170×50 mm respectively) and several massive bricks of 80 mm thickness, with no other measurements preserved.

None of the bricks in the assemblage from Yurta-Stroyno was stamped. However, one of the rectangular bricks revealed an engraved inscription 'HΘEOC', further analysed and discussed by P. Heřmánková (2022, pl. 4/2) in this volume.

IMPRESSIONS / IMPRINTS ON BRICKS AND TILES

The architectural ceramics with impressions / imprints are a common phenomenon, as the bricks and tiles had to dry before firing. It is generally expected that the ceramics were kept under shelters, most likely open at the sides to allow for a swift drying process (Brodribb

1987, 125; Elliot 1991, 225; Adam 2005, 108) or simply dryed in the open air. These conditions, analogically, enabled the easy access of animals and people.

Yurta-Stroyno revealed 14 pieces of architectural ceramics with identifiable impressions (**Tab. 2**). Out of the 14 impressions, 11 belong to animals, two to humans and one was created by a stamp. The represented animals include dogs, foxes, sheep/goats and pigs. The human impressions are represented by a foot and a hand. An appealing and unique find in the assemblage represents a *pedalis* with an impression of a stamp in the shape of a waterfowl-like foot.

In particular, a dog's or fox's paws appear on five fragments of *tegulae*, always one imprint per tile (**Tab. 2:9**, **10** and **12**). It is only possible to determine with certainty a dog's (**Tab. 2:8**; **Pl. 1/1:8**) and fox's (**Tab. 2:11**; **Pl. 1/1:11**) paws respectively in two cases.

Hooves of sheep/goats were detected on two fragments of *tegulae* and on one almost wholly preserved *pedalis*. The *tegulae* feature one (**Tab. 2:13**; **Pl. 1/1:13**) and two (**Tab. 2:14**) hooves respectively, the *pedalis* showed a group of four (**Tab. 2:15**). The fragment **Tab. 2:14** features more impressions, but they are not clearly identifiable. The piece was apparently still very wet when trampled down and the surface was accordingly disrupted.

Pig's trotters were identified on two *tegulae* and one brick. Hooves on the *tegula* **Tab. 2:16** (**Pl. 1/1:16**) were determined with certainty, the other two (**Tab. 2:17** and **18**) are possible to be interchanged with a sheep or goat. The hooves appear in clusters of several impressions, either five (**Tab. 2:16**) or three (**Tab. 2:17**); only the brick under **Tab. 2:18** revealed one single hoof of a pig.

Human imprints were both most likely done by a child or an adolescent, although the size could also correspond to an adult woman. The foot (**Tab. 2:19**; **Pl. 1/2:19**) is about the standardized European size 35–36. The right part of the imprint was decorated with incised lines, now partially missing. The brick was furthermore decorated with very shallow finger grooves; two lines of three fingers crossing the brick from edge to edge. The hand imprint **no. 20** (**Tab. 2:20**; **Pl. 1/2:20**) revealed three fingers including the thumb, index, and middle finger. The length of the index finger is almost entirely preserved and equals 58–60 mm.

No.	Yurta_Stroyno #	SU	Type	Animal imprint	No. of imprints
8	SY16_AC_09	SU001	*tegula*	dog	1
9	SY15_AC_09	SU047	*tegula*	dog (most likely)	1
10	SY16_AC_08	SU001	*tegula*	dog/fox	1
11	SY14_AC_09	SU001	*tegula*	fox	1
12	SY16_AC_24	SU001	*tegula*	fox/dog	1
13	SY15_AC_08	SU001	*tegula*	goat/sheep	1
14	SY16_AC_27	SU001	*tegula*	goat/sheep	2
15	SY16_AC_04	survey (G11)	*pedalis*	goat/sheep	4
16	SY15_AC_19	SU001	*tegula*	pig	5
17	SY16_AC_25	SU001	*tegula*	pig/goat/sheep	3
18	SY16_AC_28	SU001	brick	pig/goat/sheep	1
19	SY15_AC_16	SU001	*pedalis*	human foot	1
20	SY16_AC_23	SU001	*tegula*	human hand	1
21	SY15_AC_17	SU001	*pedalis*	waterfowl (artificial stamp)	7

Tab. 2: Bricks and tiles with impressions and imprints.

The waterfowl-like foot stamps (**Tab. 2:21**; **Pl. 1/2:21**) might be confused with real imprints at first sight, but more detailed observations reveal unambiguous identification with a stamp. The imprints are smooth and do not feature individual fingers visible within the webbing, unlike in case of a real waterfowl. Moreover, all the imprints are identical and correspond to the left foot.

PIPES AND DRAINS

Roman pipes are usually of slightly conical shape, with a narrower end that has an inset collar, called a male end, in order to allow for the join with the wider female end of the next pipe. The pipes are commonly used as drains or conduits (Celuzza 1985, 36). The assemblage revealed four pipes which allow for a more detailed analysis of their measurements and function. Moreover, highly fragmented pipes were detected all around the settlement, confirming their broad and common utilisation within the architecture of Yurta-Stroyno.

The excavated house enclosed fragments of the lower halves of two terracotta pipes still *in situ*, which can possibly be interpreted as drainpipes going in the north–south direction through Room D (Tušlová *et al.* 2015, 246; Tušlová – Weissová – Bakardzhiev 2022). Both of the pipes revealed female ends (**Tab. 3:22** and **23**). The pipe **Tab. 3:22** with the length of 540 mm is the longest reconstructed fragment, though it still does not represent a complete pipe. The inner diameter of the body is 154 mm and the constriction widens to 200 mm inside. The thickness of the sherd varies between 12 and 24 mm. The second one (**Tab. 3:23**) is 290 mm long, the female end has an 194 mm inner diameter, and the body narrows down to 157 mm. The thickness of the body varies between 12 and 22 mm. Both pipes are of light red clay and are well levigated. Despite the fact that both pipes were undoubtedly parts of one pipeline, as found *in situ*, their female ends feature considerable differences in shapes and some minor variations in measurements. In order to achieve watertight connections with male constrictions, they would have been properly sealed up (Adam 2001, 254; Ivanov 2006, 152). Although the examined pipes do not bear traces of lime mortar, numerous smaller fragments in the assemblage revealed its remains and as such attest to its utilisation as the sealing, probably eliminated as the male ends were destroyed.

The RT soil [SU001] from the excavated house revealed two more fragments of pipes with preserved constrictions (**Tab. 3**; **Fig. 3:24** and **25**). The pipe **no. 24** has a male end with an inner diameter of 98 mm and body widening to 140 mm. The thickness of the walls is about 9 to 11 mm. The colour and the fabric comport with the pipes detected *in situ* (**nos. 22** and **23**). Although **no. 24** has a male end, it was not part of the drainage going through Room D, as the measurements of its body are much smaller than of the pipes **nos. 22** and **23** (60 and 54 mm respectively) and the pipe basically fully fits inside of them.

The last discussed piece (**no. 25**) has a 183 mm inner diameter of the body and 173 mm of the rim. It represents an outlier in the group considering its shape, colour and characteristics of the material (see **Tab. 3** and **Fig. 3** for comparison). The body is straight and has a uniform thickness of 18–19 mm. The rim is turned out, pronounced, and offers some 30 mm of a straight surface on its top. The colour is light reddish brown, and the fabric contains 15% of whitish angular inclusions up to 3 mm in size (based on Mathew – Woods – Oliver 1991). The inclusions are evenly distributed all around the sherd and were most likely used as a temper. The characteristics of the pipe, especially the straight body and the tempered clay, point to its possible function as a column in a *hypocaust*.

No.	Yurta-Stroyno #	SU	Trench	Preserved l.	Body d. in / out	Rim d. in / out	Constriction	Wall th. (min-max)	Colour
22	SY14_AC_031	SU054	105E_100N	540	154 / 202	200 / 254	female	12–24	2.5YR 6/8 – light red
23	SY14_AC_030	SU054	105E_100N	290	157 / 191	194 / 227	female	12–22	2.5YR 7/8 – light red
24	SY14_AC_023	SU001	95E_100N	100	140 / 162	98 / 118	male	9–11	2.5YR 7/8 – light red
25	SY14_AC_025	SU001	×	116	183 / 217	173 / 253	×	18–19	2.5YR 6/4 – reddish brown

Tab. 3: Pipes with preserved constriction. All measurements in millimetres; l. = length, d. = diameter, th. = thickness. Colours are based on Munsell Soil Colour Chart.

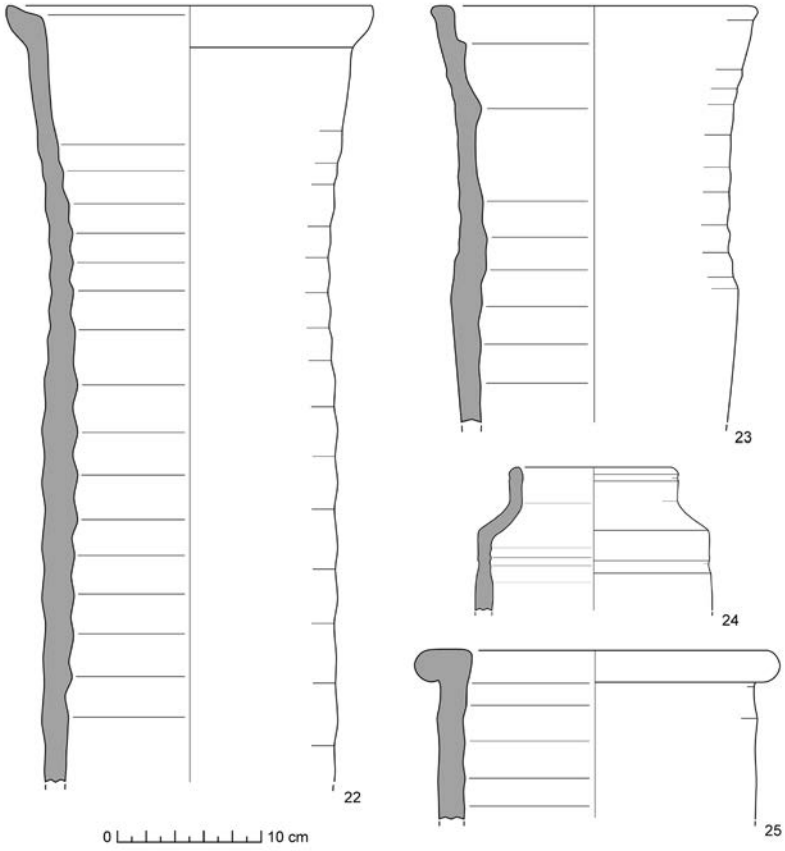


Fig. 3: Pipes with preserved constriction; 22, 23: pipes with female end; 24: pipe with male end; 25: pipe with straight neck, possibly used as a column in a *hypocaustum*. Drawings by V. Doležálková.

A SPACER

Terracotta spacers/spacer bobbins were used to keep a gap between the wall and the coating in order to create a room for circulation of hot air (Brodribb 1987, 66–69; Koçyiğit 2007, 2). They were used in combination with *hypocaustum*, in order to create a heated room, mostly in the context of baths.

Assemblage from Yurta-Stroyno revealed one spacer bobbin (**Fig. 4:26**) found in a fill [SU021] inside Room B. The spacer is 75 mm long, its ends widen to 52 and 63 mm respectively, the diameter of the hollow is 15 mm.

Spacers belong to relatively common finds in the context of the Roman architecture in Thrace (Ivanov 1971, 40); for the territory of Bulgaria, similar spacers are known from the context of the Roman house in Nicopolis ad Istrum (Poulter 1995, 190), baths in Novae (Biernacki 2003, 10, fig. 3) and Oescus (Ivanov 1971, 38–41), from the *villa rustica* near Prisovo (Sultov 1964, 57, fig. 12) or from Kabyle.[5]

Fig. 4: A terracotta spacer bobbin. Drawings by V. Doležálková.

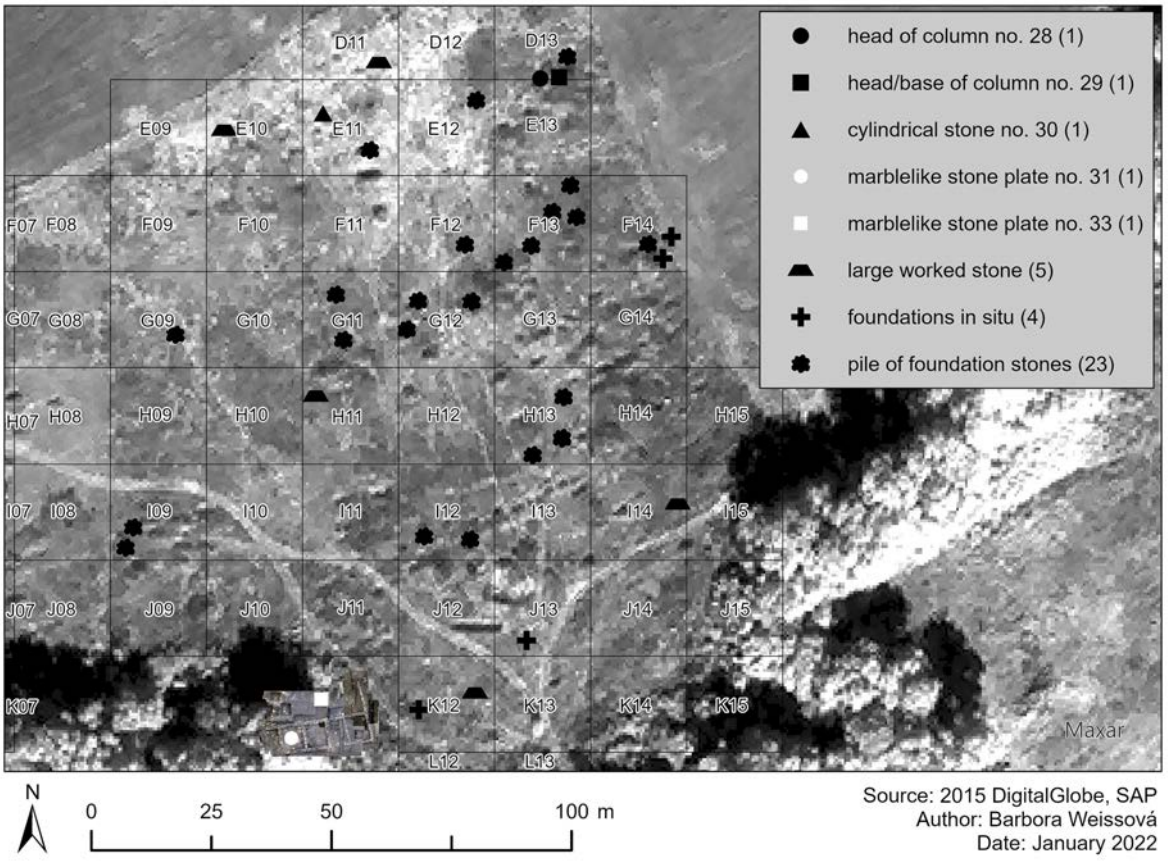
ARCHITECTURAL STONES

The architectural stones discussed in the text include two capitals and one worked stone – possibly a base or a capital, one cylindrical stone, three stone plates and four massive rectangular stones (**nos. 27–33**). The spatial distribution of the architectural stones is depicted on the **Map 1**.

CAPITALS/BASES

The most representative, as well as in the context of the detected architecture representing an outlier, is the capital **no. 27** made of marble (**Fig. 5:27**; **Pl. 1/3:27**). It was brought as a random find to the museum by locals and besides its approximate allocation to Yurta-Stroyno, we lack any other information about its finding context. The whole capital is 160 mm high; it has a square lower abacus of 50 mm height and 450 mm a side, echinus of 45 mm height, two annuli and a fluted necking. The necking features 20 channels, the endings of *arrises* are about 5 mm wide. The lower part of the necking revealed an oval dowel hole of 60–65 mm in diameter. The dowel hole is placed symmetrically in the middle of the lower part of the capital. The upper part of the abacus features a rectangular dowel hole of 50×30×20 mm, placed asymmetrically in one of the corners of the abacus, only 60 mm far of the nearest edges. On top of that, the abacus has a rounded imprint on its top, left symmetrically in its middle by a column of 390 mm in diameter.

5 Personal observation of unpublished materials deposited in the archive of the archaeological base in Kabile.



Map 1: Spatial distribution of architectural stones.

The symmetrically placed dowel hole on the lower part of the necking points to its utilization as a capital. The asymmetric dowel hole and the imprint of the column on the top of the capital are rather puzzling and point to its secondary or tertiary utilization. The imprint suggests the capital was used as a base supporting a column. The rectangular dowel hole asymmetrically placed in its corner, however, does not comport this way of utilisation. It is likely the stone had a different function and even a shape in the first place, and it was later worked to the capital and at some point reused as a base.

The surface of the capital is even and smoothed, with no visible traces of picking. The channels on the necking as well as the *arises* are regularly placed and well worked. The fine execution of the capital is an outlier within the architecture components hitherto detected in Yurta-Stroyno.

Based on the typology outlined by Dimitrov, it is a Roman-Doric capital Type 1 with fluted shaft (Dimitrov 2004, 221–222), one of the earliest details connected with Roman architecture and appearing in Thrace by the end of the 1st and beginning of the 2nd c. AD. Its utilization is typical in the context of domestic architecture. A direct parallel was found at the villa situated a mere 1.5 km south of Yurta-Stroyno, in the territory of St. Iliya (Agre – Dichev – Christov 2022),[6] at the *villa rustica* near Chatalka (Dimitrov 2004, 222, fig. 42) or in the early phases of the Roman forum in the city of Philippopolis (Dzhambov – Mateev 1978, fig. 8; 1979, 52,

6 Photo of the capital was presented at the yearly archaeological reports (otcheti) on March 3rd 2022 by D. Agre.

fig. 10), the latter two dated to the 2nd half of the 1st century AD. Diocletianopolis revealed the latest examples, dated to the 2nd–3rd century AD and found as *spolia* in the Late Antique basilica (Tsonchev, 1956, 144–145, nos. 2–7). More parallels can be seen in Moesia Inferior, including villa Madara (Dremsizova 1984, 83–85, 113), military camps situated along the Danube River in Oescus, Durostorum and inland cities Abritus and Marcianopolis (Dimitrov 2004, 221–222).

The other two pieces of architecture **nos. 28** and **29** were found during the systematic surface survey in the north-eastern part of the examined territory, in the south-eastern sector of the square D13, lying next to each other within the robbers' soil (Weissová – Tušlová – Bakardzhiev 2022, map 5). **No. 28** might be clearly identified as a capital, but the fragmentation of **no. 29** does not allow for a clear identification of its function, leaving us with two possible interpretations, either as a capital, or as a base.

The capital **no. 28** (**Fig. 5:28**; **Pl. 1/3:28**) is made of micrite (Haubenthal 2022, no. 2, tab. 1:2). It is 137 mm high; the square lower abacus measures 58 mm, with ca. 280 mm a side,[7] the echinus is 38 mm high, with no annuli between the echinus and the necking. The necking is 40 mm high and smooth, i.e. without any channels. The diameter of the necking is 230 mm. No dowel holes were detected. The echinus is largely destroyed but the abacus preserved its original surface. It is worked by picking and does not feature any traces of smoothing. The uneven surface might have been covered with a layer of stucco in order to uplift the appearance of the capital. However, the rough working could be also ascribed to the common trend appearing during the 2nd and the 3rd century AD in Moesia and Thrace described by Petrova (1990, 10) as degeneration of the capitals. The trend includes very schematic and unfinished working as well as subsequent reduction of the numbers of annuli, scaled down to a slightly concave line dividing echinus and abacus, as it also appears in case of the capital **no. 28**.

Petrova's typology (1999, 8–16) of Roman-Doric capitals from Moesia and Thrace allows classification of **no. 28** as Type 1 – a Roman-Doric capital with smooth echinus. Based on Dimitrov's typology (2004, 221), it is a 'simplified version of the Roman-Doric Type 1', also called the *classic Doric capital*. This type of capital is used in the domestic architecture. Whilst featuring analogical shapes, the available parallels are considerably larger in their sizes, especially in the width. For instance, the capital found in Philippopolis (Botusharova 1960, 88), although at first sight identical in shape, has the abacus of 400 mm a side, i.e. 120 mm (30%) more than in the case of the capital from Yurta-Stroyno. A similar piece of architecture was found in Kabile, situated some 34 km north of Yurta-Stroyno and, albeit exhibited as a base in the exhibit of the Museum of Archaeological Park of Thracian and Ancient City of Kabile, it represents a suitable parallel to **no. 28**. The height of the fragment is 200 mm, its abacus measures 360 mm a side and the diameter of the 'necking' is 310 mm. Even though the difference is not as large as in case of the capital from Philippopolis, it is still quite pronounced.

Considering the small size, the lack of dowel holes and the inelegant execution, the function of the capital as one of the main carrying and representative elements is unlikely. It was most likely either partially built in a wall or used as a small capital in some kind of a balustrade (Petrova 1990, 10). Leaving aside the size of the capital **no. 28**, parallels to its form from the Lower Danube are dated to the Antonine and Severan dynasties, i.e. to the 2nd century and the 1st half of the 3rd century AD (Dimitrov 2004, 131).

The third discussed piece of architecture **no. 29** (**Fig. 5:29**; **Pl. 1/3:29**) found in Yurta-Stroyno is represented by a relatively small fragment, which makes its identification rather

7 The measurement is reconstructed based on the preserved fragment of the abacus (135×150 mm) and remaining parts of the capital (by Věra Doležálková).

difficult. The worked piece of marble (Haubenthal 2022, no. 1, tab. 1:1) might be interpreted as a part of an echinus, although some kind of base is not excluded. The 'upper part' of the stone has a preserved roughly worked surface, which points to the fact that the expected abacus was not part of the piece. The lower part is broken off. The only measurement is the preserved height and the maximum diameter, which is possible to reconstruct. The height equals 145 mm and the diameter is 360 mm, the lower part narrows down to about 205–210 mm. Although it is broken, it seems logical the necking was not much smaller in diameter than the preserved piece; expectedly narrowing down to about 200 mm. Despite lacking direct parallels, the size of the capital is also smaller than usual proportions and might fulfil similar functions as the capital **no. 28** discussed above.

The petrographic analysis confirmed local origin of the stones **nos. 28** and **29**, possible to be ascribed to the Kamenets Quarry situated about 8 km north-east of Yurta-Stroyo or to any other quarry exploiting the local massive of Triassic marbles and (metamorphic) limestones in the vicinity of the site (Haubenthal 2022, map 1).

No.	Yurta-Stroyno #	SU	Sect.	Height of frg.	Abacus h. / side l.	Echinus h. / max d.	Necking h. / d.
27	×	×	×	160	50 / 450	45 / 450	50 / 340
28	SY16_AS_002	D13	SE	137	58 / 280	38 / 280	40 / 230
29	SY16_AS_001	D13	SE	145	×	145 / 360	×

Tab. 4: Capitals/bases. All measurements in millimetres; h. = height, l. = length, d. = diameter.

CYLINDRICAL STONE

The cylindrical piece of marble **no. 30** (Haubenthal 2022, no. 3, tab. 1:3) is 370 mm in diameter, and it is 400 mm high (**Pl. 1/3:30**). As it is relatively short, the piece represents a single drum of column or some kind of supporting element within the architecture. The surface is only very roughly worked which suggests it was either covered with stucco, used as a barely visible self-standing plinth, or it is an unfinished product, a prefabricate coming directly from the quarry. The column does not feature handling bosses, but traces of possible grips in the midst of the drum. The lack of dowel holes might be ascribed to its unfinished state, or to a fact it was meant to be partially built in the wall[8] or self-standing and not securely connected with other stones as expected in case of a drum.

STONE PLATES

The assemblage revealed three fragments of well worked stone plates, most likely used as stone cladding for an embellishment of the interior (**Tab. 5:31–33**; **Pl. 1/3:31–33**). Their original measurements are not preserved; the largest piece has mere 102×68 mm (**no. 32**). The only informative size is their thickness, varying between 7 (**no. 31**), 15 (**no. 32**) and 21 (**no. 33**) mm. Especially the **no. 31** is to be pointed out, as it is very well worked and due to its small thickness a little translucent. Given its translucency, it could be also connected with an illuminating function. **No. 33** is thick enough to be used as a flooring. The materials were analysed by the naked eye only and can be generally determined as marblelike stones.

8 Similar as in the case of the syenite columns identified in the residential complex in Philippopolis (Kesyakova 1998, 164; 1999, 89).

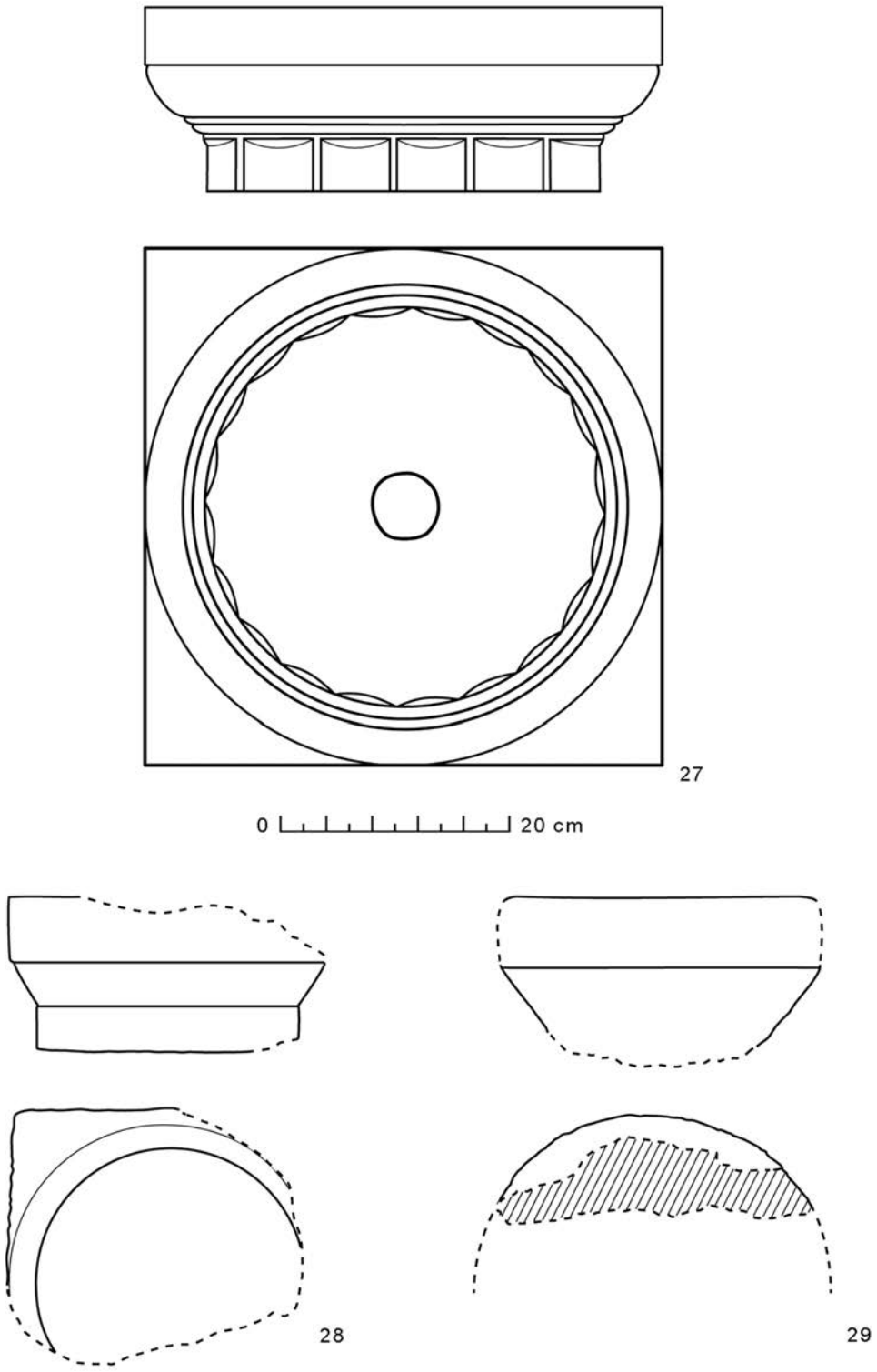


Fig. 5: Capitals/base; no. 27: Roman-Doric capital Type 1; no. 28: simplified version of Roman-Doric capital Type 1; no. 29: capital or base. Drawings by V. Doležálková.

No.	Yurta-Stroyno #	SU	Trench	Sect.	w. × l.	th.
31	SF15_167	SU001	95E_100N	×	46×62	7
32	SY14_AS_001	SU001	×	×	102×68	15
33	SY15_AS_001	SU059	100E_105N	NE	91×88	21

Tab. 5: Marblelike stone plates. All measurements in millimetres; w. = width, l. = length, th. = thickness.

MASSIVE RECTANGULAR STONES

The architectural elements detected on the settlement also include four massive rectangular stones with measurements spanning from 60×45×32 cm to 90×70×33 cm. These were found on the surface both in the northern and southern limits of the investigated area. The stones with rough dressing are unevenly worked by picking; none of them revealed traces of handling bosses, grips or lewis holes, common in the case of larger stones to enable their moving (Adam 2001, 48–50). The micritic matrix, microscopically analysed for one of the blocks, points to their local origin (Haubenthal 2022, no. 5, tab. 1:5).

Although the stones are apparently missing their original contexts, their size, lack of splendour and especially great weight prompts one to assume they were not moved far away from their original finding places. They seem to be inherent parts of the common architecture, most likely used in foundations or for outlining the corners of the buildings in order to increase their stability.

DISCUSSION

The detected ceramic and stone building materials allowed us to understand the basic techniques and forms used for the construction of the houses in Yurta-Stroyno. The materials revealed from the excavation (Tušlová – Weissová – Bakardzhiev 2022), as well as from the surface survey (Weissová – Tušlová –Bakardzhiev 2022), confirmed the utilization of *opus craticium* as the main building technique, i.e. the stone foundations with upper walls made of half-timbered adobe construction. This technique leaves us with some questions concerning the utilization of the detected bricks, as they are not an inherent part of the walls and must have been connected with other functions. The bricks, and especially the *pedales*, can be interpreted as parts of flooring. However, some of them revealed clear traces of mortar on their upper surfaces, which points to their utilisation in some construction, possibly as bases or caps for *pilae* in *hypocaustum*. The existence of the spacer bobbin and the *sesquipedalis* comports this theory. This implies that some of the houses were equipped with a floor and wall heating or, even, that the settlement had a bath. The hypothesis is also supported by fragments of windowpanes identified at the settlement (Čisťakova – Zlámalová Cílová 2022, tab. 6:22–27). Although the amount of the finds suggesting the existence of a heated floor is rather minimal, the spacer bobbin clearly points to an existence of the wall heating, as it had no other functions within the Roman architecture. The marblelike plates might also be connected with the heated rooms, serving as flooring and coatings of the walls. The dispersion and scarcity of the finds connected with the *hypocaustum* can be explained by a collapse of the heating system / bath already during antiquity and by the utilization of the debris when levelling the surface in the area of the house or even of some parts of the settlement. Such

a levelling layer was confirmed during the excavations of the house courtyard (Tušlová – Weissová – Bakardzhiev 2018, 197; Tušlová – Weissová – Bakardzhiev 2022). In order to completely reconstruct the *hypocaustum*, the detected assemblage is missing *bessales*, bricks usually used to build the *pilae*. The absence of *bessales* might be simply explained by the deficiency of the collected material, but it is highly improbable, since the systematic survey covered most of the site, and its focus was the identification of different types of architectural ceramics. More likely, the *pilae* were built from alternative materials. Out of the occurrences listed by Brodribb (1987, 93–95), the utilisation of two *imbrices* joined together and filled with mortar, such as in Rockbourne, might be considered. The large semi-oval *imbrices* (Type 1c) would serve the purpose. Further, searching in the regional parallels, villa Armira (Kabakchieva 2009), Hisar and Oescus (Ivanov 1971, 29–31) revealed a *hypocaust* support system built from pipes. This identification would explain the particular occurrence of the pipe **no. 25**, which, with its straight top, uniform thickness and tempered clay, would offer a stable support for the heated floor. Such supports had small openings which cannot be proved or disproved in the case of the pipe **no. 25**, as the fragment is too small.[9] *Pilae* made from pipes or *imbrices* were less stable than the ones made from bricks, which supports the theory of the early collapse of the heating.

Some of the bricks in the assemblage were entirely burnt, almost vitrified. This might have happened either during the initial firing, destruction, or utilization in high temperatures. In the case of the latter, it is possible the bricks were parts of hearths or kilns.

Among puzzling finds are the capitals/bases **nos. 28** and **29** and the shaft of the column **no. 30** detected on the site during the SAP. Although Dimitrov (2012, 128) connects the utilisation of the 'simplified version of the Roman-Doric Type 1' (**no. 28**) with Roman settlers who use it for simple and much easier decoration of the main buildings in the legionary camps and military sites, the pieces **nos. 28** and **29** can be rather interpreted as parts of the common dwellings such as the excavated house (c.f. Tušlová – Weissová – Bakardzhiev 2022). The reason is their small size, roughly worked surface and their singularity. However, without further excavations revealing more types of structures and architectural components at the site, the interpretation remains a mere theory, lacking more solid evidence. Although only the capital **no. 28** can be based on its stylistic analysis assigned to the 'simplified version of the Roman-Doric Type 1', and as such dated to the 2nd century and the 1st half of the 3rd century AD, I suggest dating the remaining capital/base **no. 29** to the time span between the 2nd and 3rd century AD based on its rough execution, comporting with the trend of the degeneration of capitals in this period (Petrova 1990, 10).

A real outlier in the whole group of the discussed finds represents the Roman Doric capital Type 1 (**no. 27**) with a fluted shaft with parallels from the *villa rustica* in Chatalka dated to the 2nd half of the 1st century AD. Considering its fine execution, especially when compared with the other two capitals/bases **nos. 28** and **29**, and its early dating, the direct connection with the site is rather improbable. Since it was brought by the locals to the museum, the false ascription to Yurta-Stroyno is possible. A direct parallel to the capital had been recently (in 2021) found at the villa at St. Iliya located 1.5 km south from Yurta-Stroyno. We may consequently presume it is rather related to that settlement than to Yurta-Stroyno (Agre – Dichev – Hristov 2015, 208–211; Dichev 2018, 724–726; Agre – Dichev – Hristov 2022). According to the investigators, the villa has two dated construction phases: 13/12 BC – AD 12 and the end of the 1st and the 2nd c.

9 There is, however, one ceramic fragment with a cut rectangular hole which was processed together with the pottery, and which is interpreted as a fenestrated window (Tušlová 2022). In theory, this piece could be identified as well as part of the terracotta pipe used for *hypocaustum*.

AD, and – in the case that we follow this scenario – the capital could be part of its 2nd construction phase. Last but not least, the capital might be also connected with a burial mound. An analogy to this interpretation represent the findings from the Kral Mezar tumulus, situated some 3.5 km north-west of Stroyno village. Apart from three grave constructions, the mound revealed a base, a column, and a Doric capital, interpreted as remains of a commemorative monument (Agre – Christov 2016, 303; Agre – Dichev – Agre 2019, 687).

In any case, the capital could have been brought from a site in the vicinity and used as a *spolium* in Yurta-Stroyno already during antiquity. The combination of the symmetrical dowel hole in the shaft, the asymmetrical rectangular dowel hole, as well as the imprint of a column on the top of the abacus point to the secondary or even tertiary utilisation of the capital, opening possibilities for many other theories connected with its utilisation.

Particular finds, occurring independent of the outlined typologies of the architectural ceramics, are bricks and tiles with impressions and imprints. They do not only represent entertaining discoveries and enjoy great popularity among excavators, but they also provide knowledge about animals and their activities around human habitations and production centres (Bar-Oz – Tepper 2010, 244). Based on the animal impressions, several domestic as well as wild animals could be identified at the production site, including dogs and/or foxes (**nos. 8**, **9**, **10**, **11** and **12**), sheep or goats (**nos. 13**, **14**, **15** and possibly **17** and **18**), and pigs (**no. 16** and possibly **nos. 17** and **18**). The presence of these animals at Yurta-Stroyno, except the fox, was attested by the analysis of animal bones (Nývltová Fišáková 2022, tab. 3). However, we do not have any basis on which we could prove the production of architectural ceramics at the settlement. An appealing find is represented by seven imprints of an artificial stamp, imitating feet of some waterfowl (**no. 21**). There does not seem to be any meaningful reason for using this stamp intentionally regarding the manufacture purposes. Its creation might be rather interpreted as a consequence of a game and playing at the place of the ceramic production, as the human (leisure) presence around the workshop is also well attested by other imprints – the feet (**no. 19**) and the hand (**no. 20**).

CONCLUSION

Notwithstanding the large amounts of analysed materials of architectural ceramics and stones detected at Yurta-Stroyno, they appeared to be considerably uniform. Consequently, the study offers a relatively limited number of architectural types, possible to be defined at the settlement.

The typical type of architecture detected during the excavation and based on the survey also all around the settlement are dwellings built in the technique of *opus craticium*, i.e. using unworked stones for the foundations and half-timbered adobe constructions for the walls. This type of architecture is confirmed by considerably small amounts of bricks detected between the architectural ceramics. Constructions for gable roofs were made of wooden beams and covered with Laconian tiles, using the *tegula* and *imbrex* system. The houses were equipped with drainage systems, as witnessed by the pipes found *in situ* in Room D of the excavated house as well as by the dispersion of pipe fragments within the illicit heaps all around the surface of the site. Some of the examined bricks were entirely burnt, either during initial firing, destruction, or due to their utilization in high temperatures. The latter points to the anyway inevitable existence of hearths or kilns on the site.

Besides the relatively uniform architecture, the assemblage revealed an appealing group of finds which point to the existence of a heated floor and wall situated somewhere within

the settlement, with the precise location remaining unknown. As the finds are randomly distributed all around the site, it is probable the building was destroyed already during antiquity and the debris became part of the levelling layer. The evidence includes *pedales*, one *sesquipedalis*, one spacer bobbin, three fragments of marblelike plates representing flooring and wall coatings as well as one pipe suitable for the *hypocaust* column. Despite its scarcity, the finds represent a convincing collection pointing to a bathing facility in Yurta-Stroyno.

The survey in the north and north-east part of the site revealed three worked stones represented by two capitals or possibly one capital and one base (**nos. 28–29**), and one cylindrical stone, feasibly some kind of a column or a plinth (**no. 30**). Especially conspicuous is the rough working of all the pieces, pointing to the possibility they were covered with a layer of stucco in order to uplift their outward appearance. As they have only very little representative character, they were most likely parts of the common dwellings, used for instance in some kind of a balustrade. Due to the bad preservation of the capital/base **no. 29**, only the capital **no. 28** is possible to be determined to the Dimitrov's type of the 'simplified version of the Roman-Doric Type 1'.

The last piece of architecture assigned to the site is the marble capital **no. 27** determined as Dimitrov's Roman-Doric Type 1, an outlier in the whole collection due to its fine execution. The surface of the capital is even and smoothed, with no visible traces of picking. The channels on the necking as well as the *arises* are regularly placed and well worked. The capital revealed two dowel holes and one imprint of a column, pointing to its utilization in diverse contexts and fulfilling different functions. The attribution of the capital to the site of Yurta-Stroyno is based on the information of locals who brought the capital to the museum. As we were not able to detect any architectural piece of such a fine execution during our extensive works in Yurta-Stroyno, the direct connection with the site seems rather improbable. We outlined several possible scenarios explaining the appearance of the capital. It could be assigned to a) the Roman villa situated in the territory of St. Iliya, only 1.5 km south of Yurta-Stroyno, or b) to a commemorative monument situated in the vicinity and entirely destroyed by looters. The utilisation of the capital within the architecture of Yurta-Stroyno is herewith not out of the question, but if so, it seems it was rather brought to the settlement and used as a *spolium*.

As for the chronology of the site, the architectural ceramics do not allow for any precise data. The only sensitive material are the two capitals **no. 27** and **no. 28**. The Roman-Doric Type 1 (**no. 27**) represents one of the earliest details connected with the Roman architecture and based on direct parallels from Thrace (the villa at St. Iliya, *villa rustica* near Chatalka and early phase of the Roman forum of Philippopolis), it dates from the 2nd half of the 1st century to the 2nd century AD. The 'simplified version of the Roman-Doric Type 1' (**no. 28**) is characteristic for its rough working possibly connected with the degeneration of the capitals appearing as common trend in Thrace during the 2nd and 3rd century AD. Based on the parallels from the territory of Lower Danube, the capital dates to the 2nd century or the 1st half of the 3rd century AD. Taking into account the rough execution of the capital **no. 29,** it can be approximately dated to the 2nd or 3rd century AD.

Considering the fact the chronology of the other dated finds from Yurta-Stroyno (see studies in this volume) spans between the 2nd and 4th century AD, with single finds dated to the 5th–6th century AD, the representative capital of the Roman-Doric Type 1 either belongs to for us an unknown phase of the settlement or it was brought to the site from the vicinity of Yurta-Stroyno and used as a *spolium*.

In order to allow for a better understanding and interpretation of the single finds, similar regional studies of rural settlements in Thrace would offer a better stepping stone for comparative analyses. I hope to help with this study to arouse more interest in these so far

rather neglected types of sites, opening new possibilities for our understanding of the Roman architecture within the Thracian rural landscape.

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to Jon Albers (Ruhr University Bochum) for his consultations about puzzling architectural fragments appearing in the assemblage. I am most grateful to Martin Minařík (Clare Baker's Lab, Cambridge) for his readiness to identify the animal impressions appearing on the bricks and tiles and for giving me a free hand when using his illustrations. Last but not least, I would like to thank Věra Doležálková (Institute of Archaeological Conservation, Central Bohemia) and Clarissa Haubenthal (Ruhr University in Bochum) for their help with the drawings.

ABBREVIATIONS

AB = Archaeologia Bulgarica
AJA = American Journal of Archaeology
AOR = Археологически открития и разкопки
JRS = Journal of Roman Studies
SH = Studia Hercynia

BIBLIOGRAPHY

Adam, J.-P. 2001: *Roman Building. Materials and techniques*. London.

Agre – Christov 2016 = Агре, Д. – Христов, Х. 2016: Спасителни археологически проучвания на могила Крал Мезар в землището на с. Бояново, общ. Елхово. *AOR през 2015 г.*, 301–303.

Agre – Dichev – Hristov 2015 = Агре, Д. – Дичев, Д. – Христов, Х. 2015: Археологически разкопки на селищен обект в м. Манастирчето – Св. Илия, край с. Стройно, община Елхово. *AOR през 2014 г.*, 208–211.

Agre, D. – Dichev, D. – Agre, G. 2019: Roman Balsamarium Shaped as a Male Head in Feline-Skin Cap from the Territory of Southeast Bulgaria. *AJA* 123, 687–698.

Agre – Dichev – Hristov 2021 = Агре, Д. – Дичев, Д. – Христов, Х. 2021: Трако-римски селищен обект в м. Св. Илия в землището на с. Стройно, обш. Елхово. AOR през 2020 г., 875–880.

Bakardzhiev 2007 = Бакарджиев, С. 2007: Сондажни археологически проучваня в м. 'Юрта' при с. Стройно, община Елхово, област Ямбол. *AOR през 2006 г.*, 238–241.

Bakardzhiev 2008 = Бакарджиев, С. 2007: Сондажни археологически проучваня в м. 'Юрта' при с. Стройно, община Елхово. *AOR през 2006 г.*, 471–473.

Bakardzhiev – Kozarev 2015: Бакърджиев, С. – Козарев, М. 2015: Спасителни археологически проучвания на антично Селище в м. Юрта, с. Стройно, Община Елхово. *AOR през 2014 г.*, 570–572.

Bakardzhiev – Kozarev 2016 = Бакърджиев, С. – Козарев, М. 2016: Едовни археологически проучвания на антично селище в м. Юрта, с. Стройно, общ. Елхово. *AOR през 2015 г.*, 633–635.

Bakardzhiev – Kozarev 2017 = Бакърджиев, С. – Козарев, М. 2017: Редовни археологически проучвания на антично селище в м. Юрта, с. Стройно, Общ. Елхово. *AOR през 2016 г.*, 450–453.

Bar-Oz, G. – Tepper, Y. 2010: Out on the Tiles: Animal Footprints from the Roman Site of Kefar 'Othnay (Legio), Israel. *Near Eastern Archaeology* 73/4, 244–247.

Biernacki, A.B. 2003: The Ceramic Building Material of the 1st Italian Legion in Novae (Moesia Inferior). The relationship between Form and Function. *AB* VII/3, 9–21.

Botusharova 1960 = Ботушарова, Л. 1960: Улици на Филипопол от Римската Епоха. *Годишник на Народния Археологичеси Музей Пловдив* IV, 79–91.

Brodribb, G. 1987: *Roman Brick and Tile*. Gloucester.

Celuzza, M.G. 1985: I reperti della villa. Materiali da costruzione. In: E. Papi – E. Regoli (eds.): *Settefinestre. Una villa schiavistica nell'Etruria Romana* 2. La villa e suoi reperti. Modena, 33–39.

Chichikova, M. 1992: The Thracian Tomb Sveshtari. *Helis* II, 143–163.

Conchev 1956 = Цончев, Д. 1956: Приноси към проучването на римската архитектура в България. *Годишник на музейте в Пловдивска област (Пловдив)* II, 1954–1955, 141–175.

Čisťakova, V. – Zlámalová Cílová, Z. 2022: Archaeological and Archaeometric Study of the Roman and Late Antique Glass. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 184–244.

Dichev 2018 = Дичев, Д. 2018: Геофизични проучвания на обект в м. Манастирчето св. Илия в землището на с. Стройно, Общ. Елхово. *AOR през 2019 г.*, 724–726.

Dimitrov 2004 = Димитров, З. 2004: Типология на архитектурните детайли в Долна Мизия и Тракия през Римската епоха (I–III в. сл. Хр.). In: Р. Иванов (ed.): *Археология на Българските Земи* 1. София, 203–253.

Dremsizova 1984 = Дремсизова, Цв. 1984: *Вилата край село Мадара, Шуменски окръг*. Разкопки и проучжания XI. София.

Dzhambov, Сн. – Mateev, М. 1978: Donnees nouvelles sur l'ensamble du forum Philippopolis. *Pulpudeva* 3, 106–121.

Dzhambov – Mateev 1979 = Джамбов, Х. – Матеев, М. 1979: Форумният комплеь на Филипопол. *Археология* XXI:3, 47–56.

Elliot, W. 1991: Animal Footprints on Roman bricks from Newstead. *Proceedings of the Society of Antiquaries of Scotland* 121. York, 223–226.

Ginouvès, R. 1992: *Dictionnaire méthodique de l'architecture grecque et romaine. II. Eléments constructifs : supports, couvertures, aménagements intérieurs*. Rome.

Haubenthal, C. 2022: Thin-Section Analysis of Selected Stone Objects from Yurta-Stroyno. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 106–117.

Heřmánková, P. 2022: The Epigraphic Finds from Yurta-Stroyno in a Regional Context. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 118–132.

Ivanov 1971 = Иванов, Т. 1971: Проучвания върху хипокауста от Римската и Ранновизантийската епоха в България. *Археология* XIII/1, 23–44.

Ivanov 2006 = Иванов, Р. 2006: Строителна керамика от Долния Дунав. In: Р. Иванов (ed.): *Археология на Българските Земи* 2. София, 125–207.

Kabakchieva 2009 = Кабакчиева, Г. 2009: *Велколепието на вила Армира*. Sofia.

Kesyakova, E. 1998: A Residential Complex from Philippopolis. *Thracia* 12, 159–171.

Kesyakova 1999 = Кесякова, Е. 1999: *Филипопол през Римската епоха*. София.

Kitov 2006 = Китов, Г. 2006: Архитектурните подмогилни паметници в Долината на Тракийските владетели. *Известия на Археологически Институт* XXXIX, 113–126.

Koçyiğit, O. 2007: The Role of The Terracotta Spacers in the Heating System of The Amorium Bathhouse. In: B. Böhlendorf-Arslan – A.O. Uysal – J. Witte-Orr (eds.): *First International Symposium on Late Antique, Byzantine, Seljuk and Ottoman Pottery and Tiles in the Archaeological Context*. Byzas 7. Istanbul, 309–318.

Lancaster, L.C. – Ulrich, R.B. 2013: Materials and Techniques. In: R.B. Ulrich – C.K. Quenemoen (eds.): *A Companion to Roman Architecture*. Blackwell Companions to the Ancient World. Malden – Chichester – Oxford, 157–192.

Mathew, A.J. – Woods, A.J. – Oliver, C. 1991: Spots before your Eyes: New Comparison Charts for Visual Percentage Estimation in Archaeological Material. In: A.P. Middleton – I.C. Freestone (eds.): *Recent Developments in Ceramic Petrology*. British Museum Occasional Paper 81. London, 211–263.

Nývltová Fišáková, M. 2022: Analysis of the Osteological Material from Yurta-Stroyno. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 259–269.

Poulter, A. 1995: *Nicopolis ad Istrum: A Roman, Late Roman, And Early Byzantine City*. JRS Monograph 8. London.

Petrova 1990 = Петрова, С. 1990: Типология и особености на римско-дорийския капител в Мизия и Тракия. *Археология* XXXII/3, 8–16.

Ruseva-Slokoska 2016 = Русева-Слокоска, Л. 2016: *Късноантичната крепост на хълма Хисарлика гр. Кюстендил*. Разкопки и проучвания XLII. София.

Sultov 1964 = Султов, Б. 1964: Една villa rustica край с. Присово, в. Търновски окръг. *Известия на Окръжния музей В. Търново* II, 49–64.

Tušlová, P. – Weissová, B. – Bakardzhiev, S. 2014: Stroyno Excavation Project, Introduction to the Site of Yurta-Stroyno and Report on the 2014 Season. *SH* XVIII:1–2, 16–24.

Tušlová *et al.* 2015 = Tušlová, P. – Weissová, P. – Bakardzhiev, S. – Čisťakova, V. – Frecer, R. – Janouchová, P. The Stroyno Archaeological Project, Report on the Season 2015. *SH* XIX:1–2, 247–65.

Tušlová, P. – Weissová, B. – Bakardzhiev, S. 2017: Yurta-Stroyno Archaeological Project. Preliminary Report to the Final Season of 2016. *SH* XXI:2, 99–112.

Tušlová, P. – Weissová, B. – Bakardzhiev, S. 2018: Excavations at the Roman Site of Stroyno-Yurta, Yambol Province (2014–2015). An Interim Report. In: S.A. Ross – A. Sobotkova – G. Nehrizov – J. Tzvetkova – S.E. Connor (eds.): *The Tundzha Regional Archaeology Project. Surface Survey, Paleoecology, and Associated Studies in Central and Southeast Bulgaria, 2009–2015 Final Report.* Oxford, 191–199.

Tušlová, P. – Weissová, B. – Bakardzhiev, S. 2022: The Final Excavation Report. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 24–52.

Tušlová, P. 2022: *The Yurta-Stroyno Archaeological Project. Pottery Studies.* SH Monographs 3. Praha.

Barbora Weissová
Ruhr-Universität Bochum
Institut für Archäologische Wissenschaften
Am Bergbaumuseum 31, D-44791 Bochum
barbora.weissova@rub.de

The Milling Equipment

Barbora Weissová – Clarissa Haubenthal – Věra Doležálková

ABSTRACT
The study introduces an assemblage of worked stones connected with milling activities found both during the excavation and surface survey of the Roman rural site Yurta-Stroyno. In total, 14 documented fragments include ten quern stones/querns, three mortaria and one worked stone respectively. The latter represents a unique find in the territory since it is classified as part of a segmented mill, the only one so-far identified in the area of Roman Thrace. The collection of the quern stones is further divided based on their typology to a single saddle and several rotary querns; the segmented mill and mortaria are discussed separately.

KEYWORDS
Roman Thrace; milling equipment; quern stone; saddle quern; rotary quern; segmented mill; mortarium.

INTRODUCTION

Milling equipment had been indispensable for processing grains and other foodstuff since the Neolithic period (Piperino *et al.* 2004; Alonso – Frankel 2017, 463) and, as such, it belongs to highly plausible and essentially ubiquitous findings within basically every settlement (Anderson – Scarrow – Cambeses 2014, 117). Be it due to the large weight, size and relative uniformity especially when speaking about quern stones, the milling tools have in general received little attention from archaeologists until the end of the 20th century (Moritz 1958, 18 on grain-mills; Cool 2005, 54 on mortaria). Although the last two decades have encountered a considerable boom of milling stones' studies, their focus lies for the most part in the finds from Western Europe and the Mediterranean area (Alonso – Frankel 2017, 461–462).[1]

The evidence published for the territory of Bulgaria does not represent an exception within the general picture of the outlined state of research. Although every single regional museum possesses a collection of querns (Wilson 2009, 218), they are in the vast majority unpublished or only briefly alluded to in the excavation reports.[2] To give an example, out of 105 archaeological reports from surveys and excavations conducted in 2015 on ancient sites in Bulgaria (*AOR* 2016, 317–636), merely eight mention the existence of querns (Borisov – Gyuleva – Doychev 2016, 621; Dyczek 2016, 439; Ivanov *et al.* 2016, 475–476; Minchev – Yotov 2016, 322; Nikolov – Gyurdzhiyska 2016, 362; Preshlenov 2016, 407; Vladkova 2016, 487), and only a single report indicates the type and diameter of the identified quern stone (Borisov – Gyuleva – Doychev 2016, 621). In the case of the articles and monographies, one can

1 For instance, for Great Britain, see Shaffrey 2003, 143–174; for Spain Anderson – Scarrow – Cambeses 2014, 111–131 and Alonso *et al.* 2011, 55–66; for France Lepareux-Couturier 2014, 149–158 and Groupe Meule 2014, 175–188. For a complex study on querns and mills at the northern frontier of the Roman Empire Reniere *et al.* 2016, 403–428.

2 Sporadic studies from the Eastern Mediterranean omit the territory of Bulgaria, most likely because of the lack of published evidence; see, for instance, Williams-Thorpe – Thorpe 1993, 263–320.

observe a similar neglection of the study of milling equipment. To illustrate the current state of affairs, Olynthian mills discovered in the Hellenistic city of Seuthopolis are only briefly noted (Dimitrov – Chichikova 1978, 15) and the vast collection of 72 rotary querns from the Late Antique fort Yatrus-Krivina is described within less than two pages of text (Gomolka-Fuchs 1982, 170–171). Exceptions represent the recently published dissertation thesis on 'Socioeconomic Implications of Cereal Crop Production in Inland Thrace during the Late Iron Age', including distribution and typology of Olynthus mills from Thrace (Ivanova 2019, 70–83), and the study on milling equipment from the Late Antique and Early Byzantine fort at Dichin (Watts 2019, 391–407).

Albeit the assemblage from Yurta-Stroyno is rather small, exclusively fragmentary and for the most part unstratified, the aim of this paper is to offer a synoptic and detailed description of the findings in order to allow for future comparative studies.

MILLING EQUIPMENT FROM YURTA-STROYNO

Worked stones possibly connected with milling activities found during the three seasons of the Yurta-Stroyno Archaeological Project include 14 fragments (**Tabs. 1/2:1–14**). The excavation revealed 11 fragments, the surface survey the remaining three. Despite the fact that several of the pieces detected during the excavations can be connected with particular layers, their original contexts had already been disturbed during antiquity. Concerning the three pieces identified in the course of the systematic surface survey, their number is too small to reveal any distinctive pattern in the spatial distribution. Considering these facts, all of the identified fragments are analysed as unstratified. The finding context is discussed only if the fragments were reused as building material since the construction of the house, dated to/or after the 20's of the 3rd century AD, offers a *terminus ante quem* for the utilisation of the particular milling tool.

Be it a simple random pecking or a complex pattern of furrows, working surfaces of millstones used to be sharpened to grind properly (Lepareux-Couturier 2014, 149). Due to the wear of most of the fragments in the assemblage, it is more like guesswork to establish their original dressing. The worked surfaces are described where preserved.

The drawings follow published standards where available. In particular Hamon *et al.* (2011) for the saddle quern, and Jaccottey and Farget (2011) for the rotary querns. **Tabs. 1/2** lists all the 14 fragments and their basic characteristics. The estimated minimal weight of the entire upper stone is calculated only in the case of the rotary querns, using the weight of the fragment and the preserved EVE,[3] i.e. 100 / EVE × weight. The type of rock is based on the hand specimen observed by the naked eye[4] with an exception represented by the mortarium (**no. 12**) and the segmented mill (**no. 11**) which were analysed in a thin section (see Haubenthal 2022, nos. 6–7, tab. 1:6–7). All the lengths are given in millimetres and weights in grams; 'no' excludes the possibility that the piece, even when whole, encompassed the pertinent part; '×' stands for no available information.

3 Estimated Vessel Equivalent, i.e. the percentual preservation of the rim/edge.

4 The macroscopic assessment involved a description of the material's general appearance, its mineral content or composition (for sedimentary rocks) and its texture (Vinx 2015, 120–125).

No.	Yurta-Stroyno #	SU	Trench / Polygon	Sect.	Type	Part	Shape	Specification / Classification	Rock type
1	SY15_QS_04	×	×	×	saddle quern	*metate*	flat slab	type 1 (Peacock 2013a)	(basaltic) andesite
2	SY15_QS_02	survey	F12	×	rotary quern	*catillus*	conical	without rim	(basaltic) andesite
3	SY16_QS_02	SU074/ SU062	105E_105N	×	rotary quern	*catillus*	conical	without rim	(basaltic) andesite
4	SY15_QS_03	SU059	×	×	rotary quern	*catillus*	conical	with sloping rim	sandstone
5	SY14_QS_02	survey	×	×	rotary quern	*catillus*	conical	with sloping rim	sandstone
6	SY16_QS_03	SU001/ SU062	105E_105N	NE	rotary quern	*catillus*	conical	with sloping rim	sandstone
7	SY16_QS_08	survey	F13	SE	rotary quern	*catillus*	conical	with sloping rim	(basaltic) andesite
8	SY16_QS_01	SU082	105E_105N	N	rotary quern	*catillus*	hemispherical	without rim	sandstone
9	SY15_QS_01	survey	D13	×	rotary quern	*catillus*	hemispherical	with flat rim	(quartz) schist
10	SY14_QS_01	×	×	×	rotary quern	*catillus*	cylindrical	with flat rim	(basaltic) andesite (?)
11	SY14_QS_03	SU001	survey 2015	×	segmented mill	inner stone	trapezoidal	type 1 (Peacock 2013b)	basalt
12	SY16_QS_04	SU082	105E_105N	N	mortarium	rim + body	conical	furrowed inside (?)	micrite
13	SY16_QS_06	FA07	105E_105N	NW	mortarium	rim + body	open form	furrowed inside	pyroclastic (?)
14	SF15_202	SU052	105E_105N	NE	mortarium	handle	horizontal	rounded shape, attached to an open form	marble

Tab. 1: Overview of the milling equipment found at Yurta-Stroyno; stone and rock classification.

SADDLE QUERN

Saddle querns are formed by a lower stone, the saddle or *metate*, and by a rubber. They are classified using the system proposed by Zimmerman (1988) and further specified by Peacock (2013a). The first saddle querns appear in the Upper Paleolithic period, their utilization for grinding cereals dates from the Neolithic period onwards (Piperino *et al.* 2004; Alonso – Frankel 2017, 463).

The collection revealed only one fragment, **no. 1** (**Fig. 1:1**; **Pl. 2/1:1**), representing the lower stone of a saddle quern. It is made of a (basaltic) andesite, and it most likely belongs to the type of flat slabs which with utilization develop concavity. However, the fragment is broken on all sides (preserved size is 190×200×87 mm) and only the polished surface on the top is to be clearly identified, which largely obstructs its unambiguous identification. This kind of saddle quern can be used in any direction, with or without a pounding action and it is likely to be a domestic product (Peacock 2013a, 14–15).

No.	Yurta-Stroyno #	Diameter	Height	Rim width	Handle socket (diameter)	Fragment weight	Estimate weight
1	SY15_QS_04	×	87	×	×	5800	×
2	SY15_QS_02	370	87	×	×	1900	12700
3	SY16_QS_02	430	85	×	on the side (24)	3800	21300
4	SY15_QS_03	380	80	24	on the side (16)	2500	14300
5	SY14_QS_02	400	109	26	on the side (18)	2800	18600
6	SY16_QS_03	470	82	28	×	3200	10700
7	SY16_QS_08	400	74	25	×	1200	13300
8	SY16_QS_01	350	81	×	on the top (18)	4500	16700
9	SY15_QS_01	390	67	66	×	2000	13300
10	SY14_QS_01	450	82	24	×	2000	18200
11	SY14_QS_03	×	275	no	no	11000	×
12	SY16_QS_04	117	107	33	no	3500	×
13	SY16_QS_06	360–365	141	42	no	3500	×
14	SF15_202	470–480	×	11	no	×	×

Tab. 2: Overview of the milling equipment found at Yurta-Stroyno; dimensions of individual stones. All dimensions in millimetres, weights in grams.

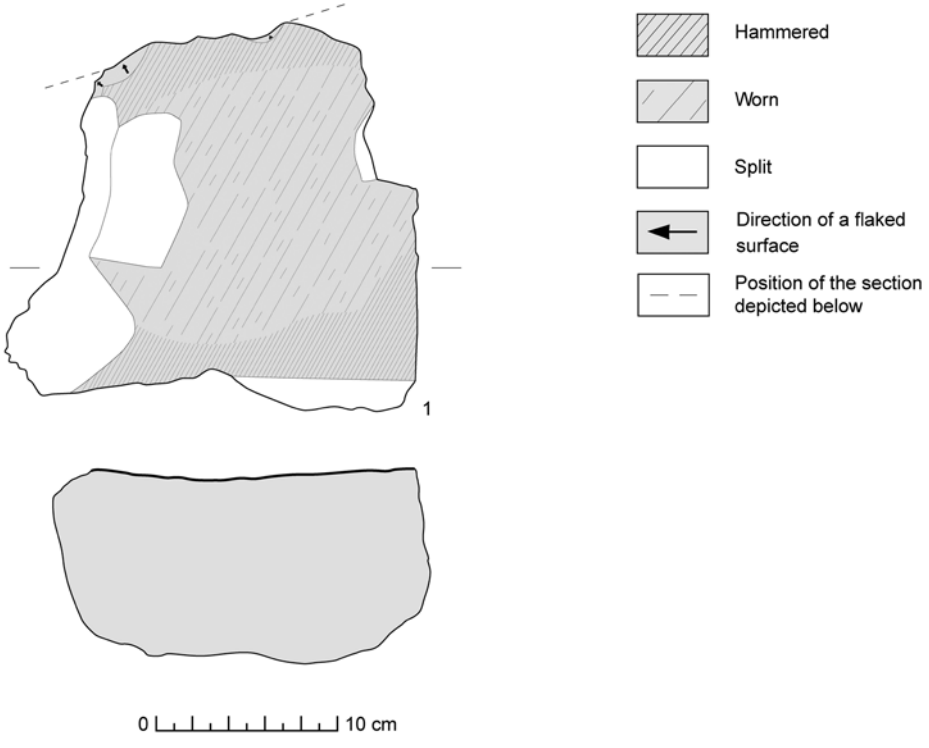


Fig. 1: Saddle quern; no. 1: *metate* Type 1 after Peacock 2013a. Drawing by V. Doležálková & C. Haubenthal.

ROTARY QUERNS

Rotary querns consist of two circular stones. The upper stone, or *catillus*, and the lower stone, or *meta*. The *catillus* has a central perforation (eye) through which it is assembled with the lower stone by means of a spindle, sometimes fixed with a rynd (Moritz 1958, 103–121; Anderson – Scarrow – Cambeses 2014, 111; Hauken *et al.* 2015, 35).

The rotary querns / hand-mills appear in Europe during the 5th century BC (Alonso Martínez 1997, 15–19; Jaccottey *et al.* 2013, 407–408, fig. 2). Unlike most other artefacts found during archaeological excavations, the rotary querns had not been subjected to rigorous typological classification until the beginning of the 21st century. Only with the establishment of the 'Groupe Meule'[5] in France in 2005, this gap started to be slowly filled in, although the geographical focus of the team are the regions of France.

Based on a comprehensive study of numerous assemblages from all over Europe, Peacock (2013a, 54–71) determined four distinctive and geographically limited groups of rotary querns appearing during the Late Iron Age. The groups are defined by the shape of the upper stone and include Cylindrical, Hemispherical, Iberian and Conical types. The Conical type should be characteristic for the examined territory, as it is determined as the representative for the area of Eastern Europe, including the Aegean area and the Black Sea region. At this point, it is necessary to stress one issue; none of the examples D. Peacock bases the geographic division on come from the territory of Bulgaria. However, we rather ascribe the deficiency to the lack of the published material, as demonstrated above, than to the lack of Conical *catilli* in Bulgaria.

The morphology of Roman rotary querns has hitherto not been analysed in a similar way. D. Peacock (2013a, 72–76), however, noted that the appearance of rotary querns during the Roman period was in a direct dependency on their antecedents, following the regional differences emerging during the Late Iron Age. This implies the Conical type should be representative for the examined territory also during the Roman period. At the same time, several distinctive changes characteristic for the Roman production appear throughout all the regional groups. In particular, the querns are significantly flatter and larger in diameter,[6] with the rynd placed on the top of the *catillus*. With regard to the changes outlined for the Roman period, we use Peacock's general grouping of the shapes of *catilli*, as his work represents the only comprehensive typology including Eastern Europe. For a more detailed subdivision, we further apply the typology developed by Staubitz (2007) who uses as a distinctive characteristic the profiling of the upper surfaces of *catilli*. Although Staubitz's work is based solely on finds from the Late Celtic oppidum Heidetränk in the Taunus hills (Western Germany),[7] the results comport with classifiable features in our assemblage. The types introduced by

5 'Groupe Meule' project focuses on the establishment of the methodological approaches (glossary, drawing standards, etc.) when processing grinding tools dated to the broad time-span from the Neolithic period to the Medieval period. For rotary querns in particular, see Groupe Meule 2014, 178–180.

6 In general, see Peacock (2013a). Particular numbers are in direct dependency on the regional development. For instance, see a study examining rotary querns from France which clearly demonstrates the growth of the diameters between the end of the Gallic period (La Tène D1) and the Medieval period (the assemblage dates latest to the 7th century AD). The edge measurements of the rotary querns are 300 and 500 mm in diameter (Jaccottey *et al.* 2011, 291–298).

7 The presented querns are divided using the same descriptive criteria, however, we do not use the types A–D as introduced by Staubitz, as they were developed and fully apply for Celtic querns of rather cylindrical shapes.

Staubitz include *catilli* without a rim (A), with a sloping rim (B), with a flat rim (C) and with a flat upper surface and no rim (D).

In general, two kinds of stones were used for the production of the rotary querns in the assemblage from Yurta-Stroyno: andesite[8] (**Pl. 2/2:2**, **3**, **7**, and **10**), a volcanic material; and sandstone (**Pl. 2/2:4**–**6** and **2:8**), a sedimentary material. The only outlier represents the *catillus* **no. 9** (**Pl. 2/2:9**), of a (quartz) schist and, thus, a metamorphic derivative of sedimentary rocks (Vinx 2015, 387–390).[9]

All the fragments of rotary querns are parts of *catilli*; the collection revealed six Conical, two Hemispherical and one Cylindrical upper stone. The Conical querns are represented by two fragments without a rim (**Fig. 2:2**–**3**) and four with a sloping rim (**Fig. 2:4**–**7**). The Hemispherical *catilli* encompass one without a rim (**Fig. 2:8**) and one with a flat rim (**Fig. 2:9**). Finally, the single representant of Cylindrical upper stones has a flat rim[10] (**Fig. 2:10**).

Diameters of the querns from Yurta-Stroyno vary between 350 and 470 mm, heights between 67 and 109 mm; both dimensions were measured at their maximal extent. Five of the *catilli*, four Conical and one Cylindrical (**Tabs. 1/2:4**–**7**, **10**), have rims with the width varying between 24 and 28 mm, one Hemispherical fragment (**Tabs. 1/2:9**) revealed a flat rim of 66 mm. Two Conical (**Tabs. 1/2:2**, **4**) and one Cylindrical upper stone (**Tabs. 1/2:10**) have preserved rynd holes on the top. One of the rynd holes (**Pl. 2/2:4**) is perforated through the entire upper stone. Four of the querns feature a socket for the handle; three Conical (**Fig. 2:3**–**5**) have the socket varying between 16 and 24 mm in diameter and situated on the side, one Hemispherical *catillus* (**Fig. 2:8**) revealed the socket on its top. Finally, diameters of two of the fragments (**Fig. 2:2**, **3**) are fully preserved as the fragments include the eye of the *catillus*.

In regard to their diameters, the upper stones worked of andesite (**Tabs. 1/2:2**, **3**, **7**, and **10**) range between 370–450 mm, while those worked of sandstone (**Tabs. 1/2:4**, **5**, **6** and **8**) show a larger range between 350–470 mm. As for the shapes, none of the basic types with more than one representative is restricted to one raw material. The Conical *catilli* are worked either of the volcanic (**Tabs. 1/2:2**, **3** and **7**) or of the sedimentary material (**Tabs. 1/2:4**–**6**) and the Hemispherical *catilli* are represented by one fragment of sandstone (**Tabs. 1/2:8**) and one made of (quartz) schist (**Tabs. 1/2:9**).

All the rotary querns are very worn and their working surfaces do not feature any remains of dressing (see **Pl. 2/2**, esp. **nos. 6** and **9** with lower surfaces represented). Relatively large diameters and small heights of the querns in the assemblage indicate their dating to the Roman period.[11] Two of the analysed rotary querns (**nos. 3** and **6**) were detected as spolia in the walls of the excavated house which gives them deposition date around AD 218 or later, as the *terminus ante quem*. The reutilisation of rotary querns as building material in Yurta-Stroyno was for the first time observed already during the rescue excavations in 2006 (Bakardzhiev 2007, 239, fig. 2).

8 The fragments were defined as andesite due to both their light-coloured matrix (compared to fragment **no. 11**, a vesicular basalt), and their porphyritic appearance. However, due to the weathered state of the fragments, some interferences on the observations cannot be excluded.

9 For a detailed study on the types of the identified stones, see Haubenthal 2022.

10 The same type of quern stone was found in Slomer, Veliko Tarnovo District, now part of the exposition of the Archaeological Museum in Sofia. For photo, see Ivanov – von Bülow 2008, 80.

11 For comparison, see Conical rotary querns dated from the 2nd century BC to the 1st century AD found in Romania and referred to as Dacian mill (Peacock 2013a, 70–71), the direct predecessor of the rotary querns in the examined area. Their measurements vary between 320–332 mm in diameter and 112–156 mm in height (Stanciu 1992).

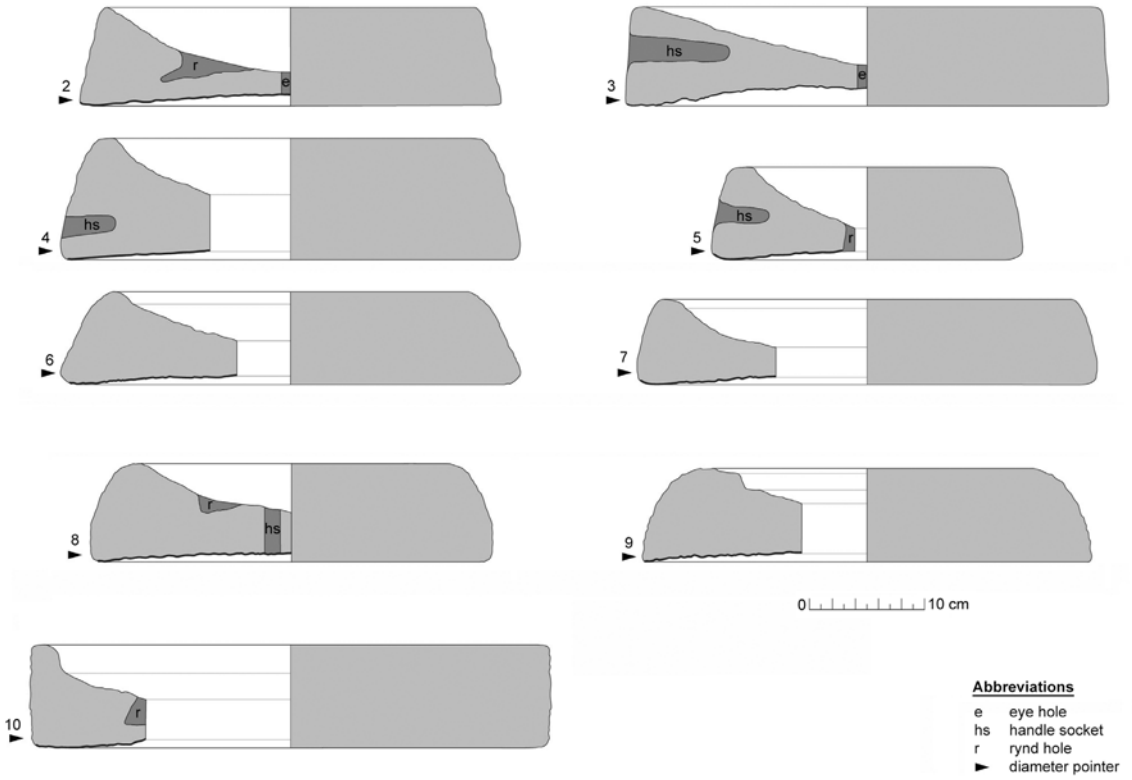


Fig. 2: Rotary querns; nos. 2–3: Conical *catilli* without rim; nos. 4–7: Conical *catilli* with sloping rim; no. 8: Hemispherical *catillus* without rim; no. 9: Hemispherical *catillus* with flat rim; no. 10: Cylindrical *catillus* with rim. Drawings by V. Doležálková.

SEGMENTED MILL

Segmented or composite mills are characterised by volcanic material and, based on shapes and numbers of the segments, they can be divided into three distinctive groups (Peacock 2013b, 154–157). The way how these mills functioned is not entirely clear and provokes an ongoing discussion among researchers, offering a number of possible reconstructions (Storck – Teague 1952, fig. 40; Brunet 1997, 30–31, figs. 2, 3; Peacock 2013, 158–160; Chaigneau 2017, 443, fig. 6). The reasons for the segmentation of the stones have not been unambiguously determined yet. M. Brunet (1997, 33–35) compellingly argues for the partition to be attributed to the simplification of the manufacturing process and refutes Deonna's theory (1938, 135), who saw in the segmentation a tool for facilitating the transport. The maintenance is also a strong argument, as the segmentation allowed for the replacement of a particular piece when broken, without the necessity to replace the whole mill (Chaigneau 2017, 446). The chronology is broad, as the mills appear in the contexts dated from the 3rd century BC (Runnels 1981, 134) to the 5th century AD (Maxfield – Peacock 2001). When compared with other milling tools, the segmented mills are relatively rare. They were so far encountered only in Greece, Central Mediterranean and Egypt (Chaigneau 2017, 439–440, fig. 1). Their rareness, rather than an outcome of their limited use, can be ascribed to the

difficulty to recognise these mills when disaggregated (Peacock 2013b, 162).[12] Based on the finds from Delos, this mill was not used in domestic settings but in bakeries (Deonna 1938, 135; Brunet 1997, 36).

The fragment **no. 11** (**Fig. 3:11**; **Pl. 2/1:11**), a distinctive tapered slab of basalt, a vesicular volcanic rock, represents a unique find in the assemblage. Based on its careful study and comparative analysis, it is an inner stone of a segmented mill Type 1 (after Peacock 2013a, 97; 2013b, 154–155, fig. 1.c). The slab is 220 mm wide at its broadest end and the preserved length is 275 mm. The broken end narrows down to 200 mm. The broad end has a round fixing hole of about 27 mm in diameter and 70 mm in depth.[13]

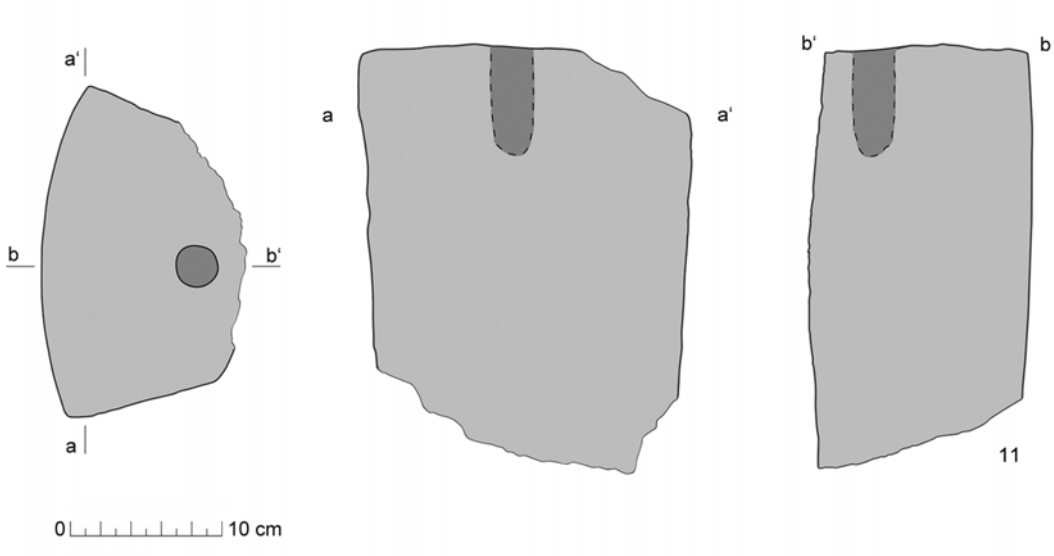


Fig. 3: Segmented mill; no. 11: inner stone represented by a tapered slab. Drawings by V. Doležálková.

MORTARIA

Mortaria consist of an open vessel and a pestle which is used for crushing or pounding diverse foodstuffs as well as processing and mixing other matters,[14] depending on the shape, material and size of both of the parts (Moritz 1958, 22–28).

12 In the first place, we interpreted the fragment as a rubber characterised by a back-and-forth motion, with one side handle socket preserved. Our interpretation anticipated one more handle on the opposite side to enable its operation. This reconstruction, however, encountered several problems including the impractical trapezoid shape and the immense weight of the fragment. These peculiarities, as they introduce a perfect fit with trapezoidal slabs used as inner stones of segmented mills, made us change the interpretation of the fragment.

13 Compare with measurements of tapered slabs belonging to Delian segmented mills Type 1 found in Delos: the length equals 300 mm, the width 200 mm, the tapering end narrows down to 150 mm, round holes on both ends are 25 mm in diameter and 40 mm in depth (Peacock 2013b, 154).

14 Besides grain (see Plin. NH. 35.25 or Ath. 3.100), the ancient literary sources mention foodstuffs such as dried fish (Hdt. 1.200.1) and meals made from diverse ingredients, all pounded together in a mortar (Ath. 9.70; Ath. 14.57). Other materials include drugs and pigments (Plin. NH. 36.43), me-

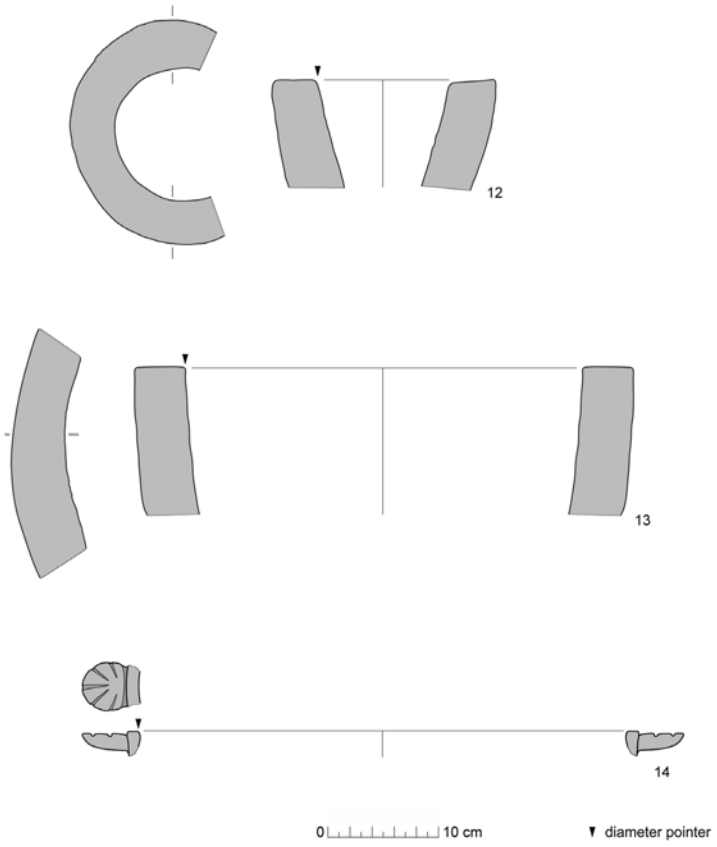


Fig. 4: Mortaria; no. 12: conical mortarium; 13: open form of mortarium; 14: horizontal handle attached to mortarium of an open form. Drawings by M. Kellová & V. Doležálková.

The assemblage revealed three fragments of stone mortaria. Two (**nos. 12** and **13**) are represented by a part of a rim with an attached body. As the bottoms are missing, the preserved lengths of the fragments allow for establishing the minimal depth of each of the vessels. Unlike the somewhat massive and roughly worked fragments **nos. 12** and **13**, the third piece of mortar **no. 14** is represented by a very fine worked handle. The handle revealed no remains of the body but a rim which allows for establishing the thickness of the mortar wall and its approximate diameter.

The mortar fragment **no. 12** (**Fig. 4:12**; **Pl. 2/3:12**) was made of a micritic carbonate mudstone (Haubenthal 2022, no. 6, tab. 1:6). It has a conical shape with the maximal inner diameter of 117 mm and the minimal depth of 107 mm. The relatively small diameter and tapering shape point to its primary function represented by pounding rather than rubbing, with an up and down motion prevailing (Storck – Teague 1952, 43–44). The inner wall revealed very worn traces of possible furrows.

The mortar fragment **no. 13** (**Fig. 4:13**; **Pl. 2/3:13**), created from a pyroclast, represents an open mortar with 360–365 mm of an inner diameter and minimal depth of 141 mm. The inner side revealed clear traces of parallel furrows (see the detail in **Pl. 2/3:13**). The shape, size and

dicaments (Plin. NH. 33.34; 34.23; 34.50; 34.51), poisons (Plut. De Iside 46), colours (Plin. NH. 33.26; 35.25) and metals (Plin. NH. 33.35; 34.26; 34.50; 34.51).

dressing of the mortar point to its utilization for rubbing rather than pounding, allowing for an indiscriminate motion within the considerably large vessel (Storck – Teague 1952, 43–44).

The mortar handle **no. 14** (**Fig. 4:14**; **Pl. 2/3:14**) is made of a white marble and it represents a fragment of very fine production, an outlier in the whole collection of the milling equipment. It looks like a small acroterion and as such it was also published in the excavation report from the season in 2015 (Tušlová *et al*. 2015, 246, pl. 10/2:3). However, based on the regional parallels from Kabyle (unpublished mortar at the archaeological base in Kabile),[15] Kirilovo (Stara Zagora District)[16] and Nicopolis ad Istrum (Poulter 1995, 198), it represents one of three horizontal handles, which together with a spout, symmetrically placed on the rim, lined the mortaria edges. The mortarium had the shape of an open bowl with diameter approximately established between 470 and 480 mm. Due to its outstanding treatment and material, it is highly probable this mortarium was not connected with the reduction of grain. References to its possible functions can be traced in ancient literary sources, mentioning the utilisation of mortaria when preparing medicaments (Paus. 5. 18. 2.; Cels. 5.24), poisons or herbal potions (Plut. De Iside 46).

DISCUSSION

The milling equipment found in Yurta-Stroyno, although heterogeneous in represented shapes and ways of utilization, features several common characteristics. None of the analysed querns is chronologically sensitive[17] and it implies that all of them might have been in use during any time of the existence of the settlement. Only two fragments of the rotary querns (**nos. 3** and **6**), as they were found as spolia in the walls of the house, were clearly used and destroyed before the house was built.

In general, the state of preservation of all the finds suggests that they had been destroyed during their utilization and thrown away or reused already in antiquity. For instance, all the rotary querns are fragments of considerably worn *catilli*: as upper stones were much more frequently subjects of destruction during milling than the lower stones, it was common to replace the *catillus* whilst the *meta* remained in use. Accordingly, the mortaria **nos. 12** and **13** have their bottoms missing, the most common place of wear and final break off in the case of this milling tool. The narrow end of the slab from the segmented mill **no. 11** is also missing.

The classification of rotary querns comports with the typology suggested by D. Peacock (2013a, 70–71) who identified the Conical group as typical for the Eastern Mediterranean. Nearly 70% of the rotary querns in the assemblage are indeed Conical and follow the characteristics ascribed to the Roman period. In particular, the *catilli* identified in the assemblage from Yurta-Stroyno reach the maximal height between 67 and 109 mm and their diameter varies between 350 and 470 mm.

15 Based on personal observations of P. Tušlová at the depository at the Archaeological base in Kabile in 2017.

16 Published online as part of the collection of the Bulgarian Academy of Sciences at the time of writing this article, but during revisions, unfortunately, the link as well as the whole server with the collection was not responding. Html: http://collections.cl.bas.bg/EU/Athena/W0065.html (visited 09/05/2019).

17 Saddle querns and mortaria were the first tools used by humans for grinding, dating back to the Upper Palaeolithic period (Piperino *et al.* 2004; Alonso – Frankel 2017, 463), rotary querns appeared in the 5th century BC (Peacock 2013a, 37) and segmented mills were first documented during the Hellenistic period (Peacock 2013b, 160–161). All of them were in use during the Roman period.

Considering the find of a fragment of a bronze military diploma (Boyanov 2006, 235–242; 2008, 208–216) which points to the presence of veterans in Yurta-Stroyno and the fact that a rotary quern was an inherent part of the equipment of each single *contubernium* (Webster 1969, 131–132; Jodry 2011, 87), we may suppose that some of the rotary querns were brought to the site by soldiers. Detailed examination of the assemblage, however, does not confirm this assumption. One of the main characteristics of the rotary querns produced for the army is their standardization. Firstly, the maximum weight of the whole quern should not overreach 30 kg, as it was carried together with 40 kg heavy tent by one mule (Jodry 2011, 87). And, secondly, taking as an example the rotary querns manufactured in the Eifel Mountains (Western Germany), their common characteristic was not only the volcanic material; they all had an average diameter of 400 mm and their height equalled 100 mm (Hörter 1994, 26). This implies that the querns produced for the Roman army should be identifiable based on the correlation between the material and size. Looking at the variety of measurements, morphology and materials detected in the assemblage from Yurta-Stroyno, they do not seem to comport with the Roman standardized production. Their local origin supports the vicinity of all the defined raw materials, including (basaltic) andesite, basalt, marble, micrite, sandstone and (quartz) schist, all in a radius of 10 km around the settlement. As the raw materials of the milling stones, except two fragments, were identified by naked eye observation in the field only, the actual sources of the stone are not possible to be defined.[18] Although we cannot exclude that the fragments come from different manufacturing places or that only one of them was part of the equipment of the *contubernium*, we tend to interpret them all as local products since also the materials are locally available.

The slab of the segmented mill **no. 11** represents an outstanding discovery in the context of Yurta-Stroyno. Not only that it is the first mill of this kind known from the territory, but its presence also indicates links with the Greek world. Last but not least, the segmented mill might also suggest an existence of a bakery at the site.

CONCLUSION

The milling equipment from Yurta-Stroyno revealed a heterogeneous collection including one fragment of a saddle quern (**no. 1**), nine upper stones of rotary querns (**nos. 2–10**), one slab of a segmented mill (**no. 11**) and three mortaria (**nos. 12–14**).

The saddle quern represented in the assemblage is a very worn fragment of *metate*. The fragment of the originally flat slab made of (basaltic) andesite features certain concavity, most likely developed with its utilisation. This type of milling tool is commonly of a local production.

18 A provenance analysis requires comparative samples from potential sources, as well as scientific analytical methods such as petrographic analysis and diverse (instrumental) geochemical analyses of both the comparative samples and the artefacts (Herz 2001, 449–451). However, a mortar **no. 12** and the fragment of a segmented mill **no. 11** have been analysed using thin-section-analysis (Haubenthal 2022, nos. 6–7, tab. 1:6–7). Basalt, the raw material of the fragment **no. 11**, belongs to the most abundant volcanic rocks with a relatively uniform appearance and the attribution to a source, thus, requires chemical analyses, i.e. wavelength-dispersive X-ray fluorescence analysis (WD XRF) (Williams-Thorpe 1988). The same applies to the micritic fragment **no. 12**, a carbonate rock; other carbonates, i.e. limestones, have been successfully allocated to their sources using stable isotope analysis (Wenner – Herz 1992) and neutron activation analysis (NAA) (Holmes – Harbottle – Blanc 1994).

Based on the typology of Peacock (2013a), the rotary querns include six Conical, two Hemispherical and one Cylindrical *catillus*, further diversified using the profiling of their upper faces (Staubitz 2007) to *catilli* without rim, with sloping rim and with flat rim (see **Tab. 1**). The appearance of the basic shapes comports with the geographic division suggested by Peacock, as the Conical shape is typical for the territory of Eastern Europe. As maximal diameters of the *catilli* vary between 350 and 470 mm, and heights between 67 and 109 mm, they can with a high probability all be dated to the Roman period. Two of them, both of Conical type, were used as spolia in the foundations of the excavated house and thereby their deposition corresponds with the house construction which happened in or after the 20s of the 3rd c. AD.

The variety of measurements, morphology and materials detected in the assemblage suggests rather local origin of the milling equipment than the Roman standardized production which could have been brought to Yurta-Stroyno by soldiers as part of their equipment. The material used for the production of *catilli* includes (basaltic) andesite, sandstone and (quartz) schist. All the stones are available in the vicinity of the settlement which allows for their local origin. However, this suggestion was hitherto not examined by further analyses.

The basaltic tapered slab represents a fragment of one of the inner stones of a segmented mill Type 1 of Peacock and points to the possible existence of a bakery at the site. The parallels are known only from Greece, Sicily and Egypt and the existence of a segmented mill in Yurta-Stroyno thus might demonstrate contacts with the Greek world. As the chronology is broad and spans between the 3rd century BC and the 5th century AD, it could have been used during any phase of the settlement. The find represents the first detected segmented mill in the territory of Bulgaria. However, this type of mill is easily to be misinterpreted when disaggregated and, as such, Yurta-Stroyno certainly does not represent a single place in Bulgaria where a segmented mill was used. We hope that the awareness of its possible occurrence in the territory of Bulgaria prompts new studies on segmented mills in the region, enlarging its spatial distribution.

The mortaria include one conical and two open vessels. The conical mortarium made of micrite has the maximal inner diameter of 117 mm and the minimal depth of 107 mm. Based on the measurements, the mortarium was used for pounding. The open mortarium made out of pyroclast revealed a diameter between 360 and 365 mm and minimal depth of 141 mm. The inner wall of the fragment shows clear traces of parallel furrows. The measurements of the vessel suggest its utilisation for rubbing. The last mortarium was made of white marble, with supposedly one spout and three rounded handles regularly placed along its rim. The mortarium represents an outlier in the entire collection not only due to the used material, but also due to its fine treatment. Accordingly, the open mortarium with diameter between 470 and 480 mm is suitable for utilisation in a representative context and rather than for the reduction of grain, it might have been used for mixing of herbs or medicaments.

Although the collection introduced in this article depicts only a fraction of the equipment connected with milling activities once used in Yurta-Stroyno, the diversity of the represented types, materials and their morphological variability should serve as a demonstration of the variety of milling tools possible to be found within similar contexts in the territory of the Roman Thrace.

ABBREVIATIONS

AB = Archaeologica Bulgarica
AOR = Археологически открития и разкопки
BAR = British Archaeological Reports
JASc = Journal of Archaeological Science
JRS = Journal of Roman Studies
JRomPotSt = Journal of Roman Pottery Studies
SH = Studia Hercynia

BIBLIOGRAPHY

Ath. = Athenaeus: *Deipnosophistae*. Transl. C.D. Yonge. The Deipnosophists or Banquet of the Learned I–III (book I.–XV.). Bohn's Classical Library. London 1854.

Cels. = Celsus: *De Medicina*. Transl. W.G. Spencer. Celsus I. Loeb Classical Library 292. Cambridge Mass. 1935.

Hdt. = Herodotus: *Historiae*. Transl. A.D. Godley. The Persian Wars I (book I.–II.). Loeb Classical Library 117. Cambridge 1920.

Plin. NH = Gaius Plinius Secundus: *Naturalis Historia*. Transl. J. Bostock – H.T. Riley. Pliny the Elder VI (book XXXII.–XXXVII.). Bohn's Classical Library. London 1855.

Paus. = Pausanias: *Description of Greece*. Books I and II. Transl. W.H.S. Jones. Loeb Classical Library 93. Cambridge 1918.

Plut. De Iside = Plutarch: *De Iside*. Transl. F.C. Babbitt. Moralia V. Loeb Classical Library 306. Cambridge 1936.

Alonso Martínez, N. 1997: Origen y expansión del molino rotavo bajo en el Mediterráneo occidental. In: Garcia – Meeks eds. 1997, 15–28.

Alonso, N. – Frankel, R. 2017: A Survey of Ancient Grain Milling Systems in the Mediterranean. In: Fronteau – Lepareux-Couturier – Buchsenschutz eds. 2017, 461–478.

Anderson, T.J. – Scarrow, J.H. – Cambeses, A. 2014: Continued Characterisation of Querns and Quern Quarries in Southern Spain. In: Selsing ed. 2014, 111–131.

Alonso *et al.* 2011 = Alonso, N. – Aulinas, M. – Garcia, M.T. – Martin, F. – Prats, G. – Vila, S. 2011: Manufacturing Rotary Querns in the 4th Century BC Fortified Settlement of Els Vilars (Arbeca, Catalonia, Spain). In: Peacock – Williams eds. 2011, 55–66.

Bakardzhiev 2007 = Бакърджиев, С. 2007: Сондажни археологически проучвания в м. Юрта при с. Стройно, община Елхово, област Ямбол. *AOR през 2006 г.*, 238–241.

Boyanov 2006 = Боянов, И. 2006: Римски ветерани от региона Кабиле. In: И. Илиев (ed.): *IV Международен симпозиум Поселищен живот в Тракия*, 9–11 Ноември 2005 г., Ямбол, Кабиле. Ямбол, 235–242.

Boyanov, I. 2007: Two Fragments from Military Diplomas in Yambol Museum. *AB* 11:3, 69–74.

Borisov – Gyuleva – Doychev 2016 = Борисов, Б. – Гюлева, Ж. – Дойчев, П. 2016: № 101. Разкопки на ранновизантийското и средновековното селище, северно от с. Карановo. *AOR през 2015*, 621–624.

Brunet, M. 1997: Les meules rotatives en Grèce, l'exemple délien. In: Garcia – Meeks eds. 1997, 29–38.

Buchsenschutz *et al.* 2011 = Buchsenschutz, O. – Jaccottey, L. – Jodry, F. – Blanchard, J.L. eds. 2011: *Évolution typologique et technique des meules du Néolithique à l'an mille.* Actes des IIIe Rencontres Archéologiques de l'Archéosite gaulois. Table ronde de Saint-Julien-sur-Garonne du 2 au 4 octobre 2009, Aquitania supplément 23. Bordeaux.

Chaigneau, C. 2017: Le moulin « délien » : apport du corpus de Mégara Hyblaea (Sicile). In: Fronteau – Lepareux-Couturier – Buchsenschutz eds. 2017, 439–447.

Cool, N.E.M. 2005: Roman Stone Mortaria – a Preliminary Survey. *JRomPotSt* 12, 54–58.

Deonna, W. 1938: *Le mobilier Délien*. Exploration archéologique de Délos 18. Paris.

Dimitrov, D.P. – Chichikova, M. 1978: *The Thracian City of Seuthopolis*. BAR Supplementary Series 38. Oxford.

Dyczek 2016 = Дичек, П. 2016: № 41. Нове. Сектор XII – бараки на I кохорта на VIII Августов и на i италийски легион. *AOP през 2015*, 438–440.

Fronteau, G. – Lepareux-Couturier, S. – Buchsenschutz, O. eds. 2017: *Les meules du Néolithique à l'époque médiévale : technique, culture, diffusion*. Actes 2e colloque du Groupe Meule, Reims, du 15 au 17 mai 2014. Revue archéologique de l'Est Supplément 43. Dijon.

Garcia, D. – Meeks, D. eds. 1997: *Techniques et économie antiques et médiévales. Le temps de l'innovation.* Colloque d'Aix-en-Provence (mai 1996). Paris.

Gomolka-Fuchs, G. 1982: Die Kleinfunde vom 4. bis 6. Jh. aus Iatrus. In: B. Böttger *et al.* (ed.): *Iatrus-Krivina. Spätantike Befestigung und frühmittelalterliche Siedlung an der unteren Donau* II. Ergebnisse der Ausgrabungen 1966–1973. Berlin, 149–206.

Graefe, J. 2009: *Neolithische Mahlsteine zwischen Weserbergland und dem Niederrhein*. Bonn.

Groupe Meule 2014: Evolution typologique et technique des meules du Néolithique au Moyen Âge en France : le projet « Groupe Meule ». In: N. Alonso (ed.): *Reunió Molins i mòlta al Mediterrani occidental durant l'edat del ferro.* Revista d'Arqueologia de Ponent 24, 175–188. Online: https://raco.cat/index.php/RAP/article/view/288714 (visited 19/10/2021).

Hamon *et al.* 2011 = Hamon, C. – Farget, V. – Jaccottey, L. – Milleville, A. – Monchablon, C. 2011: Propositions de normes de dessin et d'une grille d'analyse pour l'étude des meules va-et-vient du Néolithique à l'âge du Fer. In: Buchsenschutz *et al.* 2011, 39–50.

Haubenthal, C. 2022: Thin-Section Analysis of Selected Stone Objects from Yurta-Stroyno. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 106–117.

Hauken *et al.* 2015 = Hauken, Å.D. – Anderson, T.J. – Meyer, G.B. – Jansen, Ø. – Heldal, T. 2015: *Collection Report: Rotary Querns in the Museum of Archaeology, University of Stavanger*. NGU-rapport 2014.002. Online: https://www.ngu.no/upload/Publikasjoner/Rapporter/2014/2014_002.pdf (visited 02/11/2021).

Herz, N. 2001: Sourcing Lithic Artifacts by Instrumental Analysis. In: P. Goldberg – V.T. Holliday – C.R. Ferring (eds.): *Earth Sciences and Archaeology*. New York, 449–469.

Heřmánková, P. 2022: The Epigraphic Finds from Yurta-Stroyno in a Regional Context. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace.* SH Monographs 2. Praha, 118–132.

Hörter, F. 1994: *Getreidereiben und Mühlsteine aus der Eifel. Ein Beitrag zur Steinbruch- und Mühlengeschichte.* Mayen.

Holmes, L.L. – Harbottle, G. – Blanc, A. 1994: Compositional Characterization of French Limestone: A New Tool for Art Historians. *Archaeometry* 36, 25–38.

Ivanov, R. – von Bülow, G. 2008: *Thracia. Eine Röhmische Provinz auf der Balkanhalbinsel*. Mainz am Rhein.

Ivanov *et al.* 2016 = Иванов, Р. – Борисова, Т. – Занева, М. – Стайков, В. 2016: № 52. Крепостта Боровец при Правец. *AOR през 2015*, 473–476.

Ivanova, N. 2019: *Socioeconomic Implications of Cereal Crop Production in Inland Thrace during the Late Iron Age*. Disertacii 13. Sofia.

Jaccottey *et al.* 2011 = Jaccottey, L. – Jodry, F. – Longepierre, S. – Robin, B. 2011: Chronologie et diamètres des meules à bras à la fin de La Tène et à l'époque antique. In: Buchsenschutz *et al.* 2011, 291–298.

Jaccottey, L. – Farget, V. 2011: Les normes de dessin des meules rotatives. In: Buchsenschutz *et al.* 2011, 51–68.

Jaccottey *et al.* 2013 = Jaccottey, L. – Alonso, N. – Defressigne, S. – Hamon, C. – Lepareux-Couturier, S. – Brisotto, V. – Galland-Crety, S. – Jodry, F. – Lagadec, J.-P. – Lepaumier, H. – Longepierre, S. – Milleville, A. – Robin, B. – Zaour, N. 2013: Le passage des meules va-et-vient aux meules rotatives en

France. In: S. Krausz – A. Colin – K. Gruel – I. Ralston – T. Dechezlepretre (eds.) 2013: *L'âge du Fer en Europe. Mélanges offerts à Olivier Buchsenschutz.* Collection Mémoires 23. Bordeaux, 405–419.

Jodry, F. 2011: First Century Querns of the Roman Army in the Light of Modern Texts. In: Peacock – Williams eds. 2011, 85–91.

Lepareux-Couturier, S. 2014: Complex Dressing Patterns on Grinding Surfaces of Rotary Querns and Millstones from Antiquity in the Paris Basin, France: State of Research and Perspectives. In: Selsing ed. 2014, 149–158.

Maxfield, V. – Peacock, D. 2001: *Topography and Quarries.* The Roman Imperial Quarries: Survey and Excavation at Mons Porphyrites 1994–1998 I. London.

Minchev – Yotov 2016 = Минчев, А. – Йотов, В. 2016: № 2. Спасително археологическо проучване на бул. „Княз Борис I" № 27 във Варна в границите на аар „Одесос – Варна". *AOR през 2015*, 319–322.

Moritz, L.A. 1958: *Grain-Mills and Flour in Classical Antiquity.* Oxford.

Nikolov – Gyurdzhiyska 2016 = Николов, М. – Гюрджийска, Д. 2016: № 16. Спасително археологическо проучване на обект късноантична и средновековна крепост Порос: комплекс от постройки от VI. в. и римска вила по трасето на алея №11. *AOR през 2015*, 362–365.

Peacock, D. – Williams, D. eds. 2011: *Bread for the People. The Archaeology of Mills and Milling*. Proceedings of the British School at Rome 4th–7th November 2009. BAR International Series 2274. Southampton.

Peacock, D. 2013a: *The Stone of Life. Querns, Mills, and Flour Production in Europe up to c. AD 500*. Southampton.

Peacock, D. 2013b: Segmented Mills in Classical Antiquity. In: J. Poblome (ed.): *Exempli Gratia. Sagalassos, Marc Waelkens and Interdisciplinary Archaeology*. Leuven, 153–164.

Piperino *et al.* 2004 = Piperno, D.R. – Wiess, E. – Holst, I. – Nade, D. 2004: Processing of Wild Cereal Grains in the Upper Palaeolithic Revealed by Starch Grain Analysis. *Nature* 430, 670–673.

Poulter, A.G. 1995: *Nicopolis ad Istrum. A Roman, Late Roman and Early Byzantine City, Excavations 1985–1992*. JRS Monograph 8. London.

Preshlenov 2016 = Прешленов, Х. 2016: № 30. Археологически проучвания в централната градска зона на Деултум – Дебелтос. *AOR през 2015*, 404–408.

Reniere *et al.* 2016 = Reniere, S. – de Clercq, W. – Dreesen, R. – Goemaere, E. – Fronteau, G. – Gluhak, T. – Hartoch, E. – Picave, P. 2016: Querns and Mills During Roman Times at the Northern Frontier of the Roman Empire (Belgium, Northern France, Southern Netherlands, Western Germany). Unraveling Geological and Geographical Provenances, a Multidisciplinary Research Project. In: D. Rosenberg – Y. Rowan – T. Gluhak (eds.): *Proceedings of the 1st Meeting of the Association for Ground Stone Tools Research University of Haifa, July 2015*. Journal of Lithic Studies 3/3, 403–428.

Runnels, C.N. 1981: *A Diachronic Study and Economic Analysis of Millstones from the Argolid, Greece.*, Ph.D. Indiana University. Bloomington.

Selsing, L. ed. 2014: *Seen through a Millstone*. AmS-Skrifter 24. Stavanger.

Shaffrey, R. 2003: The Rotary Querns from the Society of Antiquaries' Excavations at Silchester, 1890–1909. *Britannia* 34, 143–174.

Stanciu, I. 1992: Descoperiri din a doua jumâtate a mileniului i î.h. şi mileniul i d.h. în judeţul maramureş. *Ephemeris Napocensis* II, 169–191.

Staubitz, H.J. 2007: *Die Mühlsteine des spätkeltischen Heidetränk-Oppidums im Taunus*. Kleine Schriften aus dem Vorgeschichtlichen Seminar 56. Marburg.

Storck, J. – Teague, W.D. 1952: *Flour for men's bread. A History of Milling*. Minneapolis.

Tušlová *et al.* 2015 = Tušlová, P. – Weissová, B. – Bakardzhiev, S – Čisťakova, V. – Frecer, R. – Janouchová, P. 2015: The Stroyno Archaeological Project, Report on the Season 2015. *SH* XIX:1–2, 243–261.

Vinx, R. 2015: *Gesteinsbestimmung im Gelände*. Berlin.

Vladkova 2016 = Владкова, П. 2016: № 56. Nicopolis ad Istrum. Сграда 10. *AOR през 2015*, 484–488.

Watts, S. 2019: Rotary Querns, Rubbing Stones and a Stone Bowl. In: A. Poulter (ed.): *The Transition to Late Antiquity on the Lower Danube: Excavations and Survey at Dichin, a Late Roman to Early Byzantine Fort and a Roman Aqueduct*. Oxford, 391–407.

Webster, G. 1969: *The Roman Imperial Army of the First and Second Centuries A.D*. London.

Wenner, D.B. – Herz, N. 1992: Provenance Signatures for Classical Limestone. In: M. Waelkens – N. Herz – L. Moens (eds.): *Ancient Stones: Quarrying, Trade, and Provenance*. Acta Archaeologica Lovaniensia Monograph 4. Leuven, 199–202.

Williams-Thorpe, O. 1988: Provenancing and Archaeology of Roman Millstones from the Mediterranean Area. *JASc* 15/3, 253–305.

Williams-Thorpe, O. – Thorpe, R.S. 1993: Geochemistry and Trade of Eastern Mediterranean Millstones from the Neolithic to Roman Periods. *JASc* 20/3, 263–320.

Wilson, A. 2009: Approaches to Quantifying Roman Trade. In: A. Bowman – A. Wilson (eds.): *Quantifying the Roman Economy. Methods and Problems*. Oxford Studies on the Roman Economy. Oxford, 213–249.

Zimmerman, A. 1988: Steine. In: U. Boelicke – D. von Brandt – J. Lüning – P. Stehli – A. Zimmermann (eds.): *Die Bandkeramische Siedlungsplatz Langweiler 8, Gemeinde Aldenhoven, Kreis Düren*. Rheinische Ausgrabungen 18. Bonn, 569–785.

Barbora Weissová
Ruhr-Universität Bochum
Institut für Archäologische Wissenschaften
Am Bergbaumuseum 31, D-44791 Bochum
barbora.weissova@rub.de

Clarissa Haubenthal
Ruhr-Universität Bochum
Institut für Archäologische Wissenschaften
Am Bergbaumuseum 31, D-44791 Bochum
clarissa.haubenthal@rub.de

Věra Doležálková
Institute of Archaeological Conservation
Central Bohemia
Nad Olšinami 448/3, CZ-10000, Praha 10
vera.dolezalkova@gmail.com

Thin-Section Analysis of Selected Stone Objects from Yurta-Stroyno

Clarissa Haubenthal

ABSTRACT
The main objective of this paper is the identification of the different types of stone used in the context of the Roman rural settlement of Yurta-Stroyno (South East Bulgaria). For this purpose, in autumn 2016 ten stone objects were sampled for thin section petrography. The samples encompass architectural fragments, milling equipment and three worked stones of undefined functionality deriving from the excavated house as well as from the systematic pedestrian survey of the immediate surroundings. In addition, this article presents a brief petrographic description of four specimens analysed from a nearby marble quarry, the so-called Kamenets Quarry, situated 8 km north-east of Yurta-Stroyno. The comparison of the marble finds from the site and the quarry specimens suggests a correlation between mainly the architectural objects and the locally available raw material.

KEYWORDS
Bulgaria; Roman Thrace; thin-section; petrography; stone; marble; quarry; provenance.

INTRODUCTION

This paper focuses on the stone types used in context of the site of Yurta-Stroyno, a Roman rural settlement in South East Bulgaria. The frame of these activities was the Yurta-Stroyno Archaeological Project (SAP) under the joint guidance of the Regional Historical Museum of Yambol and the Institute of Classical Archaeology of the Charles University, Prague (Tušlová – Weissová – Bakardzhiev 2022; Weissová – Tušlová – Bakardzhiev 2022).

The main objective of the present study is the identification of the different types of stone used within the context of the site, found during the excavations (2014–2016) and the surface survey (2016). Therefore, in November 2016 ten stone objects were sampled for petrographic analysis. Based on thin-sections with the thickness of 30 μm, the applied method allows for a detailed morphological description of even fine-grained components and serves efficiently for the characterization, identification and grouping of stone objects (McKenzie – Adams 1994, 7–30; Reedy 1994, 115–116; Allen 2017, 12).

Since the number of possible samples for analysis was limited, a careful selection of relevant finds had to take place. Part of this selection are all exceptional components of architecture as well as the ubiquitous material from the foundations of the excavated house. As a result, the sampled finds cover diverse functionalities (**Tab. 1**). They encompass architectural features such as diverse column parts under **nos. 1–3** (c.f. Weissová 2022, nos. 28–30, pl. 1/3); a rubble stone from the excavated foundations **no. 4** (c.f. Tušlová – Weissová – Bakardzhiev 2022, fig. 4: down); a large worked stone block (**no. 5**); milling equipment, represented by a mortar and an inner stone of a segmented mill **nos. 6** and **7** (c.f. Weissová – Haubenthal – Doležálková 2020, tab. 1:11–12); and three worked stones of undefined function (**nos. 8–10**). The description of each sample is accomplished by a picture of the

No.	Yurta-Stroyno #	SU / Finding context	Trench / Polygon	Sect.	Stone type	Object description	Further reference
1	SY16_AS_001	survey	D13	SE	marble	capital / base	Weissová 2022, no. 29
2	SY16_AS_002	survey	D13	SE	micrite	capital	Weissová 2022, no. 28
3	SY16_AS_005	survey	E11	NW	marble	cylindrical worked stone	Weissová 2022, no. 30
4	SY16_AS_006	SU074	110E_105N	NW	marble	building stone	
5	SY16_AS_007	survey	E10	NE	micrite	worked stone block	
6	SY16_AS_008	SU082	105E_105N	N	micrite	mortar	Weissová – Haubenthal – Doležálková 2022, no. 12
7	SY14_QS_003	SU001	×	×	volcanic rock	inner stone of a segmented mill	Weissová – Haubenthal – Doležálková 2022, no. 11
8	SY16_AS_003	survey	G14	NW	marble	worked stone	
9	SY16_AS_009	survey	F10	NE	marble	worked stone	
10	SY16_WS_002	survey	I11	SE	volcanic rock	worked stone	
11	SY16_KS_001	prospection	Kamenets Quarry, Map 1:11	×	marble	quarry specimen	
12	SY16_KS_002	prospection	Kamenets Quarry, Map 1:12	×	marble	quarry specimen	
13	SY16_KS_003	prospection	Kamenets Quarry, Map 1:13	×	marble	quarry specimen	
14	SY16_KS_004	prospection	Kamenets Quarry, Map 1:14	×	marble	quarry specimen	

Tab. 1: The sampled finds from Yurta-Stroyno and the specimens from Kamenets Quarry.

find as well as a detail of the stone, while the petrographic observations are illustrated by selected photomicrographs.

The petrographic study of the samples is accompanied by the analysis of four specimens (**nos. 11–14**) deriving from an ancient quarry site located about 8 km north-east of Yurta-Stroyno in the south-eastern surroundings of Kamenets village. During the field season in autumn 2016, the SAP team had the chance to prospect the area, and document several extraction points. The second part of this paper briefly introduces the quarry and characterizes the available raw material based on macroscopic observation and a petrographic study. Due to the vicinity and high probability of using locally sourced material e.g. for built structures (Rapp – Hill 1998, 126), the article also presents a preliminary discussion of the available raw material represented by the Kamenets Quarry as a potential source of the sampled finds by the means of a comparative morphological examination.

THE YURTA-STROYNO SAMPLES

The analyses of the thin-sections resulted in the division of the samples in three distinguished groups: a) marble, b) micritic carbonate mudstone (further on: micrite), and c) volcanic rocks. In the following text, the morphological characteristics of the samples are presented subdivided by the defined groups. The study considers main constituents and foreign phases,

and presents them in plain polarized light (PPL) and crossed polarized light (XPL). Other traits concern textural aspects, such as the mean grain-size (mgs), the maximum grain-size (MGS) or range of grain-sizes respectively, the shape of the mineral components as well as observable characteristics such as cleavages or twinning, and, eventually, the fabric of the material with a regard to its porosity. If not stated otherwise, the used terminology is based on W.S. McKenzie and A.E. Adams (1994).

MARBLES

The first group consists of five samples taken from a capital (**no. 1**), a cylindrical worked stone (**no. 3**), a rubble stone (**no. 4**) and two worked stones (**nos. 8** and **9**). Macroscopically, all of these finds appear to consist of a fine-grained crystalline material with a whitish to greyish colour (**Pl. 3/1**). Their surfaces were considerably weathered. However, the strongest weathering traces seem to follow a slightly reddish, vein-like pattern or form a patina of the same colour.

The microscopic analysis revealed that they consist mainly of fine-grained calcite crystals appearing in whitish colours in PPL and either in greyish, black or bright pastel shaded interference colours in XPL. The relevant characteristics (see e.g. Mrozek-Wysocka 2014, 107) of each individual sample are compiled in **Tab. 2**.

The analysis of mgs, range and MGS of the samples divides them in roughly two groups (see also **Fig. 2** in discussion): the grain sizes of **nos. 1**, **3** and **4** cluster about 20 µm as well as 100 µm (**Pl. 3/2:1–2**). Moreover, all of them feature a grain-size range from 20–200 µm. However, **no. 3** also contains larger crystals reaching from 1.0 mm to maximally 1.5 mm. The other two samples cover wider ranges. In the case of **no. 9**, it reaches from 20–600 µm with a mgs about 300 µm (**Pl. 3/2:3–4**), while **no. 8** shares this mgs but covers the wide range from 50 µm to maximally 1.0 mm (**Pl. 3/2:7**). The individual calcite crystals of all samples show mostly subhedral shapes, as well as multiple twinning and cleavages (**Pl. 3/2:3–4** and **7**). They are either arranged in a granoblastic structure, i.e. a structure without a preferred growth direction in a lattice of equidimensional crystals (**Pl. 3/2:5**), or demonstrating a preferred elongation direction of the crystal lattice (**Pl. 3/2:6**). The latter concerns in particular the fine-grained (sections of) sample **nos. 1**, **3** and **4** – another unifying aspect. The crystal lattices of all samples tend to appear less well sorted (**Pl. 3/2:1–4** and **7–8**). Foreign phases encompass mainly iron hydroxides partially in the characteristic serrated form of stylolites (Vinx 2015,

No.	Yurta-Stroyno #	Object description	Main components	Range	mgs	MGS
1	SY16_AS_001	capital / base	calcite crystals	20–200 µm	20 µm and 100 µm	200 µm
3	SY16_AS_005	cylindrical worked stone	calcite crystals	20–200 µm and 1000–1500 µm	100 µm	1500 µm
4	SY16_AS_006	building stone	calcite crystals	20–200 µm	20 µm and 100 µm	200 µm
8	SY16_AS_003	worked stone	calcite crystals	50–1000 µm	300–400 µm	1000 µm
9	SY16_AS_009	worked stone	calcite crystals	20–600 µm	300 µm	600 µm

Tab. 2: Table featuring the characteristics of the individual marble samples.

326) – as depicted in **Pl. 3/2:8** (PPL), where they can easily be recognized among the whitish calcite crystals due to their opaque and slightly reddish colour.

MICRITES

The second group is represented by three samples including the other capital (**no. 2**), the massive worked stone block (**no. 5**) and the mortar (**no. 6**). They feature a dense and very fine whitish matrix, with grains indistinguishable to the naked eye whilst being very hard (**Pl. 3/3:2**, **5–6**).

The analysis of the thin-sections proved, that the samples are characterized by a micritic matrix, i.e. a groundmass consisting of carbonate sediment with a submicroscopic grain-size (McKenzie – Adams 1994, 108, 111). This implies that the size of a single carbonate grain cannot be determined with the help of the applied method but i.e. with scanning electron microscopy (Klemm – Klemm 1993, 33). The micritic mud appears almost identically in both PPL and XPL (**Pl. 3/4:1–2**). The matrix of all samples is porous and shows numerous fine cracks (**Pl. 3/4:3**). Within these cracks and along the outlines of the pores are accumulations of precipitated carbonate crystals (**Pl. 3/4:4**). These crystals constitute the rock forming cement of the samples. Besides the aforementioned features, all samples are characterized by remains of (thus far indeterminate) fossils, some of them > 1.0 mm (**Pl. 3/4:5–6**). The bright orange-brownish phases – in PPL and XPL – are allochemical components or clasts respectively (**Pl. 3/4:7**). Other foreign minerals included in all samples are silicates of varying sizes; **Pl. 3/4:8** depicts a large quartzite grain with a diameter of approximately 2.0 mm in XPL.

VOLCANIC ROCKS

The last two samples are both of volcanic origin but correspond to different types of rock. The worked stone (**no. 10**) consists of a rather light coloured, fine but partially grainy matrix including diverse, mostly angular dark inclusions. It represents a pyroclastic rock whereas the inner stone of a segmented mill (**no. 7**) – grey, porous and very hard with a fine matrix and some light inclusions visible to the naked eye – represents a lava stone (**Pl. 3/3:7**, **10**).

The pyroclastic rock consists of a strongly welded ash with a devitrified matrix, a very dense and hard material (McKenzie – Donaldson – Guilford 1982, 7): **Pl. 3/5:1–4** depict the

Crystal shape	Other characteristics	Structure	Foreign phases
subhedral	partially twinned crystals, cleavages	granoblastic partially with a preferred elongation direction	iron hydroxide
subhedral	twinned calcite crystals, cleavages	granoblastic, fine-grained factions show a preferred elongation direction	iron hydroxide, possibly remains of recrystallized fossil material
subhedral	partially twinned crystals, cleavages	granoblastic, partially with a preferred elongation direction	possibly remains of recrystallized fossil material
subhedral	twinned calcite crystals, cleavages	granoblastic	
subhedral	twinned calcite crystals, cleavages	granoblastic	small amounts of iron hydroxide

sample in PPL and XPL respectively. Numerous roundish vesicles clearly visible as bright white spots in PPL characterize its distinctly fragmental texture (**Pl. 3/5:1** and **3**). Other components are pyroxene and numerous opaque phases. While the pyroxene crystals appear colourless in PPL (**Pl. 3/5:1** and **3**) and in bright interference colours (**Pl. 3/5:2** and **4**), the opaque phases are not translucent and appear black regardless of the microscope's settings. Subsequently, the latter cannot be determined more specifically without the application of different analysis methods. In the examined sample, they often show an intergrowth with fibrous greenish chlorite (**Pl. 3/5:2** and **4**).

The fragment **no. 7**, on the other hand, represents a vesicular basaltic rock, i.e. porous lava stone (**Pl. 3/5:5**). Its matrix of volcanic glass demonstrates the rapid cooling process of an erupted magma (Vinx 2015, 221). Both the predominantly elongated vesicles and the numerous lath-shaped plagioclase feldspars with a mean grain-size of ca. 100 μm show a preferential orientation and, thus, emphasize the fluidal structure of the sampled rock (**Pl. 3/5:6**). This is particularly visible where the plagioclase laths follow the outlines of pores or phenocrysts. The second are larger crystals embedded in the glassy groundmass. **Pl. 3/5:7** and **8** depict an aggregate of such phenocrysts containing twinned plagioclase feldspars (grain-sizes ca. 500 μm to 1.1 mm) that show grey to white interference colours and pyroxene crystals (grain-sizes ca. 250–700 μm) that are colourless in PPL and appear with bright interference colours. Though less numerous as in the pyroclastic sample above, the lava stone contains opaque phases as well (**Pl. 3/5:5–7**).

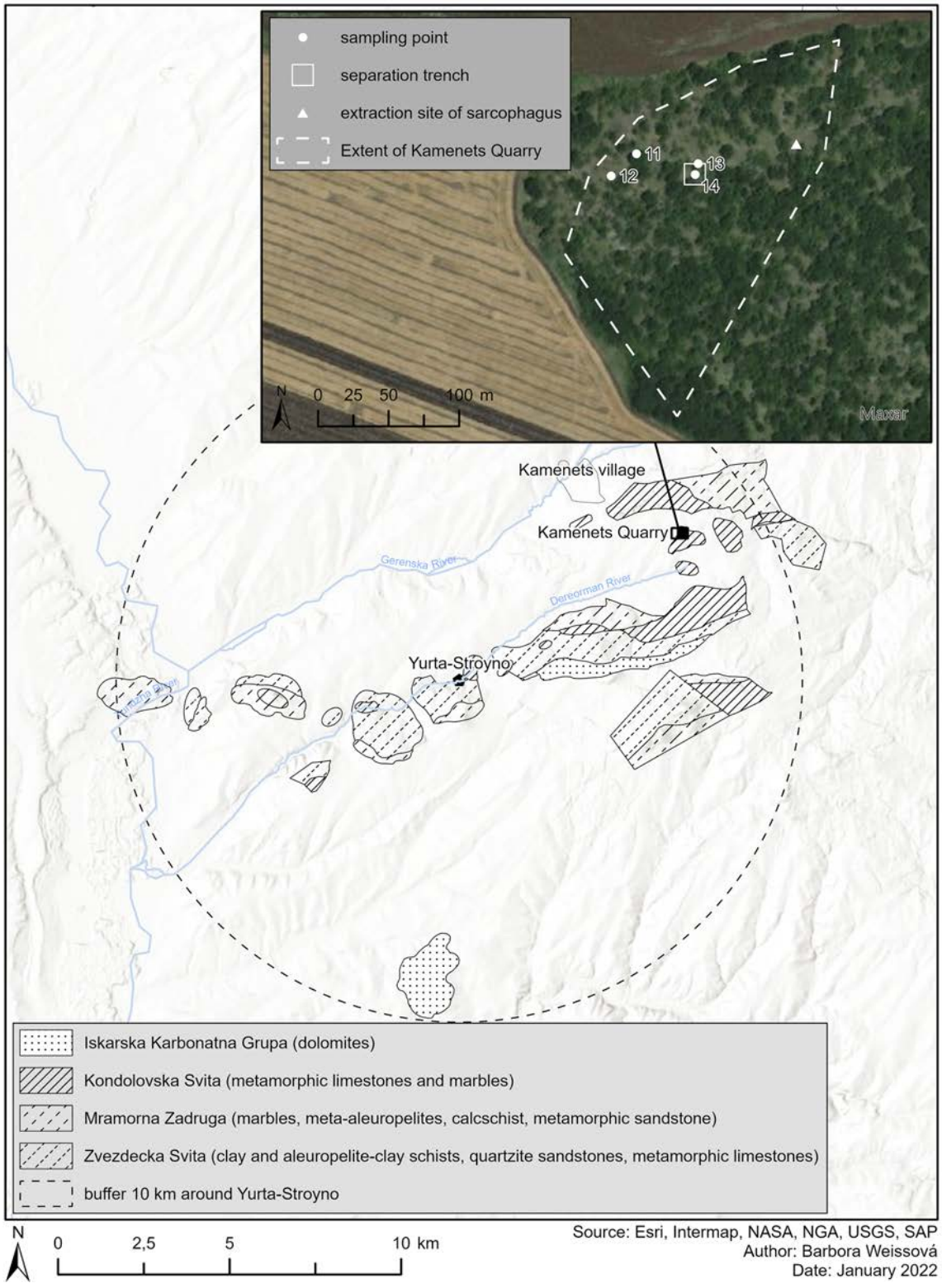
THE KAMENETS QUARRY

Apart from the excavation and the survey, in 2016 the SAP team also explored and sampled a nearby ancient quarrying area in the frame of a one-day pilot study. The area is situated just 8 km north-east of the site, south-east of the modern Kamenets village.[1] Besides a description of the geology of the surrounding environment and field observations in the quarrying area this second part of the article includes also a brief petrographic study of its specimens. In **Map 1** the distribution of the sampling points and the spatial relations of Yurta-Stroyno and the quarry are illustrated.

THE ANCIENT QUARRYING AREA

During the prospection of the area the SAP team documented several extraction points characterized by separation trenches and traces of tools such as quarry picks and iron wedges (**Fig. 1**; see also **Map 1** for the geographical position of these extraction points). However, since the area is so densely overgrown that the prospection has not revealed any datable finds (Fant 2008, 122) it was impossible to attribute a certain chronology to the quarry. Due to the same reason, the outlined extent of the quarrying area bases solely on the explored surface, i.e. it is possible that the area encompasses further extraction points outside the indicated limits.

1 I would like to thank Georgi Iliev, the restaurateur from the Regional Historical Museum of Yambol, who kindly showed us the location of the quarry, otherwise very hard to be identified as the whole area is densely overgrown.



Map 1: Map depicting the prospected extent of the Kamenets Quarry and the distribution of the sampling points within this area, as well as the geographical position in relation to Yurta-Stroyno and similar geological structures within a 10 km radius around the site (author: B. Weissová; source of geological data: Petrova – Savov – Filipov 1988; Dabowski *et al.* 1989).

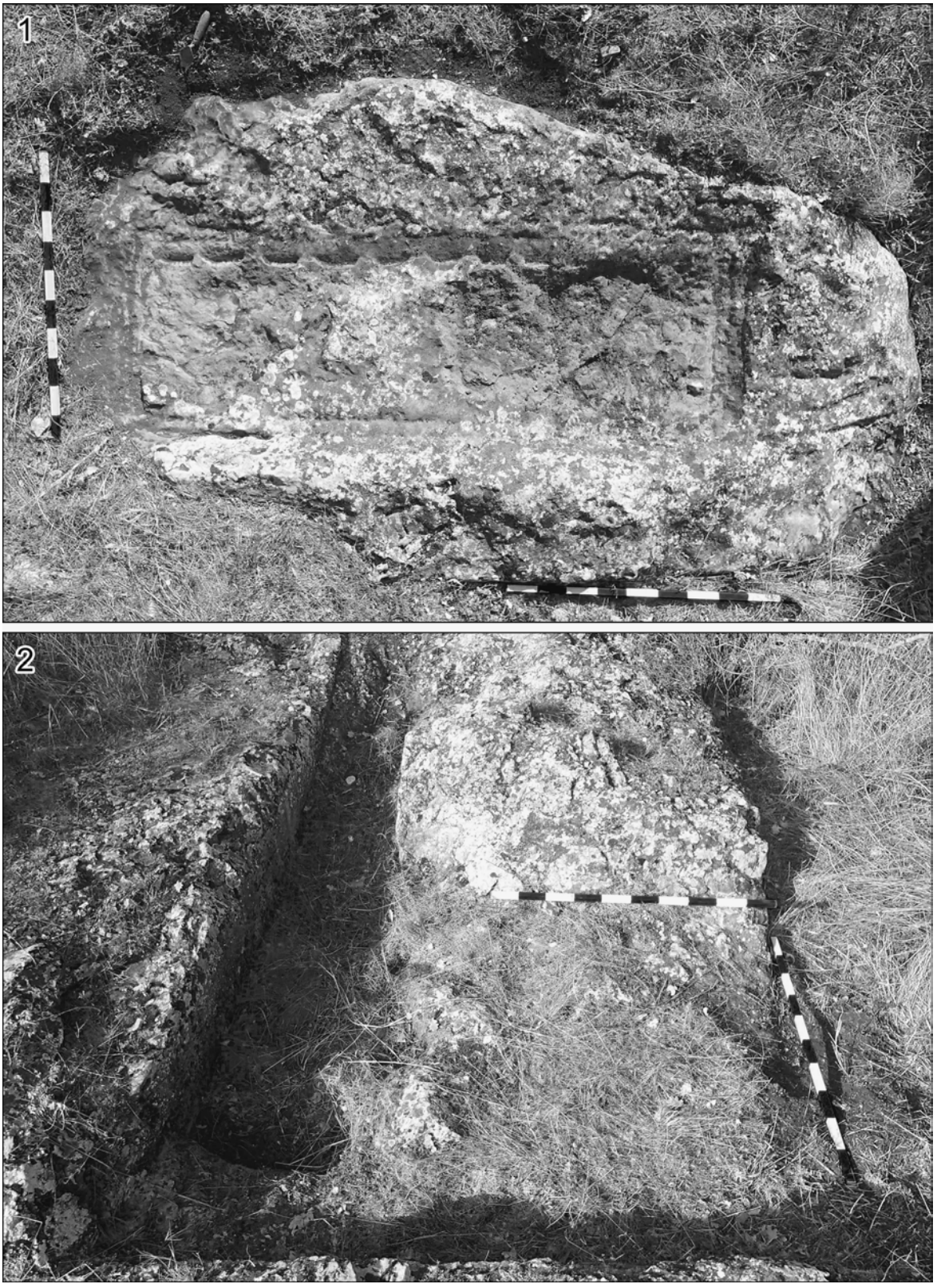


Fig. 1: Working traces within the quarrying area; 1: extraction site showing traces of quarry pick and wedges (photo by C. Haubenthal); 2: separation trench of about 40 cm width (photo by P. Tušlová).

The geological maps indicate marbles and metamorphic limestones for this area (Petrova – Savov – Filipov 1988; Dabowski *et al.* 1989). This identification fits well to the macroscopic observations in the field: the fine-grained crystalline rock features either whitish to greyish colours with occasional dark reddish veins or the appearance of a breccia composed of the same material within a reddish coloured matrix (**Pl. 3/6:11–14**).

KAMENETS SPECIMENS

The material of all four quarry samples **nos. 11–14** consists of mostly fine-grained, multiply twinned subhedral calcite crystals with a rather heterogeneous grain-size distribution and, thus, represents fine-grained marble. The crystal grain-sizes cover the range between 20–200 μm with a mgs about 100 μm (**Pl. 3/7:1–4**). However, **no. 13** represents an outlier as it also contains crystals of the MGS 500 μm (**Pl. 3/7:5–6**). While the structure of the crystal lattice is predominantly of a granoblastic character (**Pl. 3/7:1–2**), in cases of the **nos. 12** and **13** the calcite crystals show a preferred elongation direction (**Pl. 3/7:3–4**). All of the samples feature contents of iron hydroxide – mostly in the shape of conspicuous stylolites (**Pl. 3/7:2–3** and esp. **7**). In the case of **nos. 13** and **14**, the structure of the rock appears largely brecciated (**Pl. 3/7:7–8**).

DISCUSSION

While a petrographic analysis based on the described features is not sufficient to verify or exclude the investigated quarry as a possible source, this section briefly compares the investigated features in order to provide a first assessment of the relationship between finds and available resources. However, this discussion can only be preliminary on the basis of the thin-section analyses alone and needs to be confirmed by a prospection of the surrounding area and further (geochemical) analyses (Rapp – Hill 1998, 140; see e.g. Klemm – Klemm 1993, 193–197 on the combination of petrography and induced plasma spectrometry for limestone provenancing).

As already indicated by the geological maps (Petrova – Savov – Filipov 1988; Dabowski *et al.* 1989), the analysis of the specimens from the quarry resulted in identifying all of them as low-grade or fine-grained marbles. Subsequently, a comparative study with the micritic or volcanic samples is obsolete and the following discussion focuses on the marble group. It examines the finds of Yurta-Stroyno (**nos. 1**, **3**, **4**, **8** and **9**) in the light of the morphological characteristics of the quarry specimens (**nos. 11–14**).

Based on its individual characteristics, the sample of capital **no. 1** fits well to the quarry specimens: not only do its grain-sizes cover a similar range (20–200 μm), it also shares the same mgs (about 20 μm and 100 μm) and the heterogeneous grain-size distribution with the Kamenets specimens. Additionally, the granoblastic structure of the crystal lattice partially characterized by a preferred elongation direction and the subhedral shape of the individual crystals are common features. Finally, and although in a minor amount, the sample also contains iron hydroxides same as the quarry specimens. Apart from these, the same applies to the rubble stone **no. 4**. Both samples might conclusively represent material from the sampled quarry site.

While the cylindrical worked stone **no. 3** shares most of its characteristics with the aforementioned samples as well as the specimens, it also contains much larger calcite crystals with a MGS of about 1.5 mm. The largest MGS measured for the quarry on specimen **no. 13** measures

merely a third of this size (ca. 500 µm). However, considering the prevailing similarities, the sample **no. 3** might originate from the quarry despite its large MGS.

The worked stones **nos. 8** and **9** represent a different case: not only is the range of their respective calcite crystal grain-sizes wider, but they do also both feature larger mgs as well as less or no iron hydroxides as foreign phases respectively (**Tab. 2**). Another common feature of sample **nos. 8** and **9** distinguishing them from the other marble samples is their lack of a crystal lattice with preferred elongation direction. However, since this is not a common characteristic of all quarry specimens it is neglected in the course of this discussion. Considering the larger crystals in sample **no. 3** (1.0–1.5 mm) and, more importantly, the MGS of specimen **no. 13** (500 µm), the worked stones **nos. 8** and **9** do not seem to be conspicuous outliers. Nevertheless, their larger mgs of 300 µm (to 400 µm) remains without a parallel among the specimens. As does the total lack of iron hydroxides of worked stone **no. 8**. While it could be argued that the analysed thin-sections only represent a limited reference

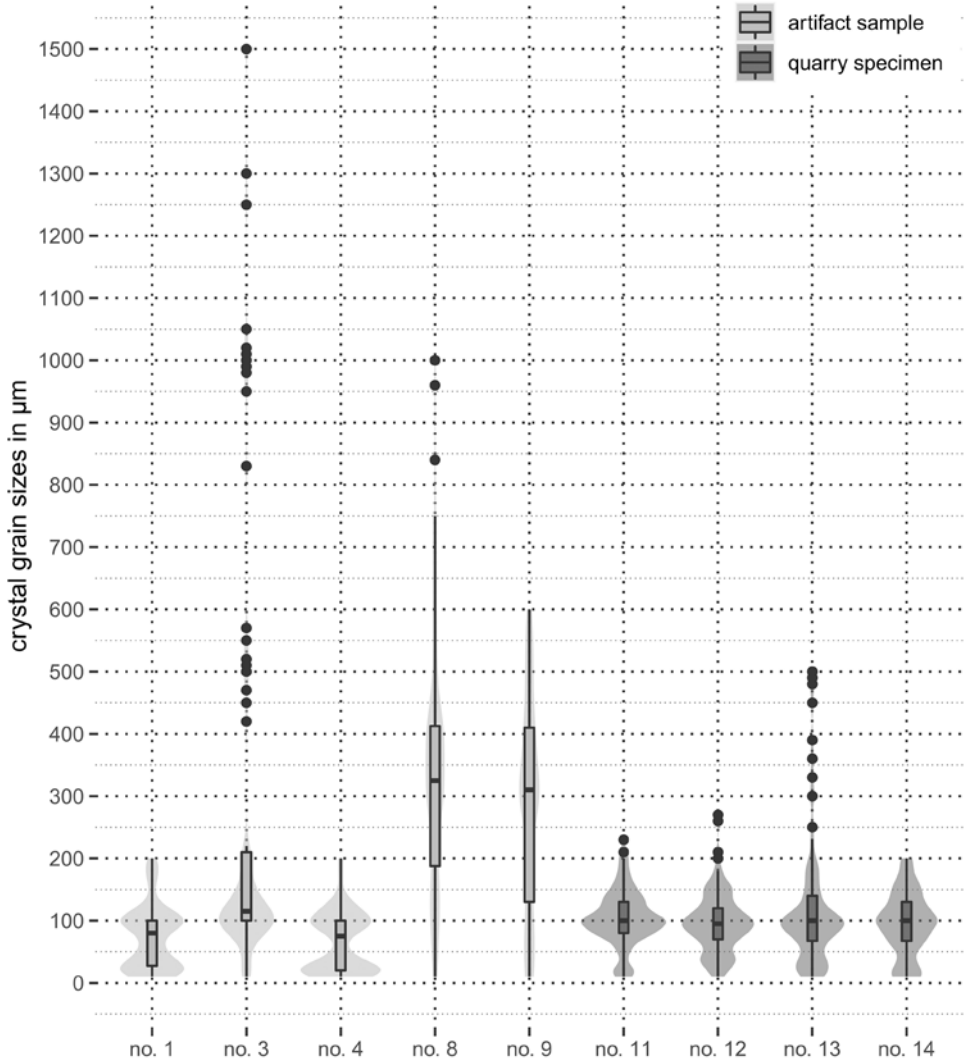


Fig. 2: Combined boxplot and violin graph visualising the range of grain sizes, mgs, and MGS of the marble samples as well as of the quarry specimens.

point (Mrozek-Wysocka 2014, 108), the prevailing differences suggest, that samples **nos. 8** and **9** at least do not originate from the sampled extraction points and represent rather a related material.

As the dense vegetation might have hindered the identification of all extraction sites at Kamenets as well as blurred the extent of the quarrying area, it is possible that the sampling was not representative for all varieties of the source rock. Moreover, considering the geology of the region (Petrova – Savov – Filipov 1988; Dabowski *et al.* 1989) other extraction points featuring related material are not unlikely: **Map 1** highlights rock structures consisting largely of marbles and/or metamorphic limestones within a radius of only 10 km from Yurta-Stroyno. This map elucidates the possibility of ancient quarries even closer to the site. A suggestive indicator for the extraction of the sampled marbles at another quarry might be that none of the finds from Yurta-Stroyno represents the breccia widely distributed on the Kamenets Quarry site**.**

CONCLUSION

The analyses of the ten sampled stone objects allowed for the identification of their individual rock material corresponding to the three groups a) fine-grained marble, b) micritic carbonate mudstone, and c) volcanic rocks represented by a pyroclastic rock and a basaltic lava stone. Particularly for the micritic samples (**nos. 2**, **5** and **6**) and the pyroclastic rock (**no. 10**), the microscopic assessment greatly improved the previous understanding of the raw material based on macorscopic observations. The grouping of the objects by stone type also allows for some more observations: besides the two worked stones of undefined function, the fine-grained marble seems to have principally been used for architectural purposes. In comparison, the functionality of the micritic and volcanic rocks seems to have been more versatile – probably due to their very fine grain-sizes, higher density and hardness. At least one but possibly two micritic samples, the capital and the massive stone (**nos. 2** and **5**), have been used for architectural purposes. The third micritic sample (**no. 6**) and the lava stone (**no. 7**) represent milling equipment. While the functionality of the pyroclastic sample is ambiguous, a similar utilization seems plausible considering its material properties.

Moreover, the microscopic examination confirmed that the sampled quarry south-east of Kamenets exploits (fine-grained / low-grade) marbles. It also allowed a comparative analysis of the quarry specimens and the sampled marble objects of Yurta-Stroyno. Due to the methodology of the thin-section analysis, the question whether the marble artefacts originate from the sampled quarry or not was mainly approached by a comparison of the morphological characteristics of the calcite crystals (e.g. size, shape, structure, twinning) as well as foreign phases. On this basis, it seems highly probable that the samples taken from the capital (**no. 1**) and from the foundations of the excavated house (**no. 4**) represent locally sourced material as available in Kamenets Quarry. While the cylindrical worked stone (**no. 3**) is closely related to the Kamenets material, the two worked stones (**nos. 8** and **9**) represent rather material from a so far unknown extraction point. However, since the geological map indicates a much larger area rich on marbles and/or metamorphic limestones in the surroundings of Yurta-Stroyno, the existence of other ancient quarries with a similar or related material is highly probable. Therefore, the identification of the Kamenets Quarry as the source represents one probable scenario rather than an only option. While a prospection for other ancient quarrying activities in the area might shed some more light on the ancient use of the available resources, the future

application of an intensified microscopy and geochemical analytic methods is essential to lift the preliminary discussion of the provenance potential to a proper provenance analysis. The latter would also be beneficial for the micritic and volcanic samples whose provenance could not be further discussed here due to a lack of comparative material and analyses.

ACKNOWLEDGEMENT

I would like to express my sincere thanks to the supervisors of the Yurta-Stroyno Archaeological Project, Dr. Barbora Weissová, Dr. Petra Tušlová and Dr. Stefan Bakardzhiev, for giving me the opportunity to take part in the field season of 2016 and process the thin-sections of the stones and thereby contribute to the project, and to Prof. Dr. Bernhard Stöckhert and Caroline Mantey M.Sc. for their help, patience and for providing me with the possibility to prepare the thin-sections and conduct the analyses at the Institute of Geology, Mineralogy and Geophysics of Ruhr-University Bochum.

ABBREVIATIONS

SH = Studia Hercynia

BIBLIOGRAPHY

Dabowski *et al.* 1989 = Дабовски, Хр. – Савов, С. – Чаталов, Г. – Шиляфов, Г. 1994: *Геложка Карта на България*. Елхово (K-35-066) 1:100,000.

Fant, J.C. 2008, Quarrying and Stoneworking. In: J.P. Oleson (ed.): *The Oxford Handbook of Engineering and Technology in the Classical World*. Oxford, 121–135.

Klemm, R. – Klemm, D.D. 1993: *Steine und Steinbrüche im Alten Ägypten*. Berlin.

McKenzie, W.S. – Adams, A.E. 1994: *A Colour Atlas of Rocks and Minerals in Thin Section.* London.

McKenzie, W.S. – Donaldson, C.H. – Guilford, C. 1982: *Atlas of Igneous Rocks and their Textures.* Essex.

Mrozek-Wysocka, M. 2014: Ancient Marbles: Provenance Determination by Archaeometric Study. In: D. Michalska – M. Szczepaniak (eds.): *Geoscience in Archaeometry. Methods and Case Studies*. Poznań, 97–116.

Petrova – Savov – Filipov 1988 = Петрова, А. – Савов, С. – Филипов, Л. 1988: *Геложка Карта на България*. Ямвол (K-35-054) 1:100,000.

Reedy, C.L. 1994: Thin-Section Petrography in Studies of Cultural Material. *Journal of the American Institute for Conservation* 33:2, 115–129.

Tušlová, P. – Weissová, B. – Bakardzhiev, S. 2022: The Final Excavation Report. In: P. Tušlova – B. Weissova – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 24–52.

Vinx, R. 2015: *Gesteinsbestimmung im Gelände*. Berlin.

Weissová, B. 2022: Shedding Light on Architecture of Roman Rural Settlements in Thrace. Ceramic and Stone Building Materials from Yurta-Stroyno. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 70–89.

Weissová, B. – Haubenthal, C. – Doležálková, V. 2022: The Milling Equipment. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 90–105.

Weissová, B. – Tušlová, P. – Bakardzhiev, S. 2022: Systematic Selective Survey of Yurta-Stroyno. A Methodological Approach to Sites Heavily Disturbed by Looters. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 53–69.

Clarissa Haubenthal
Ruhr-Universität Bochum
Institut für Archäologische Wissenschaften
Am Bergbaumuseum 31, D-44791 Bochum
clarissa.haubenthal@rub.de

The Epigraphic Finds from Yurta-Stroyno in a Regional Context

Petra Heřmánková

ABSTRACT
In the past two decades, several epigraphic monuments have been found at the settlement of Yurta-Stroyno and its immediate vicinity. Their discovery contributed to the archaeological knowledge of the site but also placed the settlement into a broader context of the middle Tundzha River region. This chapter examines in detail three inscriptions associated with the site which were found before 2014, and three objects with epigraphic value and eight graffiti found during the Yurta-Stroyno Archaeological Project in 2014–2016. The discussion of all 14 epigraphic objects and their regional comparanda are improving our understanding of the settlement's character and its links to other sites in the region. Based on the textual evidence from the inscriptions, it seems Yurta-Stroyno and the military camp at Kabyle, located some 34 km north of the settlement were interconnected during the 2nd c. AD by personal and military associations alike.

KEYWORDS
Bulgaria; Thrace; Kabyle; Greek and Latin inscriptions; epigraphy; regional networks.

EPIGRAPHIC FINDS FROM YURTA-STROYNO

Several epigraphic monuments associated with the Roman settlement of Yurta-Stroyno were found up to date. They were reported as individual finds to the Regional Historical Museum of Yambol (RIM) or discovered during the archaeological prospection and excavation of the site conducted by the RIM in 2006–2007, or, most recently, excavated during the Yurta-Stroyno Archaeological Project (SAP) in 2014–2016.

Before SAP, the epigraphic objects found at the site consisted of a bronze military diploma fragment, one marble plate fragment depicting a horse rider, and one marble plate with an inscription mentioning a Roman family *Avilius* (Bakardzhiev 2008; Boyanov 2007).

The items uncovered from the excavations between 2014 and 2016 as part of SAP represent a wider variety of finds, either bearing an inscription or providing objects without an inscribed text but showing very similar characteristics with the existing epigraphic monuments from the region. The epigraphic objects uncovered during SAP include a marble plate fragment depicting a horse rider (**Pl. 4/1:3**), a terracotta plaque with Greek inscription and relief of a temple (**Fig. 1**), an inscribed brick (**Pl. 4/2**), and eight pottery sherds containing alphabetic and pictorial graffiti (**Fig. 2**). For the overview and their archaeological context, see **Tab. 1** below. The epigraphic finds are divided into groups by their material and discussed together with their parallels from the Roman world.

MILITARY DIPLOMA

One fragment of a Latin military diploma has been discovered at Yurta-Stroyno and published by Ilian Boyanov (2007; *AE* 2007, 1259), now displayed at the Museum of the Archaeological

Fig. / Pl.	Yurta-Stroyno # / Reference	SU	Trench / Polygon	Finding context	Material	Object	Language	Inscription / Text	Chronology
×	Boyanov 2007; AE 2007, 1259	surface	×	find pre-2006	bronze	military diploma	Latin	**Ext**: RELI. N (?) NSTANTI PT ET RECOGN XA EST ROM IVI AVG **Int**: MISENEN XXVI STI SIONE FILISQ VS QVA	after mid-2nd c. AD
Fig. 1	SY15_079; SY15_080; SY15_178; SY15_179; SY15_180; SY15_414; SY15_415; SY15_419	SU001	×	RT soil, SAP	pottery	graffiti	×	A, H, X	1st–3rd c. AD
Fig. 2	SF15_218	SU001	95E_100N	RT soil, SAP	terracotta	votive plate	Greek	ΠΥΤΝΙΟΥ	2nd–3rd c. AD (?)
Pl. 4/1:1	Bakardzhiev 2008, 471–472, no. 1	×	×	excavation 2007 by RIM	stone	horse rider plate	×	×	Roman period
Pl. 4/1:2	Bakardzhiev 2008, 471–472, no. 2	×	×	excavation 2007 by RIM	marble	plate	Greek	ΑΒΙΛΛΙΟΥ	Roman period
Pl. 4/1:3	SF15_080	SU002	105E_100N	wall of the house excavated by SAP	marble	horse rider plate	×	×	Prior to AD 218
Pl. 4/2	SY16_AC_030	survey	G09	SAP	clay	fired brick	Greek	ΗΘΕΟC	Roman period (lunate sigma)

Tab. 1: An overview of all inscriptions and objects with epigraphic potential associated with the settlement at Yurta-Stroyno.

Park of Thracian and Ancient City of Kabile.[1] The military diploma was created and given to the soldier at the time of discharge from the army. As was customary in the Roman army, the soldier was honourably discharged from duty after 25 years of service, or 26 years in the case of the navy. In most cases, the veteran received Roman citizenship and sometimes was given a piece of land in one of the Roman provinces (Gardiner 2000, 80). The veterans and their families kept the diplomas as evidence of their social status and past service.

The reconstructed text indicates the veteran served in the Roman imperial fleet *Classis Praetoria Misenensis,* named after its harbour at Misenum in the Bay of Naples, representing one of the two most important Roman Imperial fleets (Starr 1975, 13–21). Most sailors of the *Classis Praetoria Misenensis* were recruited in the Roman East, where the fleet also often

1 'Kabyle' represents the form used in ancient sources, including inscriptions and literary texts, while 'Kabile' is the spelling variant used in contemporary Bulgarian. Kabyle was an ancient city, located on the bends of the River Tundzha in the northern part of the Yambol District, some 34 km north of Yurta-Stroyno. Kabyle is recorded by the ancient sources already at the time of Philipp II of Macedon as a Macedonian military outpost and during the Roman times, it served as a military base for Roman auxiliary units (Velkov 1983, 233–234).

operated.[2] According to the text of preserved tombstones from Rome associated with the *Classis Praetoria Misenensis*, sailors of the Thracian origin represented at least 15–18% of the fleet (Starr 1975, 75; Hopkins 2014, 60, 71–72; Bekker-Nielsen 2017, 479). A relatively large number of military diplomas dated to the second half of the 2nd c. AD supports the hypothesis that the *Classis Praetoria Misenensis* recruited sailors in Thrace around the time of the Bar Kochba revolt in Judaea in AD 133–134 (Eck – Pangerl 2006, 248–250; Topalilov 2013, 252).

Based on the textual formulae and their parallels, Boyanov (2007, 70) dates the military diploma from Yurta-Stroyno shortly after the mid-2nd c. AD. Boyanov's date of the issue of the military diploma further corresponds with the length of a military career in the Roman navy, providing a date for the discharge 26 years after the military recruitment for the Bar Kochba revolt in AD 133/134. Therefore, we may presume the veteran from the military diploma found at Yurta-Stroyno might have been of Thracian origin and/or settled at Yurta-Stroyno after the mid-2nd c. AD, when he was honourably discharged from the military service in the Roman navy.

According to Boyanov, the discovery of the military diploma at Yurta-Stroyno, and another diploma found at Trapoklovo, a village about 20 km north-east of Kabyle, suggest an (ex) military network centred around the military unit settled at Kabyle (Boyanov 2007, 73). The presence of veterans in the region would arguably reinforce the military and social order, as well as secure the safe passage along the middle stream of the Tundzha River and support the military units stationed at Kabyle in case of need. However, the sole discovery of the military diploma does not provide direct evidence of an organised military presence at Yurta-Stroyno but can represent an isolated event.

DECORATED STONE PLATES

The excavation report from 2008 mentions two fragments of small decorated stone plates from the museum's depository that are associated with the site, one of them bearing an inscription (Bakardzhiev 2008, 471–472). Additionally, another fragment of a marble plate with a similar decor was found directly at the site during the SAP 2015 excavation season, built into the southern wall of the excavated house.

The first stone plate fragment reported in 2008 represents a shallow relief depicting a horse rider (**Pl. 4/1:1**), now located in the collections of the RIM (Bakardzhiev 2008, 471–472). Only the lower right corner has survived, representing ca. 25% of the original monument with dimensions of 140×80×20 mm. The lower part of the fragment depicts a scene with a horse rider's foot and the horse hoof and lower leg facing right.

The second stone plate reported in 2008 is made of marble (**Pl. 4/1:2**); approximately 30% of the original monument is preserved, with dimensions 120×100×40 mm (Bakardzhiev 2008, 471–472). The shallow relief originally represented either a horse rider facing right or a standing barefoot person.[3] The second half of a carefully carved inscription in the Greek alphabet survived immediately under the relief. The text reads 'ΑΒΙΛΛΙΟΥ', associating the dedicand or the deceased from the monument with the Roman family name *Avilius* in the genitive singular. The monument served either as a dedication or a funerary inscription to the member of the *Avilius* family.

2 Literary sources mention that *Classis Praetoria Misenensis* helped Emperor Septimius Severus in the fight against Pescennius Niger at Byzantium in AD 192 (Cass. Dio, *Historiae Romanae* 74.16).

3 Iconographic parallels from the territory of Thrace, showing a barefoot deity either naked or wearing a long *toga* most often depict Zeus (*IG Bulg* 1706; *IG Bulg* 3.21873; *IG Bulg* 55198, 5284, 5315), Asclepius (*IG Bulg* 2515; *IG Bulg* 3. 2. 1669) or Artemis (*IG Bulg* 2483, 562).

Coincidentally, an inscription with the family name *Avilius* has been attested at the military camp at Kabyle (*IG Bulg* 3.2 1777; Seure 1917, 138–188; Velkov 1991, 30–31). A bilingual Latin and Greek funerary inscription states the veteran – *centurion Gaius Avilius Valens* – built a burial mound for himself and his wife, *Satria Marcia*. The inscription was carved into an elaborate funerary mausoleum found at Kabyle. In the *editio princeps* Velizar Velkov dates the monument to the Severan era (Velkov 1991, 30–31). Boyanov, however, using iconographic parallels from a funerary monument of another veteran of *Classis Praetoria Misenensis* from Philippopolis redates the inscription to the second half of the 2nd c. AD (Topalilov 2002, 61–62; Boyanov 2007, 236). Setting the debate of the exact date aside, the onomastic connection of the *Avilius* family, personalized by the family members operating within the territory of the military camp at Kabyle and the settlement of Yurta-Stroyno, implies existing relations between the two settlements in the second half of the 2nd c. AD (Boyanov 2006, 235–242; 2008, 208–216). Moreover, the fact that *Gaius Avilius Valens* identified himself on the inscription as a veteran may indirectly support the thesis that Yurta-Stroyno served as a rural outpost for veterans, conveniently located on the southern outskirts of the sphere of influence of Kabyle (Boyanov 2006, 235–239).

The third marble fragment (**Pl. 4/1:3**), found at Yurta-Stroyno in 2015 incorporated into the foundation wall [SU002] of Room D, was reused as a building material at the time of the house construction, around AD 220 (Tušlová *et al*. 2015, 257; Tušlová – Weissová – Bakardzhiev 2022, fig. 5). No inscription has been preserved, as only approximately 25% of the monument survived with dimensions of 170×170×45 mm. A shallow relief depicting a human foot and a horse hoof survived in the lower right corner, similar in style and execution to the first-mentioned fragment reported in 2008.

Once reconstructed, at least the two of three reliefs depicted a barefoot horse rider, facing right, sitting on a galloping horse, most commonly referred to as type B according to Oppermann (2006); see below for detailed discussion.

TERRACOTTA PLAQUE

In 2015, a votive terracotta plaque (**Fig. 1**) was found in the robbers' trench soil [SU001] in Room B. The terracotta plaque is preserved from 50% with dimension 60×40×10 mm, made from red clay without any slip (Tušlová *et al*. 2015, 257).

The A-side of the terracotta plaque is decorated with a figural scene in shallow mould-made relief. Although the lower part of the relief is missing, the scene depicts a deity with long hair, wearing a *polos* hat, standing in the middle of a Doric temple, accompanied by *bucranion* on her/his right and left side and what appears to be an upper part of a club on the right side, next to a head. A round object, possibly the sun or a round shield, is located in the middle of the temple's pediment.

The B-side of the plaque has no decoration, and a short inscription in the Greek alphabet survived in the middle of the plaque. Judged by the varying depth of individual letter strokes, the text was made when the clay was still wet. The text reads ΠΥΤΝΙΟΥ or ΠΙΤΝΙΟΥ, representing a genitive singular of a male Greek name Pytnios, Pitnios or, as suggested, Penios.[4] The

4 Nicolay Sharankov (Sv. Kliment Ohridski University, Sofia) suggested the reading ΠΙΗΝΙΟΥ, derived from personal name *Penios* or *Penias*, which would point to the Thessalian origin of the name. Robert K. Pitt (formerly British School of Athens) suggested the version with letter *eta* (*Penios*) resembles the cursive script, as found on Late Antique papyri. Based on autopsy at the time of discovery, the upper stroke of the letter eta is, however, missing, leaving the other two versions of the male name *Pytnios* or *Pitnios* more plausible.

personal name Pytnios or Pitnios has not been attested anywhere else. However, the suffixes *Pyt-* and especially *Pyth-* are relatively common in the Greek-speaking world, e.g. Apollo *Pythios* from Delphi (Fraser – Matthews 2005, 295). In connection with the religious scene on the A-side, the name might represent either a male personal dedicand or an epithet of a local deity, derived from local toponymy or mythology. The practice of using local names as epithets for local deities was quite common in Roman Thrace. As regional examples may serve the sanctuaries of heroes, e.g. of Apollo *Teradeenos* and Apollo *Zerdenos*, both located near the modern village of Kran in the Kazanlak Valley (the upper Tundzha River Valley) where a large number of epigraphic objects was discovered (Bujukliev 1997, 213–220; Oppermann 2006, 222–226).

Several iconographic parallels of the A-side of the terracotta are attested in modern-day Bulgaria, but none of the objects was inscribed, making the find from Yurta-Stroyno unique. The first two parallels are red clay terracotta moulds from Montana in North-western Bulgaria, depicting Apollo, and Hygieia respectively, both standing in the middle of a temple (Dremsizova-Nelchinova – Toncheva 1971, 14, nos. 130–133). Both moulds are dated to the

Fig. 1: A small terracotta plaque, photo (top) and 3D scan (bottom). The A-side with a relief decoration of a temple; the B-side with the Greek inscription, dedicated to or by Pytnios. Photo by J. Tlustá, 3D scan by Tibor Lieskovski.

2nd–3rd c. AD and are slightly larger than the terracotta from Yurta-Stroyno with dimensions 100×80×10 mm and 108×78×10 mm, respectively. These moulds were likely used to produce small terracotta plates for the local sanctuary of Apollo or Hygieia, judged by the iconographic representation of a temple building with a sculpture of the patron deity (Dremsizova-Nelchinova – Toncheva 1971, 16–17). Similar motives come from the Roman pottery production centre near Pavlikeni, some 220 km north-west of Yurta-Stroyno in Northern Bulgaria (Vladkova 2009, 40–51; Vladkova 2010, 29).[5] Most of the plaques were originally around 100×100 mm in size and were made of light-brown to beige clay with and without a glossy red slip. Based on the archaeological contexts and the chronology of terracotta production, the plaques from Pavlikeni date to AD 180–240 (Vladkova 2009, 49).

Further iconographic parallels were made of metal, e.g., the small bronze plaque dated to the 1st–2nd c. AD coming from an unknown site in South-Eastern Thrace (Tacheva-Hitova 1983, 177, no. 22; with dimensions 135×100×40 mm). The relief represents sitting Zeus *Sabazius* in the middle of a Doric temple with an eagle on his left hand. In the pediment of the temple a personification of the sun is located, possibly Helios. The missing provenance of the metal plaque makes any further associations with existing sites or temples in the area impossible.

A scene with a deity in the role of a city patron standing in the middle of a pedimental temple is a relatively common theme also on coin types minted in the territory of South-Eastern Thrace in the late 2nd c. AD and in the first half of the 3rd c. AD. Several coin types depicting a temple were minted in Hadrianopolis of the Severian period (Jurukova 1987, 78–80; *CNT* 4488, 4550),[6] in Deultum under the emperor Gordian III (Jurukova 1973, 6–10; *CNT* 6035, 7935–8, 7944–6, 7963, 8925),[7] or in Augusta Traiana during the reign of Emperors Septimius Severus and Caracalla (Schönert-Geiss 1991, 45–46, 79).[8] The depiction of a temple on coins usually serves as supporting evidence that such a temple existed in the settlement that minted the coin. Identification of a temple building based on monetary images is, however, not always successful (Schönert-Geiss 1991, 47). Similarly, to be able to identify a temple building at the Yurta-Stroyno solely on the basis of a terracotta plaque is highly problematic as the object is small and can easily travel vast distances. However, recent excavation at the site of St. Iliya, located ca. 1.5 km south-east of Yurta-Stroyno, point to an existence of a *tholos* temple and a large residential building with a colonnade, with some probability dated as the settlement at Yurta-Stroyno (Agre – Dichev – Hristov 2020). Further investigation will hopefully shed light on the attribution of the temple, period of its activity, and the possible connection between the two sites.

Based on the comparison with similar objects found in Thrace, the plaque found at Yurta-Stroyno likely dates to the 2nd–3rd c. AD. The image on the A-side presumably depicts a temple with a sculpture of a patron deity, similar to plates from the pottery workshops in Montana or Pavlikeni. Based on the Greek inscription on the B-side, the plaque most likely served as

5 Several mould-made votive plaques were discovered at the production site: eight of them depict nude Heracles; two show Dionysus together with a *boucranion* on the left side and a club on the right side; and one represents Artemis standing in the middle of a temple with detailed architectural elements.

6 The coins from Hadrianopolis are associated with deities such as Zeus, Artemis, Apollo or Tyche standing in the middle of tetrastyle temple with a tympanum and legend around it.

7 The coins were minted in Deultum between AD 238–244 with the reverse of the coin type depicting various deities such as Asclepius, Apollo, Genius, Tyche and Homonoia, standing in the tetrastyle temple holding diverse objects in their hands.

8 The coins from Augusta Traiana depict a standing statue of a deity, such as Tyche, Apollo, Artemis, Asclepius and Hades and their respective sanctuaries.

a votive offering to a local male deity bearing an epithet *Pytnios, Pitnios,* or less likely *Penios*, or dedication made by a male dedicand of such name. The origin of the plaque or its association with an existing temple remains, however, inconclusive.

BRICK WITH GRAFFITI

During the systematic surface survey of the site in 2016, a rectangular red clay brick with a short inscription was found (**Pl. 4/2**). About 85% of the original brick has survived, with the top part missing. The dimensions of the brick are 155×280<×45 mm, most likely corresponding with the conventional measurement of rectangular bricks present at the site (155×315×45–55 mm; Weissová 2022, 74). The brick was decorated with the half-letter-X shaped lines made with four fingers before firing, a typical decoration for Roman bricks (Seure 1901, 179–180; Brodribb 1987, 105–117). Additionally, a short inscription was placed roughly in the middle of the brick with space around the text, indicating it is unlikely any letters are missing. The brick was inscribed before firing while the clay was still soft, leaving strokes of uneven depths. The inscription consists of five letters of the Greek alphabet with the C-like lunate sigma, a typical letter shape for Roman and Late Antique inscriptions. The text reads 'ΗΘΕΟC' and can be interpreted as a dedication to an unknown female deity, represented by the noun θεός in nominative singular with the definite article ἡ. A variant reading suggests an adjective ἤθεος, 'unmarried youth' with the subscript iota omitted. In this instance, the adjective would serve as an epithet or a simple acclamation.

In search of a possible interpretation of the practice of inscribing bricks and tiles, the most comprehensive and well-documented datasets come from Roman Britain (Tomlin 1979; Brodribb 1987). Tiles and bricks were traditionally stamped with the name of the military unit in charge of their production. The handwritten inscriptions were less frequent and usually represented signatures or texts related to the production of the building material, such as tally number or name of the workshop. However, the dedicatory nature of inscriptions on bricks and tiles is relatively rare, even in the well-published evidence from Roman Britain. The closest example of a similarly themed text on a brick are the two Latin graffiti dedicated to an unknown young girl '*puellam*' uncovered in Roman Britain. The young girl did not necessarily mean deity and, thus, the original meaning of the dedication could be more prosaic. These two inscribed bricks were found in the Roman settlement in Silchester and Caerleon, respectively (*RIB* 2491.122: Tomlin 1979, 245; *RIB* 2491.158: Tomlin 1979, 249).[9] The original archaeological context of both examples is unknown as they come either from spoil-heap or were recorded as part of the museum collection.

There are several examples of graffiti on building material also from the Balkan provinces, both in Latin and Greek. The Latin texts come mostly from both *Moesias* and the Greek ones from *Thracia*. The graffiti represent a wide range of texts such as the dedications to Emperors (*IK Byz* 55c from Byzantion or *AE* 1991, 1405 from Hisar dated to AD 308–310); prayers to Christian God (*AE* 1910, 0089 from Viminacium, dated to the 4th–5th c. AD); various acclamations wishing well to the person inscribing the object (*IMS* II 222 from Viminacium or *SGLIBulg* 38 from Pautalia and dated to the 5th–6th c. AD); or emotional statements addressed at people known to the scribe (*SEG* 53:669 from the agora of Philippopolis dated to the 3rd c. AD; Sharankov – Dimitrova 2003, 201–204). Examples of a dedication on building material addressed to any of the Graeco-Roman deities in Thrace remain, however, unprecedented.

9 The online corpus of Roman Inscriptions of Britain (*RIB*) published in 2019: https://romaninscriptionsofbritain.org/ (visited 21/10/2021).

GRAFFITI ON POTTERY

The last group of epigraphic finds consists of four alphabetical graffiti on pottery and four pictorial graffiti representing an image of a fish.[10] Two of them are textual graffiti, each containing individual letters of the Greek alphabet. They are located on the outer side at the bottoms of vessels, traditionally interpreted as an indication of the ownership (**Fig. 2:1–2**). Because of the fragmentary preservation, only individual letters can be distinguished, e.g. H or A. The other two sherds with graffiti were made when the clay was still soft and most likely represent residues of decoration or the lower half of the letter X (**Fig. 2:3–4**). The four incised graffiti depicting a fish were placed on the inner side of a fine red-slipped ware, possibly of one open bowl; they served likely as a decorative motif (**Fig. 2:5–8**).

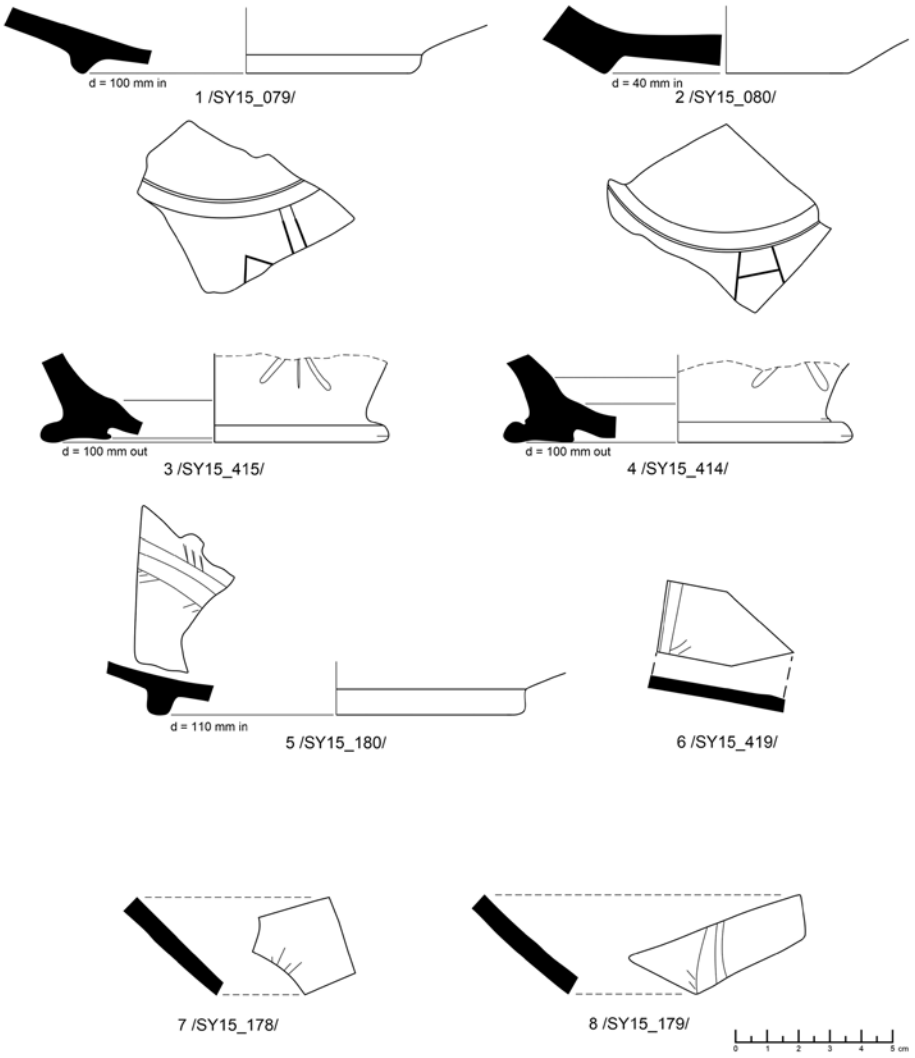


Fig. 2: Graffiti on the pottery vessels; 1–2: individual letters incised after firing; 3–4: possible lower half of letter X incised before firing; 5–8: fish depiction incised before firing.

10 See Tušlová 2022 for further description and classification of the pottery fragments.

Graffiti on pottery are documented at major Hellenistic sites in Bulgaria such as Seuthopolis, Pistiros, Kabyle, Sboryanovo or Halka Bunar (Dimitrov – Chichikova – Alexieva 1978, 22–23; Chichikova 1984, 52–53, 74; Domaradzka 1996, 89–94; Lozanov 2002, 197–201; Domaradzka 2005, 296–307; 2013, 198–206; Dana 2015, 248–249), but they are rarely published in a Roman context. Unfortunately, the current corpus of inscriptions on pottery from Yurta-Stroyno is too small to make any conclusions about their meaning or the level of literacy of the local inhabitants.

THE SETTLEMENT AT YURTA-STROYNO IN A REGIONAL CONTEXT

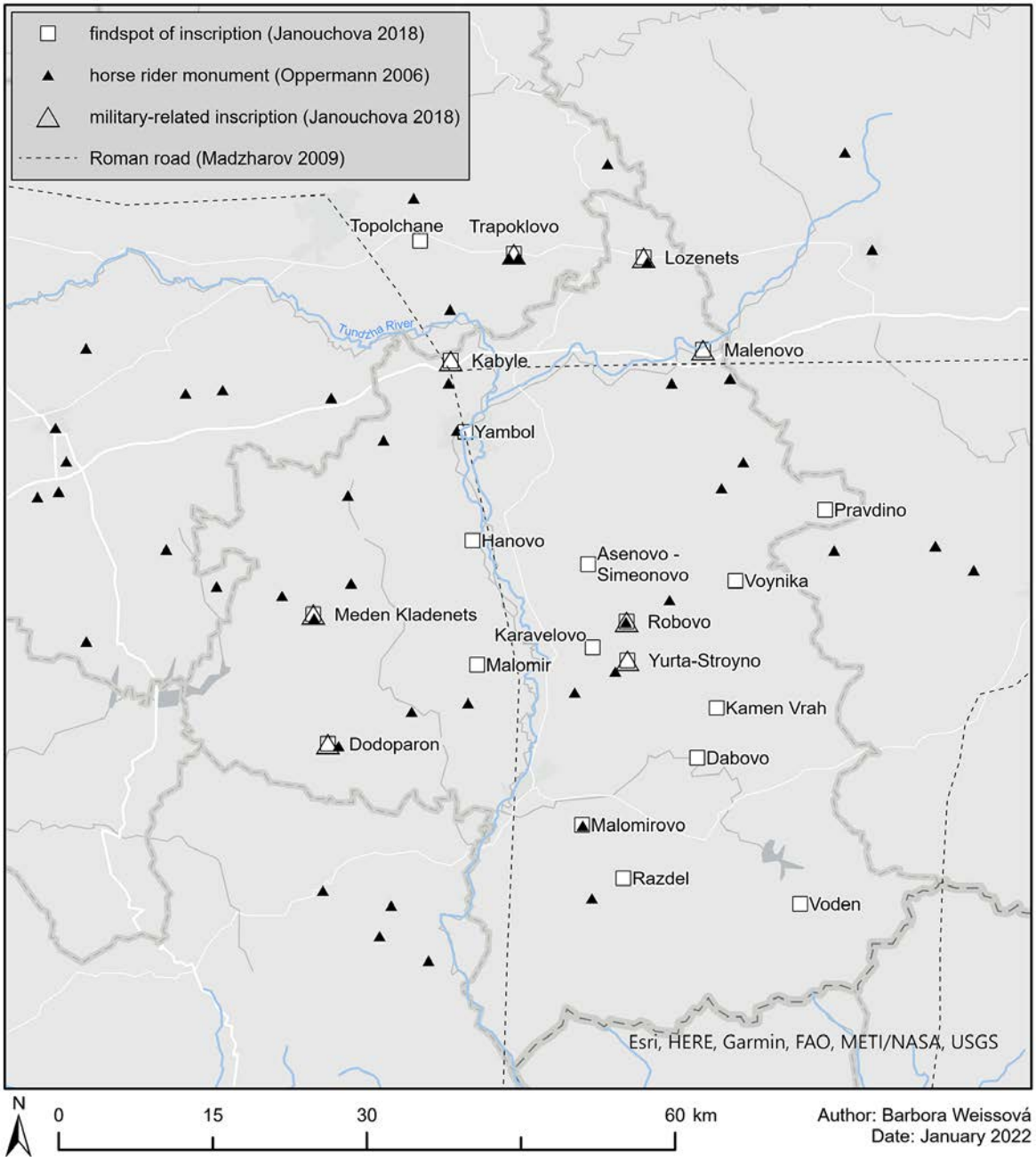
The discussed collection of finds represents a diverse array of epigraphic objects that were likely produced during the Roman Imperial Period[11] and used at Yurta-Stroyno or its immediate vicinity. The period of epigraphic activity on the site corresponds with the overall peak of the epigraphic activity in Thrace, but also with the establishment of the permanent military camp at Kabyle and the military reforms of Septimius Severus in Thrace (Dana 2015, 253; Janouchova 2017, 190).

The settlement at Yurta-Stroyno held a strategic position in the region of the middle Tundzha River near the reconstructed road connecting Kabyle and Propontis (Madzharov 2009, 237). Moreover, the site was conveniently located in the distance of approximately one day travel from the auxiliary unit stationed at Kabyle, making Yurta-Stroyno or similar settlements in the neighbourhood an ideal candidate for a sub-regional centre that would manage and guard the southern part of the sphere of influence of Kabyle. The connection of the site with the auxiliary camp at Kabyle is further strengthened by the *Avilius* family name attested on inscriptions found in both places, indicating members of the same veteran family were operating in the entire region. Additional military links of the site at Yurta-Stroyno are strengthened by the existence of the bronze military diploma, suggesting a part of the population was likely of (ex)military background and settled in rural Thrace after the honorary discharge in the second half of the 2nd century AD. Yet, the numismatic evidence from Yurta-Stroyno, albeit heavily corrupted by looting activities, does not indicate any direct monetary exchange between the two settlements in the Roman times (Heřmánková 2022).

As to the civilian aspects of life, the discovery of the votive plaque with relief decoration and inscription in Greek, as well as the inscribed brick with the Greek dedication to an unknown female deity, or the presence of the horse rider plates, may indicate the local population was well embedded in the system of beliefs characteristic for Thrace of the Roman period. The two horse rider reliefs found at Yurta-Stroyno represent a typical votive monument of the Roman period recorded in large numbers all over Thrace (Dimitrova 2002, 210). According to Kazarow (1938) and Oppermann (2006), approximately 50 sites with the horse rider relief have been discovered along the middle Tundzha River Valley. Seven of the stone reliefs depicting horse rider were executed in a similar way as the exemplars from Yurta-Stroyno, depicting a galloping horse with a rider in shallow relief, a subcategory of Oppermann type B (Kazarow 1938, nos. 117, 170, 299; Oppermann 2006, 233; nos. 499, 750–753).

The largest concentrations of the horse rider reliefs along the Tundzha River come from three village sanctuaries in the Kazanlak Valley, at the middle stream of the river (Tabakova 1959; Tabakova-Tsanova 1961; Tabakova-Tsanova 1980). The architecture of these sanctuaries did not differ from the casual dwellings of the village; therefore, they were often identified

11 In the context of epigraphical finds understood as period from the 1st–3rd c. AD.



Map 1: The spatial distribution of the horse rider inscriptions along the middle stream of the Tundzha River. The category 'Findspots of inscriptions' (21 pcs.) locates the findspots of all inscriptions, even the ones not related to the military. The category 'Military-related inscriptions' (8 pcs.) shows all inscriptions, including military diplomas, texts published by or mentioning a soldier, veteran, or a person with combined Roman and Thracian personal names, see Janouchova (2018). The category 'Horse rider monuments' (49 pcs.) shows findspots of all horse rider monuments along the middle Tundzha River as recorded by Oppermann (2006).

as sanctuaries solely on the basis of votive offerings. The votive objects represented decorated stone plates with the horse rider or depictions of other deities, small terracotta statues, precious metal jewellery, coins, or decorated mirrors. Such objects, although in smaller quantities,

possibly due to the disturbance of the site, were also found at Yurta-Stroyno, i.e. the fragment of the votive terracotta plate (**Fig. 1**), the brick with a plausibly votive inscription (**Pl. 4/2**), the enthroned terracotta deity (Minaříková 2022, fig. 2:2), or the marble head from a statuette of a bearded male (Minaříková 2022, fig. 1, pl. 8/1). However intriguing, the existence of a sanctuary in the vicinity of Yurta-Stroyno is only circumstantial and needs to be confirmed by further investigations.

It was often assumed the relief depicting a horse rider was popular amongst Roman army soldiers, as evidenced by its broad spatial distribution and by the textual content of many inscriptions on the rider monuments (Dimitrova 2002, 210). However, Dilyana Boteva's quantitative analysis of horse rider inscriptions dedicated by soldiers shows only a relatively small number of horse rider dedications contain a direct reference to soldiers or veterans (Boteva 2005, 199–204). To extrapolate Boteva's assumption to all Greek inscriptions from Thrace, I have compared her findings with the dataset from the *Hellenisation of Ancient Thrace* database.[12] In October 2018, the database contained a total of 732 horse rider relief plates with predominantly Greek inscriptions. The number represents approximately one-third of all horse rider reliefs found in Thrace, with the two-thirds remaining anepigraphic (based on figures from Dimitrova 2002). By a thorough study of the contents of all 732 inscriptions with the horse rider relief, we can confirm Boteva's assumption that only approximately 10% of inscriptions were dedicated by someone explicitly identified as a soldier (*'stratiotes'*), veteran, or by an individual male bearing a combined Thracian and Roman name, which was traditionally gained after the honorary discharge from the Roman military service. The remaining 90% of dedications come mostly from people of unknown gender or origin, and their social status or their affiliation with the military remains tacit.

Although only a small part of inscriptions with the horse rider relief can be explicitly attributed to military personnel and the presence of horse rider reliefs is not proof of evidence of the military character of the settlement *per se*, the incidence of inscriptions mentioning soldiers or veterans of the Roman army in the middle stream of the Tundzha River is conspicuous. Inscriptions either produced or mentioning military personnel were found along the middle stream of the Tundzha River not only at Yurta-Stroyno and Kabyle, but also in the region stretching between the villages Malomirovo, 50 km south of Kabyle; Meden Kladenets, 30 km southeast of Kabyle; Zornitsa, 55 km northeast of Kabyle; and Trapoklovo and Lozenets, 25 km northeast of Kabyle (**Map 1**; Janouchova 2018, 226–227). The spatial distribution of inscriptions affiliated with the Roman army and monuments with the horse rider relief coincides with what is assumed to be the sphere of influence of Kabyle. The settlement at Yurta-Stroyno was most likely located on its southern outskirts, yet, according to the existing evidence, it was connected with Kabyle by a series of personal, religious, and military associations, already suggested by Ilian Boyanov (2006, 235–239).

CONCLUSION

During the archaeological investigations of the settlement at Yurta-Stroyno in 2014–2016, we found eight new objects with epigraphic value. Furthermore, we were able to re-evaluate three already known and partially published objects associated with the settlement. In the light of the new finds, we were able to reassess the nature of epigraphic culture along the middle stream of the Tundzha River and its regional associations. Based on available comparanda,

12 Janouchova 2014; DOI 10.17605/https://osf.io/FJNW5/.

most of the epigraphic objects date to the Roman Imperial Period and are of local, respectively regional, origin. Three of the inscriptions are written in Greek, one in Latin and the rest is too fragmentary to determine any epigraphic language. One inscription represents a military diploma, five of them dedications to a deity and eight are graffiti on pottery sherds.

The three inscriptions already published in the literature include one military diploma written in Latin on a metal plate and dated to mid-2nd c. AD, granting an honorary discharge from the Roman navy to an unknown inhabitant of Yurta-Stroyno. The re-examination of two other objects mentioned briefly in the archaeological reports showed an interesting connection to the new finds of 2014–2016: two stone plates were found in the vicinity of Yurta-Stroyno, one depicting a shallow relief of a horse rider and the second one a standing deity, characteristic votive or funerary monuments of the Roman Thrace (**Pl. 4/1:1–2**). The second plate contained a Greek inscription referring to a Roman family name *Avilius* that is epigraphically attested some 34 km north in the military camp at Kabyle (**Pl. 4/1:2**), further strengthening the regional links between Yurta-Stroyno and Kabyle.

A fragment of a stone plate similar in size and treatment was found by the SAP in 2015 and after careful examination showed traces of the horse rider relief, a well-known cultural and religious phenomenon of the Roman Thrace that is in some cases associated with Roman soldiers and veterans (**Pl. 4/1:3**). However, the evidence linking the spatial distribution of horse rider reliefs and the military background of the inhabitants is confirmed only in a small fraction of all known horse rider inscriptions. Therefore, the link between the occurrence of the two horse rider reliefs and the military background of the Yurta-Stroyno settlement inhabitants remains a hypothesis, yet a plausible one.

Two newly discovered clay objects with a Greek inscription improve our understanding of the religious beliefs of the Yurta-Stroyno inhabitants, assuming at least basic comprehension of the Graeco-Roman system of beliefs. The first one is the votive terracotta plate with a representation of a Graeco-Roman deity standing in the temple with a Greek dedication referring to an otherwise unattested male name *Pytnios*, *Pitnios* or *Penios* (**Fig. 1**). The second inscription in Greek was found on a brick dated to the Roman Imperial period. The inscribed text served as a dedication either to a young female or a young female deity (**Pl. 4/2**). Both terracotta inscriptions confirm familiarity with Greek script.

As to the levels of literacy of the inhabitants, eight graffiti on Roman pottery were found during the pottery processing in 2015. Four of them consist of individual letters on the bottom or side of the original vessel, two incised graffiti before the firing and two after the firing of the vessel, and the other four pictorial representations of fish (**Fig. 2**). The size of the sample leads to a conclusion that some groups of the inhabitants were likely able to write and comprehend simple text. However, in general, the ability to read and write was not customary for the majority of the Classical world (Harris 1989, 327).

The close examination of the objects with the epigraphic value shows that the settlement of Yurta-Stroyno was well established within the local socio-cultural networks. The epigraphic activity during the Roman Imperial Period reveals indirect links between the settlement of Yurta-Stroyno and the military camp at Kabyle, suggesting the sphere of influence of Kabyle was reaching some 34 km south. Moreover, the surviving monuments reveal the inhabitants of the Yurta-Stroyno settlement were adhering to the Graeco-Roman system of beliefs and its related iconography, typical for Thrace of the Roman Imperial period. The new finds show the inhabitants of Yurta-Stroyno were aware, if not actively participating, in the Graeco-Roman cultural phenomenon of publishing written messages on permanent media such as stone, terracotta or metal.

DIGITAL SUPPLEMENT

The digital supplement containing Epidoc TEI/XML files can be accessed online at http://doi.org/10.5281/zenodo.3908271 or https://petrifiedvoices.github.io/stroyno-inscriptions/, under the CC-BY-4.0 International license.

ABBREVIATIONS

AB = Archaeologia Bulgarica
AE = L'Année épigraphique; Presses Universitaires de France. 1888–.
AOR = Археологически открития и разкопки
BCH = Bulletin de correspondance hellénique
CNT = *Corpus Nummorum Thracorum*. Berlin-Brandenburgische Akademie der Wissenschaften. https://www.corpus-nummorum.eu/ (visited 4/12/2021).
IG Bulg = Mihailov, G. (1956–1997): *Inscriptiones Graecae in Bulgaria repertae*, 5 vols. Academiae Litterarum Bulgaricae. Sofia.
IK Byz = Łajtar, A. 2000: *Die Inschriften von Byzantion*. Bonn.
IMS II = Miković, M. 1986: *Inscriptions de la Mésie Supérieure. Vol. 2. Viminacium et Margum*. Belgrade.
RA = Revue Archéologique
RIB = Vanderbilt, S. 2020: Roman Inscriptions of Britain Online: https://romaninscriptionsofbritain.org/, visited 4/12/2021.
SGLIBulg = Beševliev, V. 1964: *Spätgriechische und spätlateinische Inschriften aus Bulgarien*. Berlin.
SH = Studia Hercynia
SEG = Supplementum Epigraphicum Graecum. Brill. 1923–.

BIBLIOGRAPHY

Cass. Dio, *Historiae Romanae* = Cassius Dio Cocceianus: Dio's Roman History. Transl. E. Cary – H.B. Foster – W. Heinemann. Harvard University Press. London – New York 1914.

Agre – Dichev – Hristov 2020 = Агре, Д., Дичев, Д., Христов, Х. 2020: Трако-римски селищен обект в м. св. Илия в землището на с. Стройно, общ. Елхово. *AOR през 2020 г.*, 875–880.

Bakardzhiev 2008 = Бакърджиев, С. 2008: Сондажни археологически проучвания в Юрта край село Стройно, община Елхово. *AOR през 2007 г.*, 471–473.

Bekker-Nielsen, T. 2017: Thracians in the Roman Imperial Navy. *The International Journal of Maritime History* 29:3, 479–494.

Boteva, D. 2005: Soldiers and Veterans Dedicating Votive Monuments with a Representation of the Thracian Horseman within the Provinces of Lower Moesia and Thrace. In: M. Mirković (ed.): *Römische Städte und Festungen an der Donau. Akten der regionalen Konferenz (16–19 Oktober 2003)*. Beograd, 199–210.

Boyanov 2006 = Боянов, И. 2006: Римски ветерани от региона Кабиле. In: И. Илиев (ed.): *IV Международен симпозиум Поселищен живот в Тракия*, 9–11 Ноември 2005 г., Ямбол, Кабиле. Yambol, 235–242.

Boyanov, I. 2007: Two Fragments from Military Diplomas in Yambol Museum. *AB* 11:3, 69–74.

Brodribb, G. 1987: *Roman Brick and Tile*. Gloucester.

Bujukliev, H. 1997: Le culte d'Apollon à Augusta Trajana et dans son Territoire. In: D. Triantaphyllos – D. Terzopoulou (eds.): *Actes 2e Symposium International des Études Thraciennes, Komotini, 20–27 Septembre 1992*, vol. 1. Komotini, 213–220.

Chichikova 1984 = Чичикова, М. 1984: Антична керамика. In: Д. Димитров – М. Чичикова – А. Балканска – Л. Огненова-Маринова (eds.): *Севтополис* 1. София, 18–114.

Dana, D. 2015: Inscriptions. In: J. Valeva – E. Nankov – D. Graninger (eds.): *A Companion to Ancient Thrace*. Malden – Oxford – Chichester, 243–264.

Dimitrov, D.P. – Čičikova, M. – Alexieva, M.P. 1978: *The Thracian City of Seuthopolis*. Oxford.

Dimitrova, N. 2002: Inscriptions and Iconography in the Monuments of the Thracian Rider. *Hesperia* 71:2, 209–229.

Domaradzka, L. 2005: Graeco-Thracian Relations in the Upper Maritza Valley (5th–4th c. B.C.) (Based on Epigraphic Evidence). In: J. Bouzek – L. Domaradzka (eds.): *International Symposium in Memory of prof. Mieczyslaw Domaradzki*. Oxford, 19–26.

Domaradzka, L. 1996: Graffiti from Pistiros. In: J. Bouzek – M. Domaradzki – Z.H. Archibald (eds.): *Pistiros I: Excavation and Studies*. Prague, 89–95.

Domaradzka, L. 2013: Newly Discovered Graffiti on Pottery from Pistiros (2004–2010). In: J. Bouzek – L. Domaradzka – A. Gotzev – Z.H. Archibald (eds.): *Pistiros V: Excavation and Studies*. Prague, 198–206.

Dremsizova-Nelchinova – Toncheva 1971 = Дремсизова-Нелчинова, Ц. – Тончева, Г. 1971: *Антични теракоти от България*. София.

Eck, W. – Pangerl, A. 2006: Die Konstitution für die Classis Misenensis aus dem Jahr 160 und der Krieg gegen Bar Kochba unter Hadrian. *Zeitschrift für Papyrologie und Epigraphik* 155, 239–252.

Fraser, P. M. – Matthews, E. 2005: *Macedonia, Thrace, Northern Regions of the Black Sea.* A Lexicon of Greek Personal Names IV. Oxford.

Gardiner, R. 2000: *The Age of the Galey: Mediterranean Oared Vessels since Pre-Classical Times*. New Jersey.

Harris, W.V. 1989: *Ancient Literacy*. London.

Heřmánková, P. 2022: The Numismatic Finds. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 133–144.

Hopkins, L. 2014: *Fleets and Manpower on Land and Sea: The Italian Classes and the Roman Empire 31 BC – AD 193*. University of Oxford: unpublished PhD thesis.

Janouchová, P. 2014: Database of Greek Inscriptions 'Hellenisation of Ancient Thrace': A Final Report on Investigations during 2013–2014. *SH* XVIII:1–2, 67–74.

Janouchová, P. 2017: *Hellénizace antické Thrákie ve světle epigrafických nálezů*. Charles University: unpublished PhD thesis.

Janouchová, P. 2018: The Epigraphic Evidence from Kazanlak and Yambol, c. 500 BC – AD 300. In: S.A. Ross – A. Sobotkova – J. Tzvetkova – G. Nekhrizov – S. Connor (eds.): *Tundzha Regional Archaeological Project, Surface Survey, Palaeoecology, and Related Studies (2009– 2011): Final Report*. Oxford, 217–228.

Jurukova, J. 1973: *Griechisches Münzwerk: Die Münzprägung von Deultum*. Berlin.

Jurukova 1987 = Юрукова, Й. 1987: *Монетосеченето на градовете в Долна Мизия и Тракия II–III в. Хадрианопол*. София.

Kazarow, G.I. 1938: *Die Denkmäler des thrakischen Reitergottes in Bulgarien*. Budapest.

Lozanov 2002 = Лозанов, И. 2002: Графити от Халка Бунар. *Годишник на Археологически Институт с Музей-БАН* 2, 197–205.

Madzharov 2009 = Маджаров, М. 2009: *Римски пътища в България: принос в развитието на римската пътна система в провинциите Мизия и Тракия*. Велико Търново.

Minaříková, A. 2022: Selected Small Finds. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 245–258.

Oppermann, M. 2006: *Der thrakische Reiter: Des Ostbalkanraumes im Spannungsfeld von Graecitas, Romanitas und lokalen Traditionen*. Langenweißbach.

Schönert-Geiss, E. 1991: *Die Münzprägung von Augusta Traiana und Traianopolis*. Berlin.

Seure, G. 1901: Voyage en Thrace: Établissements scythiques dans la Thrace; Tumuli et chars thraco-scythes. *BCH* 25, 156–220.

Seure, G. 1917: Archéologie thrace documents inédits ou peu connus (suite). *RA* 5, 158–188.

Starr, C.G. 1975: *The Roman Imperial Navy: 31 B.C. – A.D. 324*. Westport, Connecticut.

Tabakova 1959 = Табакова, Г. 1959: Светилището на Аполон Зерденски при с. Крън, Старозагорско. *Известия на Археологическия Институт* 22, 97–110.

Tabakova-Tsanova 1961 = Табакова-Цанова, Г. 1961: Тракийско светилище при с. Виден, Старозагорско. *Известия на Археологическия Институт* 24, 203–219.

Tabakova-Tsanova 1980 = Табакова-Цанова, Г. 1980: Светилището на Аполон Терадеенос при с. Крън, Старозагорско. In: И. Венедиков – А. Фол (ed.): *Тракийски Паметници II, Тракийски Светилища*. София, 173–194.

Tacheva-Hitova, M. 1983: *Eastern Cults in Moesia Inferior and Thracia*. Leiden.

Tomlin, R. 1979: Graffiti on Roman Bricks and Tiles found in Britain. In: A. McWhirr (ed.): *Roman Brick and Tile*. Oxford, 231–251.

Topalilov, I. 2002: A Roman Veteran's Tombstone in Philippopolis. *AB* 6:1, 59–65.

Topalilov, I. 2013: Veterani Classiarii in Philippopolis (Thrace). *Ancient West & East* 12, 251–264.

Tušlová *et al.* 2015 = Tušlová, P. – Weissová, P. – Bakardzhiev, S. – Čisťakova, V. – Frecer, R. – Janouchová, P. 2015: The Stroyno Archaeological Project, Report on the Season 2015. *SH* XIX:1–2, 243–261.

Tušlová, P. 2022: *The Yurta-Stroyno Archaeological Project. Pottery Studies.* SH Monographs 3. Praha.

Velkov, V. 1983: The Thracian City of Cabyle. In: A.G. Poulter (ed.): *Ancient Bulgaria*. Nottingham, 233–238.

Vladkova 2009 = Владкова, П. 2009: Античен производствен център при Павликени (Долна Мизия) – периодизация и производства. Част първа. *Археология* LI:1–2, 40–51.

Vladkova 2010 = Владкова, П. 2010: Античен производствен център при Павликени (Долна Мизия). Част втора. Апликации за керамични съдове. *Археология* LII:1–2, 29–45.

Weissová, B. 2022: Shedding Light on Architecture of Roman Rural Settlements in Thrace. Ceramic and Stone Building Materials from Yurta-Stroyno. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 70–89.

Petra Heřmánková
Aarhus University
Department of History and Classical Studies
Jens Chr. Skous Vej 5, DK-8000 Aarhus C
petra.hermankova@cas.au.dk

The Numismatic Finds

Petra Heřmánková

ABSTRACT
The following text presents numismatic finds associated with the settlement of Yurta-Stroyno and its immediate vicinity which were discovered either as chance finds or during systematic archaeological investigations of the area conducted by the Historical Museum of Yambol in 2006–2007 and by the Yurta-Stroyno Archaeological Project in 2014–2016. From the total amount of 14 individual coins discussed within the text, 12 coins were minted in the period between the creation of the Roman province of Thrace in the mid-1st century AD and the decline of minting activities in South-Eastern Thrace around the mid-3rd c. AD. Two coins, however, predate the main group, such as the coin of Philip II dated to the mid-4th c. BC, and the coin of Emperor Augustus, corresponding to the Emperor's military activities in the Eastern Mediterranean during the 1st century BC. The majority of the coins found in Yurta-Stroyno were minted in the cities of South-Eastern Thrace or in the eastern part of the Aegean area, such as Anchialos, Traianoupolis, Philippopolis, Augusta Traiana, Philippi, Cyzicus and Ephesus. Only two coins were minted in the western part of the Roman Empire, namely in the imperial mints in Lugdunum and in Rome. They were likely brought to Thrace by merchants or soldiers.

KEYWORDS
Bulgaria; Roman Thrace; Numismatics; Roman coins; Roman provincial coinage.

INTRODUCTION

The numismatic finds associated with the settlement at Yurta-Stroyno represent a relatively small corpus when compared to nearby centres that were minting or countermarking their own coinage such as Kabyle, Deultum, Augusta Traiana or Hadrianopolis. Despite their scarcity, the coins from Yurta-Stroyno still provide invaluable information about the socio-economic activity of the area in the Roman imperial period and the history of the site itself.

The site at Yurta-Stroyno has been continuously looted and most of the coins originally present are now considered gone, together with their numismatic and archaeological value. Even the surviving coins are often found in the secondary context, as part of a topsoil or from robbers' trenches. Their presence at the site is rather accidental as they were most likely omitted by the modern-day looters or neglected due to their low monetary value.

Several coins, coming either from the site itself or its immediate vicinity, were recorded in archaeological sources prior to any systematic excavation project. Their description significantly varies in details of their recorded information. Several accidental coin finds were briefly summarised in regional site gazetteers, such as Dimitrova and Popov (1978, 26), or Bakardzhiev (2012, 365). Paunov (2013) lists a coin hoard found in the vicinity of the site and a few individual coins in his dissertation. The short excavation reports (*AOR*) from the trial excavation at the site in 2006 and 2007 also briefly mention numismatic finds (Bakardzhiev 2007, 238; Bakardzhiev 2008, 472) of which 29 coins were published in 2014 (Varbanov 2014).

In order to provide a comprehensive outline of the numismatic records associated with the settlement of Yurta-Stroyno, the current text summarizes the legacy data reported to the Historical Museum of Yambol (RIM) (i.e. four individual coins + one coin hoard with 29

coins [Varbanov 2014, 259–263]), with the finds discovered during the trial archaeological investigations of the environs of Yurta-Stroyno in 2006 and 2007 (one coin), and the coins uncovered within the Yurta-Stroyno Archaeological Project (SAP) in 2014–2016 (nine coins). A brief overview of the legacy data is followed by a detailed discussion of the new coins of the SAP, providing a chronological frame to archaeological contexts of the current volume. The concluding synopsis of the numismatic activity discusses all coin finds and examines the settlement of Yurta-Stroyno within the context of regional monetary networks.

NUMISMATIC FINDS FROM YURTA-STROYNO PRIOR TO SAP

The coins known prior to the beginning of SAP in 2014 were all minted during the Roman imperial period, both by the imperial and the local provincial mints. The archaeological site gazetteer in *Tabula Imperii Romanii K35/2* mentions specifically the finds from Yurta-Stroyno coming from the local mints in Anchialos, Hadrianopolis, Augusta Traiana, or Philippopolis with the majority of coins dated to the 2nd and the 3rd c. AD (Bakardzhiev 2012, 365).[1]

The earliest individual coin find is a silver *denar* of emperor Tiberius discovered near the village of Stroyno in 1961. The coin was minted in Lugdunum in Gallia in AD 14–37 and was likely brought to Thrace by the members of the Roman army because of its substantial value (Paunov 2013, 697; RIM inv. no 1853; coin type *RIC* I² 30). In 1968 a bronze *sestertius* minted in Rome during the reign of Emperor Trajan was uncovered directly at the site of Yurta-Stroyno, dating to AD 114–117 (Paunov 2013, 687; RIM inv. no. 4325; coin type *RIC* II 667). Again, this coin of large value was likely brought from Rome by the Roman soldiers during the 2nd c. AD.

The coins dated to the 3rd c. AD represent the most numerous group of finds, such as the coin of emperor Maximinus Thrax, minted between AD 235–238, and the coin of Emperor Gordian III, minted in AD 238–244, both reported by the gazetteer of archaeological sites in the Yambol District (Dimitrova – Popov 1978, 26).[2] Moreover, the gazetteer mentions a hoard of 29 silver *denarii* and *antoniniani* (Dimitrova – Popov 1978, 26; Bakardzhiev 2012, 365; RIM inv. no. 210; Varbanov 2014). The hoard contained 13 *denarii* minted in between AD 196–239 and 16 *antoniniani* minted in between AD 238–248, with 28 coins minted in Rome and one in Laodicea in Asia Minor. The hoard was possibly buried at the time of invasion of Goths to South-Eastern Thrace in AD 250–251 (Varbanov 2014, 257).

The trial excavations conducted by RIM in 2006 and 2007 recorded a silver *antoninianus* minted by Emperor Gallienus in AD 253–260 (Bakardzhiev 2007, 238; Bakardzhiev 2008, 472) which currently represents the youngest surviving coin found on the site.

In addition to the coins associated with the settlement of Yurta-Stroyno, a hoard of 195 silver coins was found in 1961 at the place called St. Iliya, located about 1.5 km south east of Yurta-Stroyno (*IGCH* 924) found in the vicinity of the newly excavated complex with a *tholos* temple-like structure, dated to 1st–3rd c. AD (Agre – Dichev – Hristov 2020). The *terminus ante quem* for the hoard was determined 81/80 BC (Schönert-Geiss 1987, 105–106; Paunov 2013, 727).[3] The discovery confirms the hinterland of Yurta-Stroyno was undeniably econom-

1 Unfortunately, the source does not provide any further details nor the total counts of coins.

2 Dimitrova and Popov (1978, 26) mention three coins in total, one of Maximinus, one of Gordian and one unidentified.

3 The hoard contained 126 tetradrachms of Thasos and its imitations, 62 tetradrachms of Maroneia, four tetradrachms of the New Style from Athens, two Macedonian tetradrachms of First Region and one tetradrachm of Aesillas, all coins are now deposited in RIM Yambol.

ically active already during the first decades of the 1st c. BC and associated with the monetary networks of the Eastern Mediterranean.

OVERVIEW OF INDIVIDUAL COINS FOUND WITHIN SAP DURING 2014–2016

The new coins found during the Yurta-Stroyno Archaeological Project represent a small corpus of nine bronze coins, eight of them found within the archaeological excavation in 2014–2016 and one during the surface survey of the site in 2016 (**nos. 1–9**; see **Tab. 1**, **Pl. 5/1**).

No.	SF #	SU	Trench / Polygon	Sect.	Mint	Depiction	Chronology	D. (mm)	Weight (g.)
1	SF14_157	SU_023	100E_105N	SE	×	Philip II	ca. 350–300 BC	15	ca. 5
2	SF14_200	SU_027	90E_105N	SE	Ephesus / Pergamon	Augustus	27–23 BC	30	ca. 10
3	SF14_016	SU_001	100E_100N	×	Philippi	(Augustus?) Trajan	(27 BC?) AD 98–117	19	ca. 5
4	SF15_069	SU_033	95E_105N	SE	×	Flavian dynasty	AD 81–96	18	3
5	SF16_185	FA09	105E_105N	NW	(Bizye? / Augusta Traiana?)	(Marcus Aurelius?)	(AD 161–180)	20	3
6	SF15_272	SU_057	100E_105N	SE	Anchialos	Ioulia Domna	AD 193–217	23	7
7	SF16_143	FA06	105E_105N	NW	Traianoupolis	Caracalla	AD 211–217	22	5
8	SF15_058	SU_036	100E_105N	N	Cyzicus	Diadumenian	May AD 217–June AD 218	22	5
9	F13_SE_12	Survey	F13	SE	Anchialos	Tranquillina	AD 241–244	18	2

Tab. 1: List of coins found at Yurta-Stroyno in 2014–2016; d. = diameter.

Five coins were found north of the house in an area that seems to serve as a courtyard, see **Map 1**. The area was covered by the so-called levelling layer, contemporary or later with the building phase of the house dated after AD 220's, which might have served as elevation and/or drainage of the courtyard. The layer is about 40 cm thick, located below ca. 50–60 cm of topsoil (see Tušlová – Weissová – Bakardzhiev 2022). Three of the coins were discovered relatively close together in the topsoil; they were dated to the 4th c. BC (**Pl. 5/1:1**), to the 1st c. BC (**Pl. 5/1:2**) and to the 1st c. AD (**Pl. 5/1:4**), suggesting the secondary deposition of the soil as chronologically younger coins were found in the lower levels.

Two other coins were found in the levelling layer of the square 105E_105N NW, located roughly from 50–60 to 90 cm below the surface. The coins were dated to the second half of the 2nd c. AD (**Pl. 5/1:5**) and to the first decades of the 3rd c. AD (**Pl. 5/1:7**).

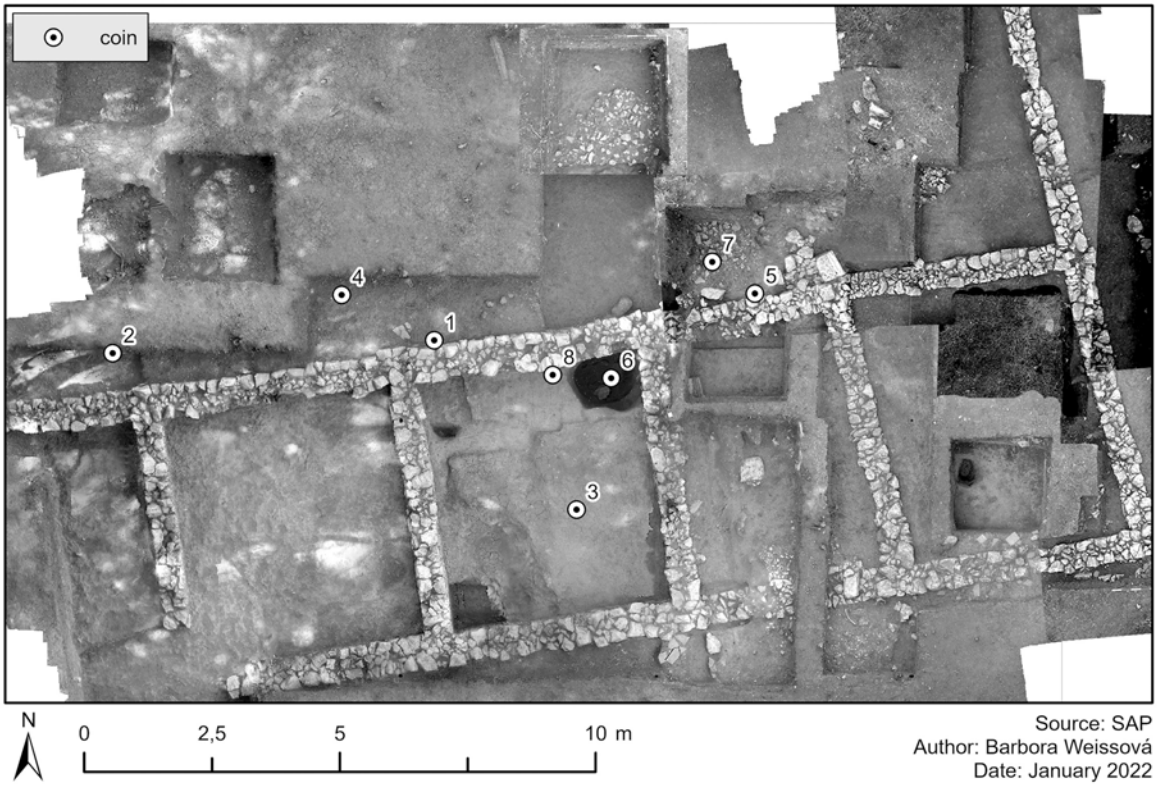
Two coins were found inside of the house, presumably in closed contexts, including the coin of Diadoumenian (**Pl. 5/1:8**), which was placed directly in the trench of the foundation wall [SU036], dating the building of the house to a period after AD 218. Coin of Ioulia Domna (**Pl. 5/1:6**), dated to AD 193–217, was found in a deep pit-like deposit [SU057] located in the north-eastern corner of Room C.

One more coin (**Pl. 5/1:3**) was found during the excavation, placed in a robber's soil [SU001] in the square 100E_100N S. It might be dated to the first decades of the 2nd c. AD, but its original context is lost.

The last coin found during SAP comes from a surface survey and represents the youngest coin found within the project dated to the mid-3rd c. AD. It is a coin of Empress Tranquilina, found in square F13 SE (**Pl. 5/1:9**). For an overview and details of the archaeological context of individual coins see **Tab. 1** and **Map 1**.

Although most coins are dated to the Roman period, the earliest numismatic find from the site is the Hellenistic coin of Philip II (**Pl. 5/1:1**). Due to its popularity, the coin was in circulation during the decades following Philip's death in 336 BC (Paunov 2015, 270; Hadzhieva 2018, 34). The coin does not provide a clear *terminus post quem* but it may suggest the existence of a Hellenistic settlement in the area of Yurta-Stroyno. The obverse depicts the head of Apollo with *tainia* facing right. The reverse depicts a naked horse rider facing right with the traces of the monogram AP or AV below the horse on the right side (Mionnet 734, 752). The typical text ΦΙΛΙΠΠΟΥ above the horse is not preserved but its presence can be reconstructed based on other well-documented parallels (*SNG Cop* 591; Sear 1978, 6696).

The second oldest coin belongs to Emperor Augustus (**Pl. 5/1:2**) and it was minted in Ephesus or Pergamon in 27–23 BC in order to pay soldiers in the service of the Roman army in Asia Minor. This particular coin type is in Thrace found quite rarely (*RPC* 2235; *RIC* 486; Cohen 34; Giard 964–971).[4] The coin may have been brought to Thrace by soldiers serving in the 1st c. BC



Map 1: Spatial distribution of coins found during the excavation of the house in 2014–2016.

4 The coin of Augustus *RPC* 2235 was known to exist only in a few examples in Bulgaria, some of them bearing countermarks intended for the local market. Six coins were found in Bourgas (Paunov 2013, 389; 610), four and half coins at Kabyle (Paunov 2013, 628–629), three in Vratsa (Paunov 2013, 621), one in Drama, one near Smolyan (Paunov 2013, 678), one in Serdica (Paunov 2013, 680), two

in Asia Minor, but because of its higher value, it may have been circulating even in the 1st c. AD (Paunov 2013, 385, 394). The obverse depicts the bare-headed Emperor Augustus facing right with the Latin legend CAESAR. The reverse reads AVGVSTVS located in the middle of an elaborate oak wreath.

The coin (**Pl. 5/1:3**) was originally attributed to Emperor Augustus but based on the recently found hoards in Serdica and in Macedonia, the current consensus places the date of the issue to the reign of Emperor Trajan, AD 98–117 (Paunov 2013, 436–439). This particular coin was minted as a civic issue in Macedonian Philippi and it was circulating predominantly in the Strymon River region in South-Western Thrace and in western Moesia (Paunov 2013, 439). On the basis of visual references on the coin, the issue was previously dated to the reign of Augustus as celebrating the victory at Philippi in 42 BC (*RPC* I 1651; *SNG ANS* 674; SGI 32). Its obverse image depicts the winged victory facing left, holding a wreath in her outstretched right hand and a palm branch in her left hand, accompanied by the Latin legend VIC-AVG on sides. The reverse image portrays three standing military standards (*vexilla*), originally interpreted as a reference to the military victory at Philippi in 42 BC. The legend on the reverse should, according to known parallels, read COHOR – PRAE – PHIL but in our case it is illegible. According to the new interpretation, the coin was minted to mark the 250th anniversary of the establishment of the colony Philippi, rather than the battle of 42 BC (Paunov 2013, 436–439).

The two following coins are moderate to seriously worn out and were identified with varying precision. Based on the iconographic parallels, the coin (**Pl. 5/1:4**) is identified as Flavian (AD 81–96), possibly minted by Emperor Domitian (parallels: *RIC* 924, *RIC* 288, *RIC* 487, *RIC* 755, *RIC* 756.2, *RIC* 837). The obverse depicts a male head facing right, most likely the Emperor himself. The reverse shows a standing female figure with long garments holding a *cornucopiae* in her hand, most likely representing the goddess Spes, Fortuna or Pax. However, the mint remains unknown.

The second of the worn-out coins (**Pl. 5/1:5**) was found ca. 80 cm below the surface in the levelling layer in the northern area of the house. Based on the regional parallels, it was most likely minted by Emperor Marcus Aurelius (AD 161–180) either at Bizye, Augusta Traiana or another regional mint during the second half of the 2nd c. AD. The obverse represents a bust of a bearded male Emperor with curly hair facing right with traces of the letter A on the left side (parallels: Jurukova 1981, 17–23 [Bizye]; Schonert-Geiss 1991, 37 290/2 [Aug. Tr., R 251, Caracalla]). The reverse image represents a standing goddess, Athena, holding a spear entwined with a snake in the left hand and possibly a globular shield and hanging garment in the right hand.[5] The image is encompassed by the Greek legend with only the last three letters –NΩN legible. Similar motives were found on coins from Deultum, showing Athena holding a spear and globular shield (*CNT* 7694 Caracalla; *CNT* 7904 Gordian III) or in Augusta

in Philippopolis (Paunov 2013, 661–662) and now one in Yurta-Stroyno. Evgeni Paunov (2013, 392) documented additional six coins found in 1994 at the excavation at Aquae Calidae near Bourgas dedicated as votive gifts in the sanctuary to the Three Nymphs. One more coin was recorded as part of the museum inventory in Anchialos, but remains unpublished (Paunov 2013, 408).

5 The iconographical representation of a deity holding a club entwined with a snake is usually associated with Asclepius. The image of Asclepius can be found on Roman Imperial coins from Pergamon in Mysia (*CNT* Type 4878), Ainos in Thrace (*CNT* Type 5057), Augusta Traiana in Thrace (*CNT* Type 1717) and Philippopolis in Thrace (*CNT* Type 10902). Due to the bad preservation of the coin, we are unable to say with 100% certainty whether the image represents Athena or Asclepius. However, the presence of a globular shield, helmet, and an entwined spear with a snake, together with the iconographic comparanda from Deultum and Mysia, favours the interpretation of Athena.

Traiana (*CNT* Type 1885 Caracalla). However, the coins from Deultum were minted only with the Latin legend and minting was discontinued between the reign of Emperors Trajan (AD 98–117), and Caracalla (AD 198–217) (Jurukova 1973, 28).

The coin of Ioulia Domna (**Pl. 5/1:6**) minted in Anchialos in AD 193–217 was found in the pit-like deposit [SU057] in the corner of Room C, enclosed by the two foundation walls. The coin of Ioulia Domna is well preserved, depicting the bust of the Empress facing right on the obverse along with the Greek legend ΙΟΥΛΙΑ ΔΟΜΝΑ. The reverse depicts enthroned goddess Ceres facing left, holding a sceptre and corn-ears (parallels: *RIC* 546; *RSC* 14; *BMC* 10; different reverse *CNT* 5125; Moushmov 2840, 2841). The Greek legend ΑΓΧΙΑΛΕΩΝ points to the city of Anchialos, located near Bourgas Bay on the Black Sea coast, where the coin was also minted.

From another local mint in Traianoupolis comes the coin of Caracalla minted between AD 211–217 (**Pl. 5/1:7**). The coin was found at the upper part of the levelling layer ca. 50–60 cm below the surface, in the area north from Room D, ca. 30 cm above the younger coin of M. Aurelius (**Pl. 5/1:5**). The obverse of the Caracalla's coin depicts a radiate bust of the Emperor facing right with the partially preserved Greek legend AYT K M AYP ΣE ANTΩN[EINOΣ]. There is a noticeable dent in the middle of the coin, likely the result of the process of shaving the excess material after the coin was struck (Strong – Brown 1976, 67). The reverse image represents the Three Nymphs/Three Graces standing naked side by side and holding their shoulders. This particular iconographic image has a special place also in the local epigraphy (parallels: *CNT* 3797 reverse; Schönert-Geiss 1991 [Traianopolis] 50/2, 70, 81; Varbanov 2857).[6]

From the point of the excavators, the most important numismatic find from the site represents the coin of Emperor Diadoumenian (**Pl. 5/1:8**), found directly in the foundation trench [SU036] of the northern wall of the house near the pit-like deposit [SU057] with a coin of Ioulia Domna (**Pl. 5/1:6**). The coin was minted during the short reign of the young Emperor Diadoumenian, between May AD 217 when Diadoumenian was named Caesar by his father Emperor Macrinus, and June AD 218 when Diadoumenian was killed. The coin was unlikely to have circulated for a long time as the coinage of both Emperors was succeeded by the new issues of Elagabalus. According to C.L. Clay (1979, 33 note 57), some of the existing coins could have been even melted in the imperial mint in Rome and reused for new issues. Therefore, the closed context of the find clearly defines the *terminus post quem* for the building phase of the house to June AD 218 or later. The obverse of the coin portrays the bust of the young Emperor himself facing right, encompassed by the Greek legend M OΠEΛI ΔIAΔOVMENIANOC K, letter K referring to Diadoumenian's official titulature Caesar. The reverse depicts a calf walking to the right with the legend KVZIKHNΩN NE|ΩKOR, stating the coin was minted in Cyzicus in Mysia on the Propontic coast (parallels: *BMC Mysia* 261; Sear 1982, 2294; *SNG ANS* 1944.100.42854; *SNG Tübingen* 2283; Mionnet 2224). The title Neokoroi signified the existence of a provincial temple to the cult of the Roman emperor in Cyzicus, as was quite common in many Greek cities in Asia Minor during the Roman Imperial Period (Burrell 2004, 1).

The latest coin found during the SAP comes from the north-western part of the surface survey area and was issued on behalf of Empress Tranquillina (**Pl. 5/1:9**) in the nearby city of Anchialos on the Black Sea coast in AD 241–244. The obverse depicts a draped female bust, wearing a diadem, facing right, encompassed by the Greek legend [ΣAB TP]ANKYΛΛIN[A AYΓ].

6 One of the well-known sanctuaries of the Three Nymphs using the same iconographic motive was located during the Roman times in not-so-distant Anchialos / Aquae Calidae (Mihailov 1970, 335–337; Larson 2001, 174–175; Janouchova 2013, 11).

The reverse image represents goddess Homonoia holding a *patera* in the left hand and a corn--ear in the right hand, accompanied by the Greek legend ΑΓΧΙ[Α]ΛΕΩΝ (parallels: *CNT* 5892 obverse; Varbanov 793).

DISCUSSION: THE NUMISMATIC CHRONOLOGY OF THE SETTLEMENT

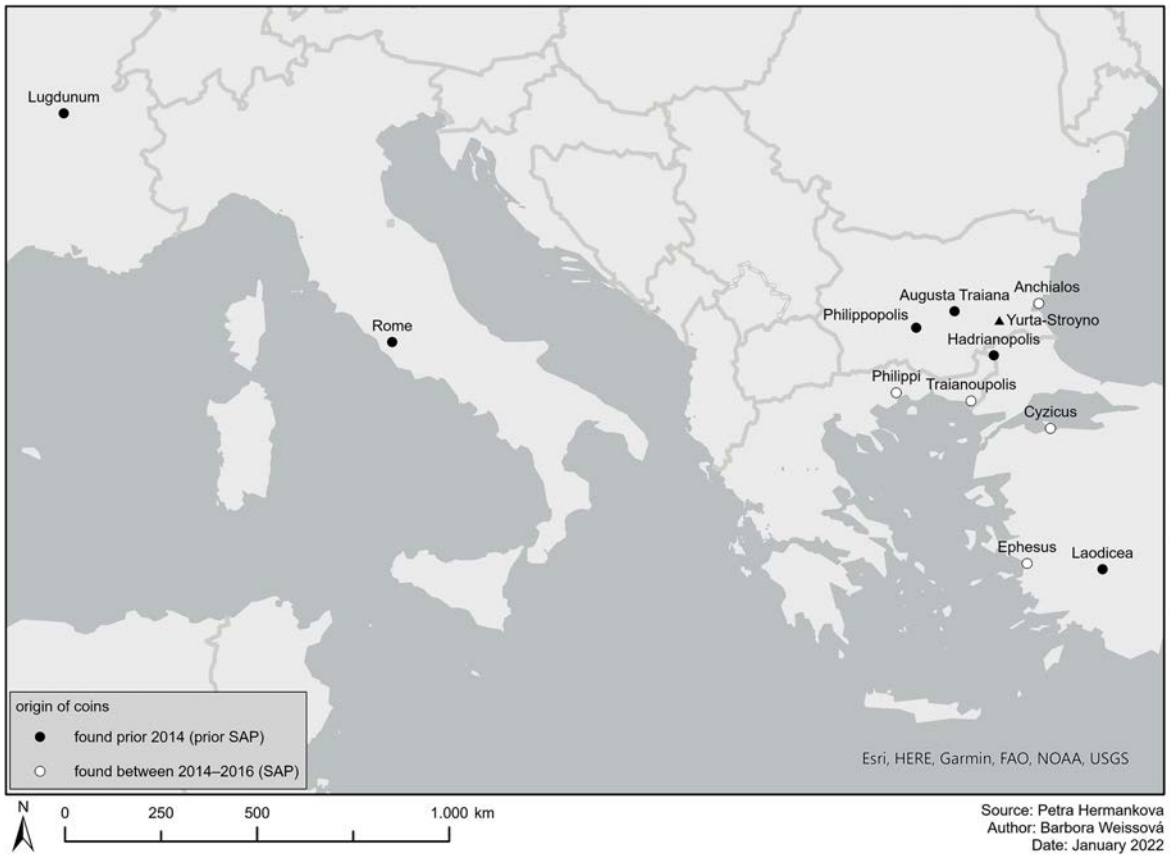
The coins associated with the settlement of Yurta-Stroyno represent a small but diverse group of Roman imperial coinage. Both the coins discovered in the past, prior to any systematic excavation and the most recent finds of SAP, suggest the period of the numismatic activity of the site as the Roman Imperial period up to the mid-3rd c. AD. All coins are predominantly regionally minted with only a few exemplars coming from the Western Roman Empire. The regional mints are represented by nearby cities such as Anchialos, Traianoupolis, Augusta Traiana, Hadrianopolis and Philippopolis. As an example of existing monetary links in the region may serve the coins from Anchialos minted between AD 193–244 (**Pl. 5/1:6**, **Pl. 5/1:9**). Contrary to expectations, the coins minted or countermarked in the nearby military camps at Deultum or Kabyle are missing so far, although we may assumed some sort of economic exchange. Two coins minted in the western part of the Roman Empire come from the imperial mints in Lugdunum in Gallia and from Rome. The coins may have travelled east with soldiers or merchants to be ultimately deposited or lost at Yurta-Stroyno. Nevertheless, the low number of coins from the western part of the Roman Empire and the prevalence of the regional coins suggests their local circulation and participation in daily economic exchange, see **Map 2**. The black dots represent the mints of new coins uncovered during SAP, and the white dots represent the mints of coins found prior to SAP.

If we compare the coins found in the past and the ones discovered within SAP, the main difference is the material the coins were made of. The coins mentioned in the literature prior to SAP were mostly made of silver or were large bronze denominations and their value was therefore substantially higher than the ones found by SAP, which are made uniquely of bronze.[7] If we discount the silver hoard from St. Iliya dated to the 1st c. BC, the chronology of both groups is relatively similar – the first two centuries AD are represented only by one or two coins respectively (**Fig. 1**), however, the 3rd c. AD yields the most coins for both groups. Any further comparison is at this point difficult due to the incompleteness of the published data.

The earliest coin found directly on the site is dated to the 4th c. BC and it represents the only example of the pre-Roman coinage at Yurta-Stroyno (**Pl. 5/1:1**). However, the coin was not found in a closed context, and it may only hint at an existing Hellenistic installation located somewhere in the vicinity of Yurta-Stroyno.

The two known hoards are dated to the first quarter of the 1st c. BC and the half of the 3rd c. AD, suggesting a period of turmoil and imminent danger in the area (Milne 1939, 109–110). The coins made of more valuable material, such as silver or gold, were usually treasured as they represented a substantial economic value. They were likely hidden in the form of a hoard by

7 The underlying reason for such differentiation might be a result of varying methods of discovery – bronze coins are in general smaller, and, therefore, harder to find during the pedestrian surface survey, but likely to be found during archaeological excavation. Moreover, because of their lower monetary value, the bronze coins are less attractive to looters and likely to stay in place. Almost all the silver coins were found in 1960's when the site was closer to its original condition and the likelihood of a chance numismatic find was higher than in 2014, namely because of the intensification of looting activities in the last few decades.



Map 2: Map with marked original minting places of coins associated with the settlement at Yurta-Stroyno.

the owner to protect his or her fortune in the time of danger or as future savings. The existence of the hoard may thus indicate a period of instability at the beginning of the 1st c. BC and after the mid-3rd c. AD, either in the form of military conflict or raids of unknown invaders. When consulting historical sources, they mention the Roman military campaign of Proconsul M. Terentius Varro Lucullus in 72/71 BC that resulted in the non-permanent establishment of a Roman military outpost in nearby Kabyle (Eutropius *Breviarium* 6.10; Paunov 2013, 383; Lozanov 2015, 77). The presence of the Roman army in the region may have involved armed conflicts or simply brought the sense of threatening danger to the owner of the 195 silver coins found nearby St. Iliya (*IGCH* 924) that lead to their deposition. The other hoard of 29 silver coins found at Yurta-Stroyno was likely hidden shortly after the mid-3rd c. AD, a period that coincides with the time of invasions of Goths and Vandals that destabilized the entire region and led to a destruction of settlement complex in St. Iliya (Agre – Dichev – Hristov 2020). As further evidence for the instability of the region, the local mints limited or entirely stopped their activities and the minting moved to the cities in the east shortly after the attacks (Jurukova 1973, 19–22; Varbanov 2014, 257; Lozanov 2015, 87–88).

The evidence for ceasing numismatic activity is visible also at Yurta-Stroyno. The latest recorded coin associated with the site is the *antoninianus* of Emperor Gallienus minted between AD 253–260 (Bakardzhiev 2007, 238; Bakardzhiev 2008, 472). No coins dated to the end of the 3rd c. AD or to the 4th c. AD were recorded at the site, which may be a result of the extensive looting activities and may not correspond with the original historical development

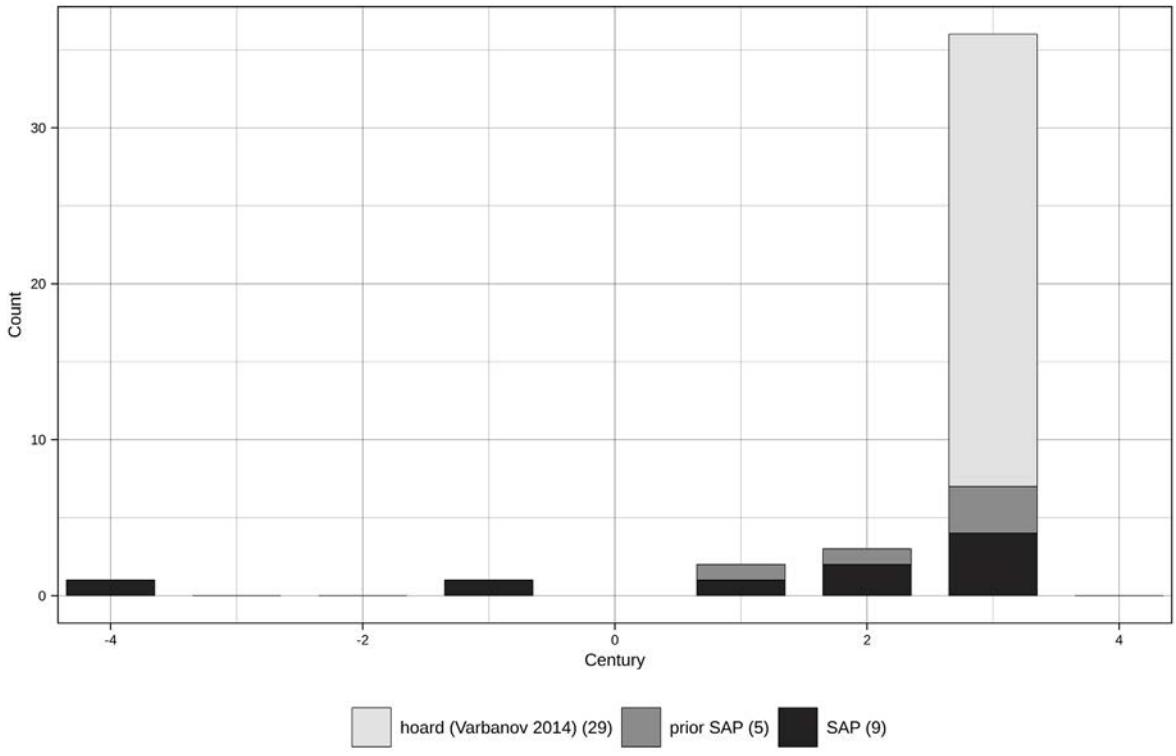


Fig. 1: Chart depicting chronological distribution of coins found at Yurta-Stroyno; n=43.

of the settlement. Nevertheless, the decreased number of coins in the second half of the 3rd century AD also correlates with the period of instability, invasions of Goths and Vandals and limited minting activities of local mints mentioned above (Jurukova 1973, 19; Lozanov 2015, 87–88). If we look at the contemporary situation in the region, coins from the eastern part of the Roman world were however still minted and circulated at some sites in the nearby region. For example, several 4th and 5th c. AD coins from Heraclea, Constantinopolis or Nicomedea were discovered in Kabyle (Dimitrov 1982, 161–164), but none at Yurta-Stroyno. Thus, the absence of coinage at the site after AD 260 may suggest the end of its economic activities.

CONCLUSION

The nine new coins recorded during the archaeological excavation and surface survey conducted by the Yurta-Stroyno Archaeological Project in 2014–2016 represent accidental losses, typically dropped one by one or misplaced by their owners in antiquity. The economic value of such coins tends to be relatively low and corresponds with the used material – bronze. Therefore, these coins were associated with the daily trade and indicated a period of economic activity of the settlement during the Roman Imperial Period. An exception to the local circulation represents the coin of Emperor Augustus (**Pl. 5/1:2**) that most likely circulated longer and on a larger area as it was used to pay the soldiers for their service in Asia Minor at the last quarter of the 1st c. BC and its economic value was presumably higher than the other bronze coins.

Considering all the coins associated with the site, the economic activities of the first two centuries AD are represented by individual coins only, whereas there is an increase in the numbers of coins present at the site during the 3rd c. AD, featuring individual coins as well as one coin hoard. The growth of the number of coins in later centuries may be accidental due to the nature of their discovery, but it likely also corresponds with the change in the minting activities in the area. The coins from the 1st c. BC and the 1st c. AD were minted outside Thrace, either in the cities of the Northern Aegean or in Asia Minor and were brought to Thrace either by soldiers or merchants. The coins from the 2nd and the 3rd c. AD were mostly minted in the local provincial mints in Thrace, corresponding with the development of the political organisation, the existence of provincial administration and the establishment of provincial minting in Thrace.

The most important numismatic find, in terms of the chronology and our understanding of the settlement development, represents the coin of Emperor Diadoumenian (**Pl. 5/1:8**) that dates the building phase of the house to AD 218 or after. The coin was minted in Cyzicus between May AD 217 and June AD 218 and did not stay in circulation for long. Therefore, we may assume the deposition of the coin into the wall foundation trench in the years following Diadoumenian's death in late June AD 218.

The discontinuation of provincial minting after AD 250 may have resulted in the decreased circulation of coins and subsequently their absence from the site, as well as it may reflect the end of economic activity at the site after the second half of the third century AD in reaction to the increased societal pressure.

ABBREVIATIONS

AOR = Археологически открития и разкопки

BMC = Wroth, W. 1892: *Mysia. Catalogue of Greek Coins in the British Museum* 14. Oxford.

CNT = Corpus Nummorum Thracorum, Berlin-Brandenburgische Akademie der Wissenschaften, available at https://www.corpus-nummorum.eu/, (visited 21/10/2021).

Cohen = Cohen, H. 1880: *Description historique des monnaies frappées sous l'Empire Romain* I. Paris – Londres.

Giard = Giard, J.-B. 2001: *Monnaies de l'Empire Romain, I Auguste*. Paris.

IGCH = Thompson, M. – Noe, S.P. – Kraay, C.M. – Mørkholm, O. 1973: *An Inventory of Greek Coin Hoards*. New York.

Mionnet = Mionnet, T.E. 1806: *Description de médailles antiques, grecques et romaines; avec leur degré de rareté et leur estimation; ouvrage servant de catalogue à une suite de plus de vingt mille empreintes en soufre, prise sur les pièces originales*. Paris.

Moushmov = Мушмов, Н. 1912: *Античните монети на Балканския полуостров и монетите на българските царе*. София.

RIC = Mattingly, H. – Sydenham, E.A. – Sutherland, C.H.V. – Carson, R.A.G. 1926: *The Roman Imperial Coinage*. London.

RPC = Burnett, A.M. – Amandry, M. – Pau Ripollès, P. – Carradice, I. 1992: *Roman Provincial Coinage* 1:1. London – Paris.

RSC = Seaby, H.A. – Sear, D.R. 1952: *Roman Silver Coins*. London.

SH = Studia Hercynia

SNG ANS = Waggoner, N. 1987: *Sylloge Nummorum Graecorum: The Collection of the American Numismatic Society, Pt. 7. Macedonia I: Cities, Thrace-Macedonian Tribes, Paeonian Kings*. New York.

SNG Cop = Kromann, A. – Mørkholm, O. 1982: *Sylloge Nummorum Graecorum. The Royal Collection of Coins and Medals, Danish National Museum 2: Thrace*. Copenhagen.

SNG Tübingen = Mannsperger, D. 1989: *Sylloge Nummorum Graecorum. Deutschland. Münzsammlung der Universität Tübingen 4: Mysien-Ionien*. Munich.

Varbanov = Varbanov, I. 2007: *Greek Imperial Coins 3: Thrace (from Perinthus to Trajanopolis), Chersonesos Thraciae, Insula Thraciae, Macedonia*. Bourgas.

BIBLIOGRAPHY

Eutropius *Breviarium* = Flavius Eutropius: *Breviarium ab urbe condita cum versionibus Graecis et Pauli Landolfique additamentis*. Monumenta Germaniae Historica. Auctorum antiquissimorum 2. Transl. H. Droysen. Berlin 1961.

Agre – Dichev – Hristov 2020 = Агре, Д. – Дичев, Д. – Христов, Х. 2020: Трако-римски селищен обект в м. св. Илия в землището на с. Стройно, общ. Елхово. AOR през 2020 г., 875–880.

Bakardzhiev 2007 = Бакърджиев, С. 2007: Сондажни археологически проучвания в Юрта край село Стройно, община Елхово. *AOR през 2006 г.*, 238–241.

Bakardzhiev 2008 = Бакърджиев, С. 2008: Сондажни археологически проучвания в Юрта край село Стройно, община Елхово. *AOR през 2007 г.*, 471–473.

Bakardzhiev, S. 2012: Stroyno. In: R. Ivanov (ed.): *Tabula Imperii Romani K35/2: Philippopolis*. Sofia, 364–365.

Burrell, B. 2004: *Neokoroi: Greek Cities and Roman Emperors*. Leiden-Boston.

Clay, C.L. 1979: The Roman Coinage of Macrinus and Diadumenian. *Numismatische Zeitschrift* 93, 21–40.

Dimitrova – Popov 1978 = Димитрова, Д. – Попов, Ж. 1978: *Археологически паметници в Ямболски окръг*. София.

Dimitrov 1982 = Димитров, К. 1982: Антични и ранновизантийски монети от Кабиле, базилика no 1. In: Т. Иванов (ed.): *Кабиле* 1. София, 158–165.

Hadzhieva 2018 = Хаджиева, Н. 2018: Бронзови монети на Филип II (359–336 г. пр. хр.) и Александър III (336–323 г. пр. хр.) от колекцията на РИМ – Благоевград. *Известия на исторически музей Кюстендил* 19, 33–42.

Janouchová, P. 2013: Thrácké Nymfy a řecké nápisy: možné využití GIS v epigrafice. *Auriga* 55:2, 5–26.

Jurukova, J. 1981: *Die Münzprägung von Bizye*. Berlin.

Jurukova, J. 1973: *Die Münzprägung von Deultum*. Berlin.

Jurukova 1987 = Юрукова, Й. 1987: *Монетосеченето на градовете в Долна Мизия и Тракия II-III в. Хадрианопол*. София.

Larson, J. 2001: *Greek Nymphs: Myth, Cult, Lore*. New York.

Lozanov, I. 2015: Roman Thrace. In: J. Valeva – E. Nankov – D. Graninger (eds.): *A Companion to Ancient Thrace*. Malden – Oxford – Chichester, 75–90.

Mihailov, G. 1970: *Inscriptiones graecae in Bulgaria repertae I,2: Inscriptiones orae Ponti Euxini*. Sofia.

Milne, J.G. 1939: *Greek and Roman Coins and the Study of History*. London.

Paunov, E.I. 2013: *From Koine to Romanitas: The Numismatic Evidence for Roman Expansion and Settlement in Bulgaria in Antiquity (Moesia and Thrace, ca. 146 BC–AD 98/117)*. Cardiff University, unpublished PhD thesis.

Paunov, E.I. 2015: Introduction to the Numismatics of Thrace, ca. 530 BCE–46 CE. In: J. Valeva – E. Nankov – D. Graninger (eds.): *A Companion to Ancient Thrace*. Malden – Oxford – Chichester, 265–292.

Schönert-Geiss, E. 1987: *Die Münzprägung von Maroneia*. Berlin.

Schönert-Geiss, E. 1991: *Die Münzprägung von Augusta Traiana und Traianopolis*. Berlin.

Sear, D.R. 1978: *Greek Coins and Their Values 1: Europe*. London.

Sear, D.R. 1982: *Greek Imperial Coins and Their Values: The Local Coinages of the Roman Empire*. London – Beverly Hills.

Strong, D. – Brown, D. 1976: *Roman Crafts*. New York.

Tušlová, P. – Weissová, B. – Bakardzhiev, S. 2022: The Final Excavation Report. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 24–52.

Varbanov 2014 = Върбанов, В. 2014: Находки от римски монети (III. век) от фонда на Регионален исторически музей – Ямбол. *Проблеми и изследвания на тракийската култура* 7, 254–284.

Petra Heřmánková
Aarhus University
Department of History and Classical Studies
Jens Chr. Skous Vej 5, 8000 Aarhus C, Denmark
petra.hermankova@cas.au.dk

The Terracotta Lamps

Robert Frecer

ABSTRACT

A total of 130 terracotta lamps, all but one in fragmentary state, were found during the three-year project at the Roman settlement of Yurta-Stroyno. The processed fragments were retrieved from the area of the excavated house, from the so-called levelling layer, as well as from the surface survey. Most lamps came from the levelling layer north of the house, while several belong to stratified contexts within the house – primarily from fills of the ditches in Room B [SU021] and Room C [SU008]. Only 31 of all fragments, however, are diagnostic enough to be assigned to a specific type.

Five lamps of Broneer type XXVII are the most striking. Two of these, including an excellent bust of Athena in armour, may have been imports from a Greek workshop of the late 3rd – early 4th century AD, while three lamps likely stem from workshops operating near Pavlikeni in northern Bulgaria. Nine rib-shouldered lamps of Iconomu type XXX/Broneer XXIX were scattered across several contexts. Three unique local Thracian imitations of Loeschcke type IV/V volute lamps come from a single stratified context [SU021] dug in Room B. Eight variations on Loeschcke type VIII *koiné* lamps were found, including the only whole lamp from the corpus and another with an incised swastika on its base. Three battered fragments may have been Firmalampen. Finally, a mould-made terracotta piece found unstratified may have been a production waster or part of a lampstand.

The lamps from Yurta-Stroyno can be roughly dated to a period stretching from the 3rd to early 4th century AD, yielding a mixture of local ware, Thracian production, and two clear imports perhaps from Athens which attest to the trade connections of the settlement with the Aegean area.

KEYWORDS

Bulgaria; Thrace; Roman period; terracotta lamps; rural settlement; Broneer type XXVII.

LAMPS FROM THE EXCAVATION

Eighty-four lamps or lamp fragments thereof were recovered during the excavation seasons 2014–2016 of the site Yurta-Stroyno proper, of these, 30 may be identified with varying confidence (**Tab. 1:1–28**, **36–37**). Overall, 13 of them had partially intact *disci*, 33 shoulders, 15 handles, 21 nozzles and 15 bases. These numbers may overlap, as lamp fragments include various parts. Fifteen fragments were considered entirely non-diagnostic as they could only be identified as lamps based on firing, clay structure and the presence of mould-made markings. A single lamp (**Pl. 6/2:20**) was discovered complete.

SPATIAL AND STRATIGRAPHIC DISTRIBUTION

Twenty-seven fragments may be said to have been found inside the house. Of these, 16 were from the treasure hunters RT soil [SU001], and 11 come from stratigraphic units. Rooms B and C had significant clusters of 12 lamps each, while Rooms D and E contained only a pair each, respectively. Of note are three fragments from the context [SU008], a fill of a trench dug in the southwest corner of Room C. One of these is a variation of Loeschcke type VIII/

Broneer type XXIX (**Pl. 6/2:21**), another with an angular nozzle in the style of Loeschcke I (**Pl. 6/3:27**).

Four fragments came from [SU021] a trench dug near the east wall of Room B. These include three Loeschcke IV/V imitations (**Pl. 6/1:6–8**) and one Broneer type XXVII, Group B or Vine-and-Ray lamp (**Pl. 6/1:1**). Another Broneer type XXVII, Group C or Ovule-and-Panel lamp was found incorporated into a floor level ([SU063]) in the southeast corner of Room D (**Pl. 6/1:5**).

In contrast, 57 fragments were found outside the house – mostly north of the structure – as this area was more intensely excavated and not disturbed by treasure hunters. Thirteen fragments may again be discounted as coming from the unstratified RT soil [SU001] (see **Tab. 1**). An important stratified cluster was recovered from the levelling layer. This cluster consists of 42 lamps, of which eleven can be identified: nine fragments of Iconomu type XXX/Broneer type XXIX (**Pl. 6/1:9–10**, **Pl. 6/2:11–17**); Broneer type XXVII, Group C lamp (**Pl. 6/1:3**) and one more Broneer type XXVII, Group C or Ovule-and-Panel lamp (**Pl. 6/1:4**) dated to AD 300–325.

The tying presence of identical lamp types across the area north of the house, found in different trenches and layers, confirms this was originally one layer created by homogenous material spread in short time. This conclusion is also supported by the character of other material retrieved from the levelling layer (for the pottery see Tušlová 2022; for the glass Čisťakova – Zlámalová Cílová 2022; for the bones Nývltová Fišáková 2022).

No.	SF #	SU	Trench / Polygon	Sect.	SU specification	Lamp classification / Type	Chronology (AD)	
							Lower range	Upper range
1	SF14_130	SU021	95E_100N	SE	fill of a ditch	Broneer XXVII, Group B (Vine-and-Ray)	275	325
2	SF14_011	SU001	100E_100N	×	RT soil	Broneer XXVII, Group C (Ovule-and-Panel)	200	350
3	SF14_073	SU010	90E_105N	NE	levelling layer	Broneer XXVII, Group C (Ovule-and-Panel)	200	350
4	SF15_114	SU047	100E_105N	NE	levelling layer	Broneer XXVII, Group C (Ovule-and-Panel)	300	325
5	SF15_324	SU063	105E_100N	NE	floor level	Broneer XXVII, Group C (Ovule-and-Panel)	200	350
6	SF14_131	SU021	95E_100N	SE	fill of a ditch	Loeschcke IV/V imitation	100	×
7	SF14_132	SU021	95E_100N	SE	fill of a ditch	Loeschcke IV/V imitation	100	×
8	SF14_140	SU021	95E_100N	SE	fill of a ditch	Loeschcke IV/V imitation	100	×
9	SF14_072	SU010	90E_105N	NE	levelling layer	Iconomu type XXX / Broneer type XXIX	200	600
10	SF14_084	SU016	95E_105N	NW	levelling layer	Iconomu type XXX / Broneer type XXIX	200	600
11	SF14_107	SU016	95E_105N	NW	levelling layer	Iconomu type XXX / Broneer type XXIX	200	600
12	SF14_210	SU033	100E_105N	SE	levelling layer	Iconomu type XXX / Broneer type XXIX	200	600
13	SF15_145	SU052	100E_105N	NE	levelling layer	Iconomu type XXX / Broneer type XXIX	200	600
14	SF15_168	SU052	100E_105N	NE	levelling layer	Iconomu type XXX / Broneer type XXIX	200	600

No.	SF #	SU	Trench / Polygon	Sect.	SU specification	Lamp classification / Type	Chronology (AD)	
							Lower range	Upper range
15	SF15_219	SU001	95E_100N	×	RT soil	Iconomu type XXX / Broneer type XXIX	200	600
16	SF16_130	SU078	100E_110N	SE	levelling layer	Iconomu type XXX / Broneer type XXIX	200	600
17	SF16_211	SU084	100E_110N	SE	levelling layer	Iconomu type XXX / Broneer type XXIX	200	600
18	SF14_007	SU001	100E_100N	×	RT soil	Loeschcke VIII	100	×
19	SF14_009	SU001	100E_100N	×	RT soil	Loeschcke VIII	100	×
20	SF14_090	SU021	95E_100N	SE	fill of a ditch	Loeschcke VIII	100	×
21	SF14_207	SU008	100E_100N	SW	fill of a ditch	Loeschcke VIII	100	×
22	SF14_224	SU001	125E_100N	×	RT	Loeschcke VIII	100	×
23	SF15_008	SU015	95E_105N	NE	topsoil	Loeschcke VIII	100	×
24	SF15_024	SU001	90E_110N	SE	RT soil	Loeschcke VIII	100	×
25	SF16_100	SU078	100E_110N	SE/SW	levelling layer	Loeschcke VIII	100	×
26	SF15_183	SU001	95E_100N	×	RT soil	potential Bildlampen (Loeschcke types I–IV)	100	?
27	SF14_180	SU001	90E_100N	NE	RT soil	potential Bildlampen (Loeschcke types I–IV)	100	×
28	SF14_181	SU008	100E_100N	SW	fill of a ditch	potential Bildlampen (Loeschcke types I–IV)	100	×
29	SF14_031	SU001	100E_100N	×	RT soil	unidentified	×	×
30	SF14_082	SU010	90E_105N	NE	levelling layer	lampstand?	×	×
31	SF16_D13_NW_39	×	D13	NW	survey	potential Bildlampen (Loeschcke type I–V?)	100	×
32	SF16_H13_SW_02	×	H13	SW	survey	potential Bildlampen (Loeschcke type I–V?)	100	×
33	SF16_F13_SE_07	×	F13	SE	survey	unidentified	×	×
34	SF16_H14_NE_01	×	H14	NE	survey	unidentified	×	×
35	SF16_J13_SE_02	×	J13	SW	survey	unidentified	×	×
36	SF14_010	SU001	100E_100N	×	RT soil	Firmalampen?	100	×
37	SF14_035	SU001	100E_100N	×	RT soil	Firmalampen?	100	×

Tab. 1: Overview of the presented terracotta lamps with indicated chronological lifespan of their production if possible.

BRONEER TYPE XXVII

Five lamps of Broneer type XXVII dated from the 3rd to early 4th century AD described below are the most striking lamps from Yurta-Stroyno (**Pl. 6/1:1–5**; **Tab. 1:1–5**). They belong to Broneer type XXVII (in Oscar Broneer's typology) and appeared as a distinct unslipped type in Corinth in the early decades of the 2nd century AD (Broneer 1930, 85, 96; Broneer 1977, 64), inspired by the *koiné* lamps of the Roman Mediterranean known as Loeschcke type VIII (Perlzweig 1961, 7) via the production centres of Africa Proconsularis (Deneauve 1969, pl. LXXX–LXXXI, cat. no. 878–898; known as Deneauve type VII-C).

Broneer type XXVII, Group B

Broneer type XXVII is divided into three sub-groups based on the dominant decorative element. Group B of this type is known as 'Vine-and-Ray' by the typical alternating shoulder motif. Not long after the start of Corinthian production, Athens began manufacturing its own lamps in this style, and their output soon came to surpass Corinth in both quantity and quality (Perlzweig 1961, 57, 94, cat. no. 271–274, signed *Sposianou* and *Kallistou*). The Athenian production, with finer relief and probably influenced by metalwork (Perlzweig 1961, 18), was once thought to have been ended by the Herulean invasion in AD 267 but is now known to have continued until about AD 350 (Bailey 1988, 406–408) while Corinthian production persisted until at least the mid-5th century AD (Garnett 1975, 190, cat. nos. 5–6).

Our only lamp of this subtype (**Pl. 6/1:1**) has grape bunches and vine leaves in circles connected with spirals in the typical Athenian 'blurred relief' style. Its best analogies are four lamps from the Athenian Agora (Perlzweig 1961, 145, cat. no. 1470–1473), two of them signed Κλάρο|υ and Πρείμο|υ, respectively, and dated to around AD 300 by Judith Perlzweig. These are the only known analogies to our lamp, with corresponding shoulder forms and the vine/grape motifs in a sinusoid spiral; a similar lamp from the RGZM in Mainz has neither provenience nor provenance, and it is simply dated to 'Late Antiquity' (Menzel 1954, cat. no. 540, Abb. 47:5). Based on what we know of Athenian lamp shoulder decoration (Perlzweig 1961, cat. nos. 646, 707, 714, 726, 750, 757, 777, 784, 805, 908, 924, 1017, 1022), we can confidently attribute this lamp to the late 3rd century or early 4th century AD Athenian workshop producing in a Corinthianizing style.

Broneer type XXVII, Group C

Group C is dated much the same as Group B, having been produced in the 3rd and early 4th century AD. The lamps have symmetrical lugs, fixed up like locks, on each side of a central decoration panel. Their shoulders bear a characteristic 'Ovule-and-Panel' decoration and these lamps were called "the perfection of lampmaking in Greece during Roman Imperial times" (Broneer 1977, 66) due to their high level of craftsmanship. With Athens being the primary production centre, these are no longer simply Corinthianizing but original Athenian products.

Four lamps from Yurta-Stroyno can be matched to this type (**Pl. 6/1:2–5**). The first three are minor shoulder and discus fragments showing the flowing characteristic, Ovule-and-Panel motif. The latter of the four deserves a lengthier discussion due to its stunning discus motif.

This exceptional discus fragment with a bust of Athena in full armour was found in the levelling layer north from the house in trench 100E_105N (**Pl. 6/1:4**). Its light yellowish-brown clay (10YR 6/4) without any slip makes it stand out from all other lamps found at Yurta-Stroyno.

A series of identical lamps (perhaps from the same mould as the one from Yurta-Stroyno!) from the Athenian Agora (Perlzweig 1961, cat. no. 653–655, pls. 12, 15, and 36) are the best analogies to our lamp. However, two similar discus fragments published from Augusta Traiana (Stara Zagora) were uncovered near a kiln and are hypothesized by Maria Kamisheva-Ivanova to have been produced in that centre (Kamisheva 2010, 245, обр. 2 А-b). These are covered by reddish slip, not present on our fragment.

The two distinct analogies can be combined in three possible interpretations:

a) our lamp, based on the clear match from the Athenian Agora, was produced in Athens and brought to Yurta-Stroyno by trade or as a personal item. The fragments from Stara Zagora are mis-identified as local products but are in fact imports from the same Athenian batch;

b) our lamp, along with the two fragments from Stara Zagora, was produced locally from a mould taken directly off an original Athenian lamp;

c) our lamp was in fact made in Athens, based on its crisp relief, difference in clay from the rest of the lamps from Yurta-Stroyno, and lack of reddish slip compared to the analogies from Stara Zagora. The two fragments from Stara Zagora were produced locally using moulds taken off of original Athenian lamps (similar to ours).

Without conclusive chemical analysis of the clay from all lamps in this equation (Athens, Yurta-Stroyno, and Stara Zagora), we cannot be sure which of these interpretations is correct. However, each theory itself paints an interesting picture of the trade connections of Yurta-Stroyno circa AD 300.

Broneer type XXVII production and imitation

Athenian lamps of Broneer type XXVII were widely exported across the Roman provinces, but they were also subject to local imitations. Athenian export is known from Dalmatian Nicopolis of Epirus Vetus (Busuladžić 2007, cat. no. 62), Norican Lauriacum (Deringer 1965, 116–117, cat. no. 349), Aquileia in Italy (di Filippo Balestrazzi 1988, 403–404; cat. nos. 1113–1117), Pannonian Intercisa and Arrabona (Iványi 1935, 98, cat. nos. 873–874) or other places in Greece and Asia Minor (Bruneau 1965, cat. nos. 4658–4659; Broneer 1977, 65). In light of this evidence, our conjectured Athenian originals (Group B: **Pl. 6/1:1**; and Group C: **Pl. 6/1:4**) may also have been exported from Athens in this manner.

Broneer type XXVII lamps were also imitated by craftsmen elsewhere in the Roman provinces. Group B was manufactured in Djerba, Tunisia (Zeischka 1997, cat. no. *182*); Group C and D imitated in Noviodunum (Baumann 2009, 247–249; type XI, cat no. 99–109 – with 13 items dated to the 3rd century AD). An interesting and early variation was found in Cnidus (Bailey 1988, 341–342, Q 2735, Q 2737, 344, Q 2760). But perhaps closest to home are the Thracian production centres of Pavlikeni and Butovo which produced lamps in Broneer type XXVII strikingly similar to those found at Yurta-Stroyno dated to the 3rd century AD (Sultova 1991, 116, 122–123, обр. 7–13; Vladkova 2011, 124, cat. no. 18). Three of our lamps attributed to Group C (**Pl. 6/1:2–3, 5**) from Yurta-Stroyno, while similar to true Corinthian Group B wares (such as Broneer 1977, 75, cat. no. 2974), are probably local imitations of this kind.

UNIQUE IMITATIONS OF LOESCHCKE TYPE IV/V BILDLAMPEN

Three lamps (**Pl. 6/1:6–8**; **Tab. 1:6–8**) found together in the south-eastern quadrant of the trench 95E_100N ([SU021]) in Room B are interesting imitations of Loeschcke type IV/V Bildlampen. Uncharacteristically for the type, their clay is light brownish grey (Munsell 2.5Y 6/2) and they are covered in traces of a dark grey slip (Munsell 5Y 4/1). Their volute is merely sug-

gested by an incised line, with a relief ring around the discus in the manner of Firmalampen, and with a prominent relief half-circle on the nozzle. Although lamps of Loeschcke types I to V were produced in Italy from the Augustan Age to about AD 100, plenty of provincial imitations exist – even with similar incised volutes, no less (Baumann 2009, 230, cat. no. 29), or incorporating a similar relief ring on the discus (Goethert-Polaschek 1985, Taf. 76). As the lamps of this special type from Yurta-Stroyno are significantly derivative from the original Loeschcke types IV/V, they must be dated to the 2nd century AD at the earliest.

ICONOMU TYPE XXX/BRONEER TYPE XXIX

A group of nine lamp fragments with varying clay structure but united by relief rays on their rounded shoulders can be soundly bundled together as a group (**Pl. 6/1:9–10**, **Pl. 6/2:11–17**; **Tab. 1:9–17**). All but one of these fragments were found in the levelling layer, the one was retrieved from RT soil [SU001]. They best recall Dalmatian and Thracian local variations on Loeschcke type VIII round lamps. Examples of these may be found in Zagreb (Vikić-Belančić 1971, 162, cat. no. 238), Noviodunum (Baumann 2009, 254, fig. 14, cat. no. 122), Chersonesus, where they are termed "ribbed" lamps (Klenina – Biernacki 2015, 271–272), and in Butovo and Pavlikeni (Sultova 1991, 117, 123, обр. 14–16, 24; Vladkova 2011, 126, cat. no. 30). These crude and rare lamps have an uncertain date range; usually they are attributed to the 3rd and 4th century AD.

After the 2nd century AD, the Loeschcke type VIII *koiné* lamp of the Mediterranean is more of an umbrella term for various round shaped lamps that were widely distributed and copied than a specific type itself. The existence of these "ribbed" variations on the type should therefore come as no surprise. Alternatively, the rays on the shoulder recall Iconomu type XXX late Danube/Balkan lamps made as late as the 6th century AD, which were in turn a variation on North African lamp production (Curta 2016, 75–81). As the dating for this type proposed by analogies is unclear (from the 3rd to the 6th century AD), they cannot be used to date stratigraphic contexts at Yurta-Stroyno.

OTHER VARIATIONS ON LOESCHCKE TYPE VIII LAMPS

A dissonant group of Loeschcke type VIII round lamps – a very broad type in itself – complete the series with eight lamps found in mixed contexts, but mostly in the RT soil [SU001] (**Pl. 6/2:18–25**; **Tab. 1:18–25**). These hardy lamps were the common ware of the Roman East, and it is no surprise to find them locally produced in Thrace as well. Three of our finds might be attributed to specific context: a shoulder and discus fragment (**Pl. 6/2:21**) comes from the trench [SU008] in Room C; a shoulder and handle fragment with a prominent globule (**Pl. 6/2:25**) was found in the levelling layer north of the house; and the round and worn slipped lamp (**Pl. 6/2:20**), which has the distinction of being the only complete lamp from Yurta-Stroyno, comes from the fill of the ditch [SU021]. The last one has discus decorated by 8–10 petals around the central oil filling hole.

POTENTIAL BILDLAMPEN (LOESCHCKE TYPES I–V)

Three fragments have the limited potential to be Bildlampen (**Pl. 6/3:26–28**; **Tab. 1:26–28**). One discus fragment (**Pl. 6/3:26**) has a shoulder groove typical of late Bildlampen produced from the 2nd century AD, although, in the Roman provinces, an upper date cannot be specified. Two fragments (**Pl. 6/3:27– 28**) potentially have angular nozzles typical of Loeschcke type

I lamps but cannot be conclusively identified. Neither of these is sufficiently preserved as to allow definite attribution.

PRODUCER STAMPS, WORKSHOP MARKS, AND A WASTER

Almost no producer stamps or workshop marks survive on lamps from Yurta-Stroyno; however, a Loeschcke type VIII lamp (**Pl. 6/2:24**) is a prominent exception with an incised swastika on its base. Unfortunately, like another lamp (**Pl. 6/3:29**) with a decoration of incised rays on its base, it was found in RT soil [SU001] contaminated by modern looting activities. The two possible base fragments of Firmalampen (**Pl. 6/3:36–37**) may show faint signs of firm marks; both are beyond recognition.

An interesting ceramic fragment found in the levelling layer (**Pl. 6/3:30**) may not belong to a lamp at all, but certainly bears all the signs of being mould-made with finger smears on the inside surface, and small relief globules on the outside (indicating that a plaster form was used to make it). It is irregular, deformed and with a sandwich firing structure, and could be interpreted either as a ceramic lampstand or a waster. Since there is no reason for wasters to have travelled very far from their point of origin, if this attribution is true, it would indicate a ceramics workshop located on or very nearby the settlement of Yurta-Stroyno.

LAMPS FROM THE SURFACE SURVEY

Altogether 46 fragments were recovered from the surface survey. Most fragments were nondescript walls or shoulder joins which are a strong point for a lamp's hardiness, often preserved, but with little diagnostic value. Nine *disci*, ten handles, five nozzles and five bases were recovered. Lamp finds from the survey area would appear to be clustered to the north--northeast of the presumed extent of the settlement core, especially in squares D13, F13, H13 (see Weissová – Tušlová – Bakarzdhiev 2022, map 3).

LOESCHCKE TYPES I–V

Despite their miniscule size, two fragments (**Pl. 6/3:31–32**; **Tab. 1:31–32**) may have belonged to volute lamps of Loeschcke types I–V. The former is distinguished by its fine orange clay and three grooves which vaguely recall a Form I/IIa shoulder type found on early Loeschcke type Ia lamps (c.f. Loeschcke 1919, 28, *Abb. 2*). The latest imitations of this subtype were produced at the end of the 1st century AD in Raetia (Leibundgut 1977, 22–23) but unfortunately the fragment is too battered to definitely assign it to Loeschcke type Ia or to identify it with other types. The latter fragment shows signs of a volute near the angular nozzle of an unspecified volute lamp – either of Loeschcke types I–V or an imitation.

SINGLE FINDS AND LOCAL VARIATIONS ON KNOWN TYPES

A fragment (**Pl. 6/3:33**) has preserved discus and nozzle with similar relief decorations on the shoulder to our group of rib-shouldered Dalmatian and Thracian local variations on Iconomu type XXX/Broneer type XXIX from the excavation (c.f. **Pl. 6/1:9–10**, **Pl. 6/2:11–17**). However, in this case, the relief rays are made with deep incuse cuts on the shoulder, and the nozzle is separated by a thick band with three relief globules. A lamp from Pavlikeni has similar relief ribs (Sultova 1991, обр. 24). Other parallels, such as a lamp of this type from Noviodunum

dated to the 3rd–5th century AD (Baumann 2009, 254, fig. 14, cat. no. 122) have a star pattern on their base. This pattern is far from unique, but it is also found on a lamp body from the survey (**Pl. 6/3:34**) and on a base fragment from the excavation (**Pl. 6/3:29**).

A badly damaged discus (**Pl. 6/3:35**) with two shoulder grooves shows what appear to be either two bird feet with part of a wing, or legs of stags, such as the ones found on lamps from Boutovo and Pavlikeni (Sultova 1991, tab. I, обр. 22–23).

CONCLUSION

Most lamps from Yurta-Stroyno were found in unstratified contexts and therefore stand out as artefacts more so than as dating elements. The lamps that do have chronological value are Iconomu type XXX/Broneer type XXIX lamps (**Pl. 6/1:9–10**, **Pl. 6/2:11–17**; dated broadly to the 3rd and 4th centuries AD, but even as late as the 6th century AD) and Broneer type XXVII, Group C lamps (**Pl. 6/1:2–5**; dated from the 3rd to the late 4th century AD). They were mostly (10 out of 13 pcs.) found in the levelling layer north of the house and can only be used to suggest that this layer was laid down within the same time frame by virtue of sharing similar material. The last three fragments were found in the RT soil [SU001] (2 pcs.) and in the floor level inside of the house, Room D (1 pc.) (**Tab. 1**).

A ditch dug inside Room B [SU021] contained three unique Loeschcke type IV/V imitations (**Pl. 6/1:6–8**); Broneer type XXVII, Group B lamp (**Pl. 6/1:1**) with a *terminus post quem* of the late 3rd century AD that dates this trench and the lamps within; and the only complete lamp found in the excavations, of Loeschcke type VIII (**Pl. 6/2:20**).

Most lamps were likely produced in the region itself. In the absence of evidence for a pottery kiln at Yurta-Stroyno, we may assume source workshops for local wares to be in the well-known centres such as Pavlikeni, Boutovo, Stara Zagora, or other, yet unknown, Thracian workshops. A local variation on the *koiné* round lamp, Iconomu type XXX/Broneer type XXIX was produced in Dalmatia and Thrace in the 3rd–4th century AD, and it is frequently found at Yurta-Stroyno (**Pl. 6/1:9–10**, **Pl. 6/2:11–17**). The round lamps of Loeschcke type VIII (**Pl. 6/2:18–25**) were very common in the Roman East, and it is no surprise to find them locally produced in Thrace as well. Bolder imitations of the Greek Broneer type XXVII were also made at Boutovo and Pavlikeni; these might be found at our site in three examples. The three unique variations on Loeschcke types IV/V (**Pl. 6/1:6–8**) are a novel find, and they fit in well with the model of regional workshops producing wares in imitation of the dominant original.

Lamp type:	Broneer type XXVII; Groups B, C	Iconomu type XXX / Broneer type XXIX	Bildampen (?) (Loeschcke types I–V)	Loeschcke type IV/V imitations	Loeschcke type VIII	Firmalampen (?) (Loeschcke types IX, X)	**Identified frgs.**	**Total frgs.**
Excavation	5	9	3	3	8	2	30	84
Survey			2				2	46
Total	5	9	5	3	8	2	32	130

Tab. 2: Overview of the amount of identified terracotta lamp types within the excavated area and the surface survey.

Evidence has shown that two lamps of Broneer type XXVII (**Pl. 6/1:1** and **Pl. 6/1:4**) could be imports from Roman Athens made in the late 3rd and early 4th century AD respectively. **Pl. 6/1:4** stands out as with an exceptionally preserved bust of Athena, patroness of Athens, in full armour, with a distinctly different clay make. Clear analogies from the Athenian Agora indicate it might be an import; other similar discus fragments with the same motif from Stara Zagora may either support that claim by additional evidence, or help interpret our fragment as a Thracian product from Stara Zagora made from a derived mould taken off an Athenian original.

All but one of the lamps from Yurta-Stroyno were in fragmentary state; 73% (95/130 frgs.) of terracotta lamps retrieved from the excavation and the survey, respectively, could not be assigned to a type based on any characteristics or using any reasonable estimate. Working with a corpus in this state precludes judgments made with high confidence, but exceptional items such as the Broneer type XXVII Greek lamps, unique Loeschcke type IV/V imitations and Iconomu XXX/Broneer type XXIX Thracian ware do flicker a light on patterns in the darkness.

ABBREVIATIONS

AB – Archaeologia Bulgarica
RGZM – Römisch-Germanisches Zentralmuseum in Mainz
SH – Studia Hercynia

BIBLIOGRAPHY

Bailey, D.M. 1988: *A Catalogue of the Lamps in the British Museum 3: Roman Provincial Lamps*. London.

Baumann, V.H. 2009: Lucernele de la Noviodunum. *Peuce* VII, 217–310.

Broneer, O. 1930: *Terracotta Lamps.* Corinth IV:2. Cambridge.

Broneer, O. 1977: *Terracotta Lamps*. Isthmia III. Princeton.

Bruneau, P. 1965: *Exploration archéologique de Délos faite par L'École Francaise D'Athénes. Les lampes*. Paris.

Busuladžić, A. 2007: *Antičke svjetiljke u Bosni i Hercegovini* [*Antique Lamps in the Collections in Bosnia and Hercegovina*]. Sarajevo.

Čisťakova, V. – Zlámalová Cílová, Z. 2022: Archaeological and Archaeometric Study of the Roman and Late Antique Glass. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 184–244.

Curta, F. 2016: Shedding Light on a Murky Matter: Remarks on 6th to early 7th Century Clay Lamps in the Balkans. *AB* XX:3, 51–116.

Deneauve, J. 1969: *Lampes de Carthage*. Paris.

Deringer, H. 1965: *Römische Lampen aus Lauriacum*. Linz.

di Filippo Balestrazzi, E. 1988: *Lucerne del Museo di Aquileia Vol II. Lucerne romane di etá repubblicana ed imperiale*. Aquileia.

Garnett, K.S. 1975: Late Roman Corinthian Lamps from the Fountain of the Lamps. *Hesperia* 44/2, 173–206.

Goethert-Polaschek, K. 1985: *Katalog der römischen Lampen des Rheinischen Landesmuseums Trier: Bildlampen und Sonderformen*. Mainz.

Iványi, D. 1935: *Die Pannonischen Lampen*. Budapest.

Kamisheva 2010 = Камишева, М. 2010: За производство на глинени лампи с изображения на диска в Августа Траяна. *Великотърновски Университет Св. св. Кирил и Методий и Българската Археология* 1, 241–247. https://www.uni-vt.bg/bul/pages/?page=2857 & zid=4 (visited 01/12/2021).

Klenina, J. – Biernacki, A.B. 2015: Местные и импортные античные светильники из Херсонеса Таврического: типология и хронология. In: A. Michalowski – M. Teska – M. Zolkiewski (eds.): *Viator per devia scientiae itinera*. Poznań, 267–282.

Leibundgut, A. 1977: *Die römischen Lampen in der Schweiz*. Bern.

Menzel, H. 1954: *Antike Lampen im Römisch-Germanischen Zentralmuseum zu Mainz*. Katalog 15. Mainz.

Nývltová Fišáková, M. 2022: Analysis of the Osteological Material from Yurta-Stroyno. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 259–269.

Perlzweig, J. 1961: *Lamps of the Roman Period. First to Seventh Centuries After Christ*. Athenian Agora: Results of Excavations Conducted by the American School of Classical Studies at Athens VII. Princeton.

Sultova 1991 = Султова, С. 1991: Глинени лампи тип Бутово. *Известия на Регионален исторически Музей Велико Търново* VI, 116–128.

Tušlová, P. 2022: *The Yurta-Stroyno Archaeological Project. Pottery Studies.* SH Monographs 3. Praha.

Vikić-Belančić, B. 1971: Antike Lampensammlung im Archäologischen Museum zu Zagreb. Teil I: Bildlampen. *Vjesnik Arheološkog muzeja u Zagrebu* 5:3, 97–182.

Vladkova 2011 = Владкова, П. 2011: *Античен производствен център при Павликени /Долна Мизия/*. Велико Търново.

Weissová, B. – Tušlová, P. – Bakardzhiev, S. 2022: Systematic Selective Survey of Yurta-Stroyno. A Methodological Approach to Sites Heavily Disturbed by Looters. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 53–69.

Zeischka, A. 1997: Lampen aus dem Altbestand des Museums und Nachträge zur Sammlung Mummenthey. In: D. Ahrens (ed.): *Licht durch die Jahrtausende. Die Lampen-Sammlung Karl-Adolph Mummenthey im Städtischen Museum Simeonstift Trier.* Trier, 11–24.

Robert Frecer
Institute of Classical Archaeology
Faculty of Arts, Charles University
Celetná 20, CZ-11000, Prague 1
r.frecer@gmail.com

Metal Finds and Traces of Metallurgical Activities at Yurta-Stroyno

Viktoria Čisťakova – Jiří Kmošek

ABSTRACT
The paper summarizes the assemblage of metal finds from Yurta-Stroyno. Based on their function, we may class the metal finds into four main groups: constructional elements, tools, decoration, and miscellanea. The main emphasis is placed on the group of copper alloy/bronze decorations such as belt/strap fittings, a fibula with a returned foot and an axe shaped pendant, as they represent the most chronologically sensitive items. Many constructional elements such as nails and clamps/dogs were retrieved from the settlement as well. Interesting finds also come from the surface survey where numerous fragments of a smelting furnace, smelting slags, and forging slags were found.

KEYWORDS
Thrace; *vicus*; belt fitting; fibula; nails; tools; smelting slag; forging slag; smelting furnace.

INTRODUCTION

In the course of the excavation and surface survey of the Yurta-Stroyno Archaeological Project during 2014–2016, 657 pcs. of different metal objects, mostly made of iron and bronze were found (**Tab. 1**).[1] Part of the finds, numbering 277 pcs., however could not be identified due to its poor condition. Based on the function, we may class the identifiable metal finds into four basic groups: constructional elements, tools, decoration, and miscellanea. The main body of the identifiable items is formed by iron nails (319 pcs.) and other building components such as clamps and dogs (63 pcs.). The second most abundant group is made up of a heterogeneous collection of tools or their parts (71 pcs.). However, in terms of chronological identification, the most important group of finds is that of decoration (9 pcs.), which include different bronze belt fittings, one fibula with a returned stud and a smaller sub-group of private decoration (an axe shape pendant, a cross shape pendant and a bronze ring). The last group is represented by miscellanea, which includes a mixture of different finds including several keys, part of a locker, a stylus, and a bronze vessel attachment. Additionally, during the surface survey several concentrations of an iron slag (nearly 19 kilograms) and specific fragments of daub, interpreted as parts of a furnace were identified.

A selection of typologically more representative metal finds is described in the following text as are the important finds (**Tab. 4**) including fragments of a smelting furnace, smelting slags, and forging slags (**Tab. 2**) attesting to metallurgical activities at the settlement.

1 For different types of copper alloys, the term bronze is used within the text. No elemental composition analysis has been made to better clarify the real composition of the used alloy.

Season	Identified	Unidentified	Total finds
2014	128	36	164
2015	74	53	127
2016 excavation	53	22	75
2016 survey	125	166	291
Total (pcs.)	380	277	**657**

Tab. 1: Overview of the number of metal finds from Yurta-Stroyno uncovered during different years of the project.

DECORATION

The most relevant metal finds for establishing chronology based on parallels are those connected with a decorative function, either adornments of human clothes or horse harnesses. Several belt/strap fittings, mounts, pendants, and a single fibula and a ring were found at the settlement (**Tab. 4:1–9**). All of the fittings (except the irregular bronze bridle-fitting **no. 5**) have a high level of craftsmanship and have multiple parallels at other Roman settlements.

Among the best-preserved pieces belongs the belt fitting **no. 1** in the shape of plant tendrils (**Fig. 1:1**), which was found in the levelling layer north of the house. The elongated belt fitting was fixed with a hinge, although it also bears traces of small iron nails placed on both its sides. This belt fitting reveals a high level of craftmanship, which, with its decoration of an openwork floral motif, resembles the execution of the so-called "peltate/trumpet" ornaments, popular in the 2nd and 3rd c. AD (type Oldenstein 388–402). Belt fittings with a hinge were quite common in the Upper Rhine Limes area during the 2nd half of the 2nd c. to the mid-3rd c. AD. Similar fittings are also known from military camps such as Abusina, Holzhausen, Zugmantel, Feldberg, Osterburken, Weißenburg, Pfünz and Pocking (see Gschwind 2004, Taf. 47; Oldenstein 1976, 157–158, Taf. 41). The fitting from Yurta-Stroyno likely belongs to the Klosterneuburg belt type, dated from the 2nd half of the 2nd c. to the 1st half of the 3rd c. AD (Fischer 2014, 121–124). Regarding the nearest parallels, a similar belt fitting was found at the legionary camp in Novae, where it is dated based on a typological analysis to the mid-2nd c. AD (Gencheva 2016, 192).

Another interesting find is the peltate bronze fitting plated with silver or tin[2] **no. 2** (**Fig. 1:2**), probably used as decoration for belts/straps or a horse harness. The item was found in the first centimeters of virgin soil just under the looted trench, luckily escaping the treasure hunter's attention. Peltate mounts had been widely spread over the Roman provinces since the mid-2nd c. AD with the latest known finds dated to the contexts of the early 4th c. AD (Radman-Livaja 2009, 1501; Oldenstein 1976, 181). The peltate strap mounts are well known from military sites at the Rhine and Danube Limes, where they are mostly dated to the 2nd half of the 2nd c. till the 1st half of the 3rd c. AD (Gschwind 2004, Taf. 55; Laharnar 2015, 23).

Figure **no. 3** (**Fig. 1:3**) is a small bronze fitting/stud decorated with three concentric engraved circles. Similar fittings are well known from military assemblages in the western provinces and are usually identified as a belt fitting or a strap fitting/decoration from horse gear. This type of fitting could also have a thorn fixed to a belt/strap. Such fittings are usually

2 Both options are possible, as the difference is not recognizable by the naked eye. However, due to the specific use of the item as a belt fitting, tin alloy seems more probable (Fütterer *et al.* 2018).

dated to the second half of the 2nd c. till the first half of the 3rd c. AD (Oldenstein 1976, 172). Close in shape is also a stud from Nicopolis ad Istrum, dated according to its context from the 4th c. to the mid-5th c. AD, however, there is a probability it has been a secondary postdeposition at the finding context (Poulter 2007, 36). It is worth mentioning that a similar fitting is also known from the military camp in Novae, where it was identified as a bronze box/chest application dated to the 1st–3rd c. AD (Gencheva 2016, 197).

A small bronze boss **no. 4** (**Fig. 1:4**), found in the levelling layer, could be identified as a belt/strap circular fitting. This type of fitting belongs among frequent finds from places connected with the Roman military, particularly with the cavalry. One of the richest collections of similar bronze fittings from horse harnesses was found in the Kastell of Zugmantel, while single finds are also known from Alkofen, Feldberg, Niederbieber and Saalburg (Schleiermacher 2000, 167, 174–176). As suggested by the finds from Zugmantel, fittings with a central boss could be originally fixed to the straps of the horse harness. However, they could also be used as parts of waist-belt decoration. Corresponding finds from Germania Superior and from the Rhaetian Limes are mainly dated from the mid-2nd till mid-3rd c. AD (Oldenstein 1976, 165–166).

The bronze bridle-fitting **no. 5** has an atypical irregular rectangular shape (**Fig. 1:5**) with lateral protrusions. The bridle-fittings are commonly used as a part of the Roman horse gear and belong to finds connected with the presence of Roman military units, or more precisely, of cavalry (Radman-Livaja 2009, 1501–1503).

Among the other exceptional finds there is a bronze fibula **no. 6** (**Fig. 1:6**) with a returned foot of the type 'Fibeln mit umgeschlagenem Fuß' (Almgren 162),[3] found in the topsoil north of Room B. This fibula type was widely spread in the Danubian provinces, with a higher concentration in Pannonia, Dacia, and Moesia Superior. Fibulae with a returned foot are well known from Barbaricum and are usually connected with a "gothic" cultural environment such as the Wielbark culture and the Chernyakhov culture/Sântana de Mureș culture; they are also known to a lesser degree from the Przeworsk culture[4] (Olędzki – Ziętek 2014, 123–131). The type is dated widely from the end of the 2nd to the beginning of the 5th c. AD, with the highest frequency of appearance from the 3rd to 4th c. AD (Almgren 1923, 76–78; Ambroz 1966, 57–68; Petković 2010, 307–310). The fibula is very well preserved, missing only the pin. It is characteristic for having a special hole for spiral windings, a feature that assigns our fibula to subtype 19a after Gencheva (Gencheva 2004, 53–54) or Variant I after Diaconu (Diaconu 1971, 2–10). Fibulae of this subtype were found only in two places in Bulgaria, one at Hitovo (Shumen District), and two at Novae. The finds from Novae are well dated to the second half of the 3rd c. AD (Gencheva 2004, 54). In Dacia, the fibulae with a returned foot of Variant I after Diaconu are dated to the 2nd half of the 2nd c. till the 3rd c. AD (Diaconu 1971, 10).

The shape of a miniature bronze axe head pendant **no. 7** (**Fig. 1:7**) is rather unusual for the territory of the Roman Empire. Some of the closest parallels to our example come from Germania Libera. The so-called axe head pendants or "axtformige Bronzeanhanger" are well known from the funeral equipment of the Wielbark and Przeworsk cultures and Sarmatian graves, found in the territories of the present-day Poland, northern Germany, Serbia, Hungary, Romania, western Ukraine, and south Crimea (Magomedov 2001, 71; Rodzińska-Nowak 2001, 320–321; Florek 2008, fig. 2). The Yurta-Stroyno axe head shaped pendant most resembles the type Kokowski 5, which is an elongated triangle shaped pendant with a wedge-shaped section (Kokowski 1997, 102). Examples of this type are known from the area of the Wielbark

3 After Kokowski 1995 type Masłomęcz 55 A (ZM–55 A) dated from C1b till C3/D1.

4 With the chronology spanning from the turn of the 2nd/3rd c. AD till the turn of the 4th/5th c. AD (Olędzki – Ziętek 2014, 123–131).

culture along the Danube and Tisa Rivers; several pendants are also known from the area of the eastern Crimea. The appearance of this type correlates with the Late Antique period in Barbaricum – C2 phase. After the year AD 400[5] the number of axe head shaped pendants started to grow and they spread to the Danubian area (Kokowski 1997, 100–102; Ziemlińska-Odojowa 1999, 130–131).

The bronze cross-pendant **no. 8** is made from thick bronze wire shaped into a simple cross with a suspension loop (**Fig. 1:8**). These crosses are known from the Early Medieval and Medieval settlement assemblages. Similar crosses (iron and/or bronze) are also known from numerous Early Medieval and Medieval sites in Bulgaria, e.g., from the fortresses in Yakoruda, Pernik, Lovech and Veliki Preslav or the settlement in Seuthopolis; they are commonly dated to the 11th–13th c. AD (Inkova 2011, 71–72).

Only one bronze ring, originally with an oval stone/glass intaglio **no. 9** (**Fig. 1:9**), was found at the settlement. The ring belongs to the group 2. 1. 2 after Riha (1990), "Sphendonen fingerings", which were in use from the 1st till the 3rd c. AD. For the later period (the 3rd c. AD) it is typical to have more thickened rings with a slightly protruding intaglio (Riha 1990, 30–31). Bronze rings with a glass intaglio are a common find at Roman settlements and were also used as grave goods. A similar ring is also known from Novae, where it is dated to the 3rd c. AD (Gencheva 2016, 199).

TOOLS

The publication of Roman tools is usually underestimated in the majority of the excavation reports and settlement related articles. The main reason is the lack of representative finds. The tools are mostly made of iron which normally leads to their poor finding condition. Moreover, it is impossible to use them as reliable dating material as their shape changed only little or not at all for many centuries. On the other hand, these finds could bring us interesting information about the daily life and manufacturing activities that took place at the Yurta-Stroyno settlement.

The excavation and surface survey revealed a different assemblage of working tools (**nos. 10–24**; **Tab. 4:10–24**), including part of an iron saw (**Fig. 2:10**) and five fragments of iron knives (**Fig. 2:11–13**). Besides these well identifiable items, some other iron fragments might be attributed to different tools only with some probability. **No. 14** (**Fig. 2:14**) could be a part of a wedge, a traditional tool for wood working and **no. 15** (**Fig. 2:15**) could be the lower part of an auger with a long handle and pyramidal pointed blade (Type I after Cholakov 2008). Augers were used to drill holes in wooden or stone material, and they are quite a common find at Roman and Late Antique settlements (Cholakov 2008, 102–104). Numerous finds of augers are known from Sadovec, Dichin and Yatrus-Krivina (Manning 2019, 330).

Many other smaller iron fragments of tools (45 pcs.; **nos. 16–19**; **Fig. 3:16–19**) were found during the excavation and surface survey.[6] They might be identified as parts of metal/iron/wood working tools such as punches or awls, originally combining a metal body with wooden handles (Manning 2019, 332). The awls could have a wide variety of forms (see Manning

5 Another very important find, which is dated to Late Antiquity, is a bronze belt buckle found in Yurta-Stroyno during the short excavation season in 2007 (Bakardzhiev 2008, 472, fig. 3). These belt buckles are known from different sites, both from settlement and funeral contexts, and are dated to the end of the 4th c. AD till the first half of the 5th c. AD (Rybová 1988, 172–174; Genčeva 2000, 55; Tejral 2011, 202–209).

6 Regarding the surface survey, the main concentration of finds was in squares J13 (8 pcs.), F13 (6 pcs.) and E12 (6 pcs.); another 9 pcs. were found in the context of the excavated house.

1985, 39–41), which is conditioned by the diversity of their use, e.g., for wood, leather, and bone processing. These tools are characteristic finds for Roman rural settlements (Poulter 2007, 34–35; Greiner 2010, 185).

Among the characteristic finds at Roman rural settlements also belong parts of iron chains, such as **nos. 20–21** (**Fig. 3:20–21**), representing an indispensable part of every homestead. The character of the finds (as their shape did not significantly change over the centuries) and their uncertain chronological context does not allow us any closer chronological classification. Similar parts of chains are known from many Roman settlements in Bulgaria, e.g., from Dichin (Ghey 2019), Nicopolis ad Istrum (Poulter 2007), Yatrus-Krivina (Gomolka-Fuchs 1982) or Novae (Gacuta 1993).

Two iron hammers were recovered from the excavated house. The first hammer **no. 22** (**Fig. 3:22**) was found within the wall foundation trench [SU036] of the house in Room C together with a coin of Diadoumenian minted in AD 217–218 (see Heřmánková 2022, pl. 5/1:8). It has small dimensions (70×18 mm) with the front working part shaped like a chisel and its back part in the form of a hammer. These morphological features class the tool under the "hammer–chisel" type I after Cholakov 2008 (also known as Gaitzsch type II/3), which belongs to the commonest type of Roman metalworking hammers used as blacksmith's tools (Manning 2019, 327).

The second hammer **no. 23** (**Fig. 3:23**) has a symmetrical shape and smaller dimensions (65×16 mm). It is of the type II after Cholakov (also Gaitzsch type I/3) (Cholakov 2008, 109). These smaller-sized hammers were commonly used for the processing of thin metal plates or post-processing of smaller items.

In general, hammers were universal instruments, used (depending on their size and shape) for metallurgy, stone-, metal- and wood-working. Our examples, based on their smaller proportions, could have been used as blacksmith equipment for detailed work. In the territory of Bulgaria there are 25 published finds of type I hammers with the majority dated to the 4th–7th c. AD, while only a few of them come from earlier contexts dated to the 2nd and 3rd c. AD (Cholakov 2008, 109–112).

The last item in this category is an upper part of a conical bronze bell **no. 24** (**Fig. 3:24**) with suspension loop. Bronze bells (both conical and pyramidal in shape) are known from numerous Roman and Late Antique civilian settlements and military sites. Their shape did not change over the Roman period, which makes it complicated to ascertain their chronology. In the context of the Roman Empire, these bells were used either as a decoration, part of horse gear, or for draught animals. Numerous bells are also known from provincial female and child graves, where they are interpreted as apotropaic amulets (Könemann 2018, 105–106). Roman and Late Antique bronze and iron bells are known from different Bulgarian sites, including Dichin (Ghey 2019, 291), Nicopolis ad Istrum (Poulter 2007, 33–34) and Yatrus-Krivina (Gomolka-Fuchs 1982, 158, Taf. 59).

CONSTRUCTION ELEMENTS

The biggest group of the metal objects found at Yurta-Stroyno consists of functional elements and/or decorative fittings from architectural constructions (**nos. 25–60** in **Tab. 4**). The most common finds within the assemblage are iron nails (319 pcs.) and iron clamps/dogs (63 pcs.). The surface survey revealed 146 iron nails, with the highest concentration recorded in the trenches E09 (28 pcs.), G12 (26 pcs.), D13 (26 pcs.) and E12 (17 pcs.) (see the polygons in **Map 1**), the rest of the nails (173 pcs.) came from the excavation. As the original finding context of the settlement was disturbed, we cannot identify the location of the discussed items within the

excavated house/contexts of the settlement to interpret the precise function of the fastening elements (such as nails or clamps) in relation to its architecture. However, it is still possible to make a basic classification of these items indicating their different purpose and use. It is possible to divide the iron nails based on their different lengths and according to variable sizes and shapes of the nail-head. The following **length classification** includes nails from the surface survey as well as from the excavation.[7]

The **1st group** includes the shortest nails with a length of 10–44 mm (44 pcs.). Nails from this group could be used as fastening elements for wooden or metal sheets or panels, furniture, or doors (Peltz 2010, 30). We may also add here nails with a wide flat head and a short stem **nos. 25–27** (**Fig. 4:25–27**), which could be interpreted both as construction elements as well as decorative nails fastening and decorating bigger wooden objects such as an entrance gate (Gacuta 1987, 76; Gencheva 2013, 204–206). Hobnails, short nails with a thick head with a specific rib "cruciform" decoration on the underside of the head **nos. 46–47** (**Fig. 6:46–47**) might also be classed here. Similar nails are well known from other Roman settlements and military sites (Laharnar 2016, 89–90).

The **2nd group** includes nails of 45–75 mm in length with an average thickness of 7.3 mm (211 pcs) and the **3rd group** includes large nails of 76–95 mm (19 pcs; see **Fig. 4:28–29, 30**; **Fig. 5:32–34**). The nails from both of these groups could be used as fastening elements for the wooden or metal sheets or panels, furniture, or doors (Peltz 2010, 30).

The **4th group** features the longest nails within the assemblage at 95–210 mm in length (20 pcs; e.g. **no. 30** in **Fig. 4**). The presence of these big nails, points to the presence of an architectural structure with a robust wooden construction. Based on the dimensions and shape, these nails were likely part of original wooden constructions and/or were meant to join roof timbers or parts of a solid wood door (Poulter 2007, 58; Peltz 2011, 19).

Another important morphological sign is the **head shape**, which, in combination with the nail length, could help to identify the original use of the nail. Partly inspired by the typology of Greiner (2008, 196), it is possible to divide our nails into four main types based on the head shape: **Type 1** with a flat rectangular or rounded head (97 pcs.) (**Fig. 4:28–30**); **Type 2** with a conical rectangular or conical rounded head (57 pcs.) (**Fig. 4:31**, **Fig. 5:32**); **Type 3** with an elongated rectangular T-shaped head (35 pcs.) (**Fig. 5:33–34**); and **Type 4** with an L-shaped head (49 pcs.) (**Fig. 5:35–36**).

Type 1 is the commonest type of iron nail with a rectangular or round head with a rectangular section stem. These nails are widespread all over the Roman Empire. Nails with a conical head (**Type 2**) are similar in head shape to **Type 1** (they could even be its sub-type). They are also well-known from Roman period settlements. **Type 3** and **4** nails with L- and T-shaped heads are less represented in our assemblage. Their specific head shape was probably used to fix flat wooden boards (Manning 2019, 359).

Selected nails from the assemblage might be used for specific purposes. Based on the characteristic shape of the conical head and shorter shank, nail **no. 37** could be used both as a fastening element and, e.g., as a horseshoe nail (**Fig. 5:37**), as suggested by finds at several Roman period settlements (Litwinowicz 2010, 168). The practice of the reusing of shorter – wedge shaped – nails as an engraving/punching tool is also well attested (Peltz 2011, 23). Some other nails such as **nos. 38–39** (**Fig. 5:38**, **Fig. 6:39**) were bent in a way characteristic for specific multiple fastening of wooden constructions. The deformed nails or nails without a head (64 pcs. from the excavation and 49 pcs. from the surface survey) were probably discarded or already

7 It is worth mentioning that only 34% of the nails have their original size and at least partly preserved head, the rest of the nails had been preserved in a fragmentary state.

removed nails that had been thrown away as waste (Peltz 2011, 19–23). Regarding the material from the excavated house, such nails might not have belonged to the original context of the building and their damage could have been caused by the postdeposition process on the site.

Smaller hobnails and bronze decorative nails/studs belong to the separate group of construction elements. These might have had functional as well as decorative purposes. Finds of small bronze nails (7 pcs., **nos. 42–47**), are relatively frequent in urban settlements; for instance, they are known from the agora of Nicopolis ad Istrum and from Dichin, where they were probably used as decorative elements on household utensils, wooden furniture (often chests) and building elements (Crummy 1981, 115–119; Gencheva 2013, 201; Ghey 2019, 289). Similar bronze nails/studs were, however, also used for the decoration of horse harnesses, waist-belts or leather equipment (Oldenstein 1976, 168; Crummy 1981, 115–119). The small iron hobnails (18 pcs., **nos. 40–41**), could be used as shoe studs or for a construction/decoration purpose. Similar finds are known from other Roman sites such as Dichin (Manning 2019, 257) or Nicopolis ad Istrum (Poulter 2007, 58).

Besides the nails, dogs and clamps belong to the second most numerous metal finds in Yurta-Stroyno (63 pcs., **nos. 48–56**). Dogs have different shapes and sizes, but are usually formed of square sectioned bars, which are banded. The iron dogs (**Fig. 6:48–52**) were used to join wooden constructional elements, consequently, their shape and length is conditioned by the type of wooden structural elements. The U-shape dogs (**Fig. 7:53**) are also well known from Roman settlements. It seems possible that these dogs could have served as handles or attachments of constructional elements (Manning 2019, 356–358). Larger dogs bent at a right angle, such as **no. 54** (**Fig. 7:54**), were used for fixing bigger timbers (Greiner 2010, Taf. 45, 92); in Bulgaria, they are known e.g., from Yatrus-Krivina (Gomolka-Fuchs 1982, Taf. 58). Another significant group of metal objects is constituted by the iron clamp or L-shape bracket such as **no. 55** (**Fig. 7:55**). Similar clamps were frequently used in the Roman settlements for fixing bigger architectural elements, mainly solid wood doors, gates, or walls (Crummy 1981, 120–121; Gacuta 1993, 89).

Double spike loops, such as **no. 57** (**Fig. 7:57**) have various uses as constructional elements, e.g., as hangers or sockets, they could also tie other items such as rings. In Bulgaria, these loops are known from Sadovec, Nicopolis ad Istrum, Novae, Yatrus-Krivina and Dichin (Manning 2019, 356).

The last two iron fittings, **nos. 58–59**, are ring headed spikes which could be fixed into the timber or stone block (**Fig. 7:58**, **Fig. 8:59**). Bigger nails with a hole in the head such as **no. 60** (**Fig. 8:60**) could also be used as sturdy loops. Such nails are known from the Roman period estate in Laufenburg and are interpreted as ceiling joints (Rothkegel 1994, 163; Greiner 2010, Taf. 116, 145).

MISCELLANEA

Several other objects found at the settlement could not be classed among the above menioned groups of finds. These are the three iron keys and a locker fragment, one bronze stylus and one attachment of a bronze vessel (**nos. 61–67**; **Tab. 1:61–67**; **Fig. 8:61–67**).

KEYS AND A LOCKER

From the remaining better-preserved iron items we may list several keys. The first one, **no. 61**, is a tumbler-lock slide key with a toothed set-backplate and a handle which ends in a suspen-

sion loop (**Fig. 8:61**). It belongs to a group of smaller-size slide keys, which were used to close bigger furniture such as chests or bigger boxes. A similar key is known from necropolis III (grave 33) from Kabyle (Scholz 2009, 214–215; Pencheva 2016, 112). Slide keys are known from many Roman settlements and belong to the most numerous key types (Müller 2011, 20–22). Considering their long-lasting popularity, the tumbler-lock slide keys are dated broadly between the 1st and 5th c. AD. However, the slide keys with a suspension loop (ring keys), such as our key, were in use in the 2nd–4th c. AD (Torbatov 2013, 208).

No. 62 may be identified as a rotary key (**Fig. 8:62**). The first rotary keys were developed by the Romans in the 1st c. AD and continued to be in use till the 3rd c. AD (Rothkegel 1994, 158). Nevertheless, keys of a similar shape are also known from Medieval and modern times. Since other items dating to the Medieval period were identified at the settlement (such as the cross-pendant **no. 8**), we should be cautious in this case in assigning the item's final chronological classification.

Quite an interesting type of key is a folding key on a ring **no. 63** (**Fig. 8:63**). The folding ring key is not a common type for the Roman environment, although several examples are also known from Roman sites, e.g., from castell in Straubing (Walke 1965, Taf. 123/19). This type of key is however characteristic for the Byzantine cultural area, and it was in use from the Early Medieval till the Medieval period (Vikan 1980, 3–4).

Besides the keys, the heavily corroded iron fragment **no. 64** (**Fig. 8:64**) with one rectangular hole, seems to be a part of a locker bolt from a tumbler locker. Similar finds are known from Roman and Late Antique settlements (Poulter 2007, 40–41; Pencheva 2016, 111–112).

OTHERS

Styluses used for writing made of iron and bronze,[8] are well known from military and settlement sites all around the Roman Empire (Walke 1965, 58; Geiner 2008, 190). One such bronze stylus, **no. 65**, was also found at Yurta-Stroyno (**Fig. 8:65**). It has a consistent thickness along the entire length of its shaft (82 mm) and a pointed tip. This shape relates to type C 23 after Schaltenbrand Obrecht,[9] characteristic for the second half of the 1st c. AD, however, still in use during the 1st half of the 3rd c. AD (Schaltenbrand Obrecht 2012, 126–128).

An iron bolt-head **no. 66** (**Fig. 8:66**) was found during the surface survey in trench E12 sector NW. It consists of a pyramidal head with a rectangular section and closed socket. It could be used as a projectile for a catapult or ballista. Its use as a spearhead seems to be unlikely. The term *catapulta* was used for Roman artillery which fires arrows, on the other hand, the term ballista was originally connected with firing stone shots (Manning 2019, 322). Pyramidal iron bolt-heads with a conical socket are known from numerous Roman provincial sites (Bishop – Coulston 2006, 169; Greiner 2008, 94, 107). In our case it is also possible to connect this find with an arrowhead, which could also have a pyramid shape with a conical socket (Laharnar 2015, 26, pl.1; Deschler-Erb 1999, 15–22) and which, in comparison to the bolt-head, are more typical finds for a settlement context. Both finds of bolt-heads and arrowheads are well known from Bulgarian sites such as Nicopolis ad Istrum (Poulter 2007, 44), Dichin (Manning 2019, 322–324), Sadovec (Uenze 1992, Taf. 41) and Novae (Biernacki – Różycki 2018, 461).

8 Bone styluses are also known from Roman sites, however they could be interchanged with hair pins or spindles. There are also known several examples made of wood (Schaltenbrand Obrecht 2012, 53–66; Walke 1965, 58).

9 This type has a simple form without any decoration and with a uniform thickness of the body; the eraser is offset, with rounded sides (Schaltenbrand Obrecht 2012, 126).

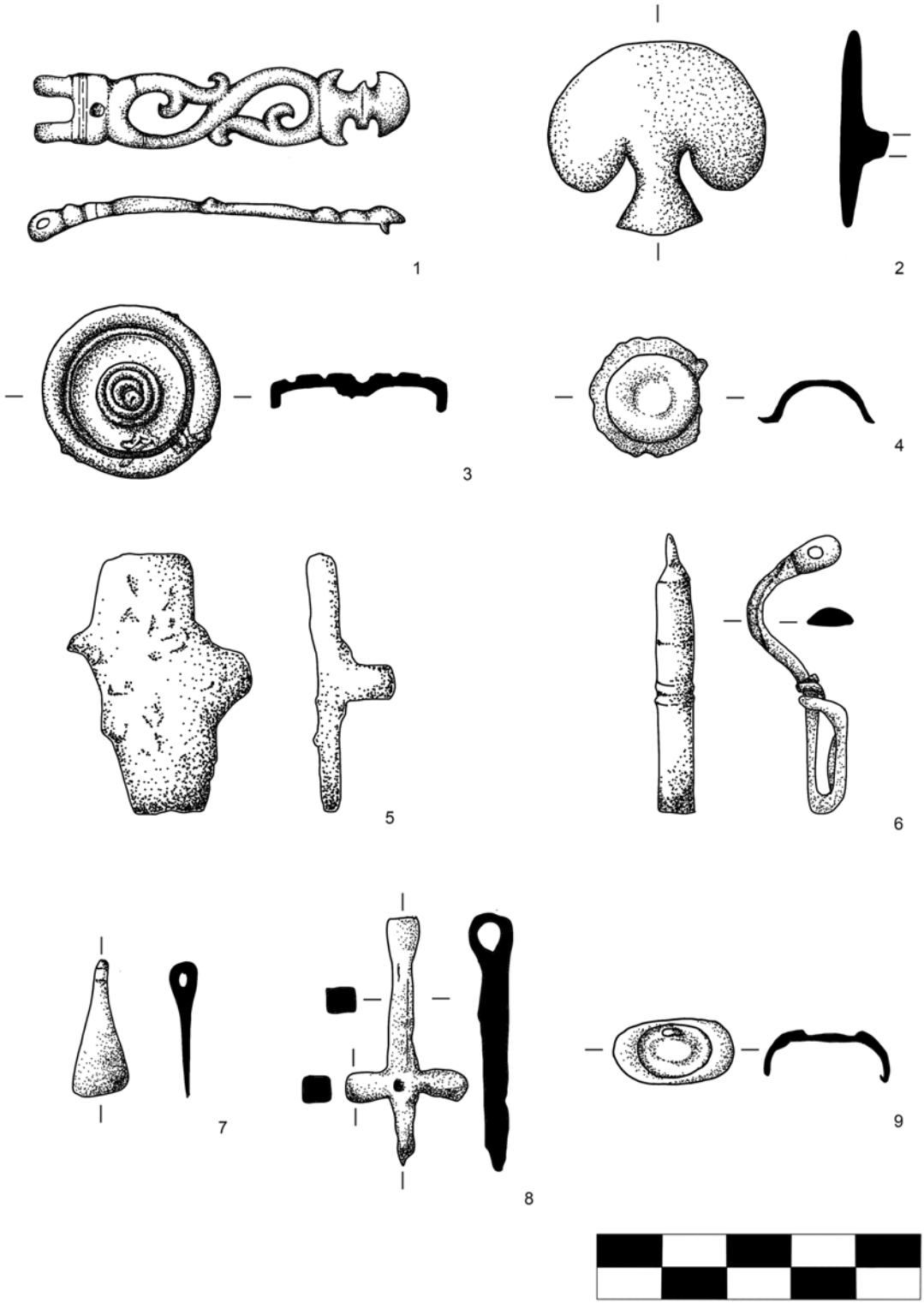


Fig. 1: decoration; all bronze/copper alloy. 1: belt fitting, 2: peltate mount, 3: fitting/stud, 4: boss, 5: bridle-fitting, 6: fibula, 7–8: pendants, 9: ring.

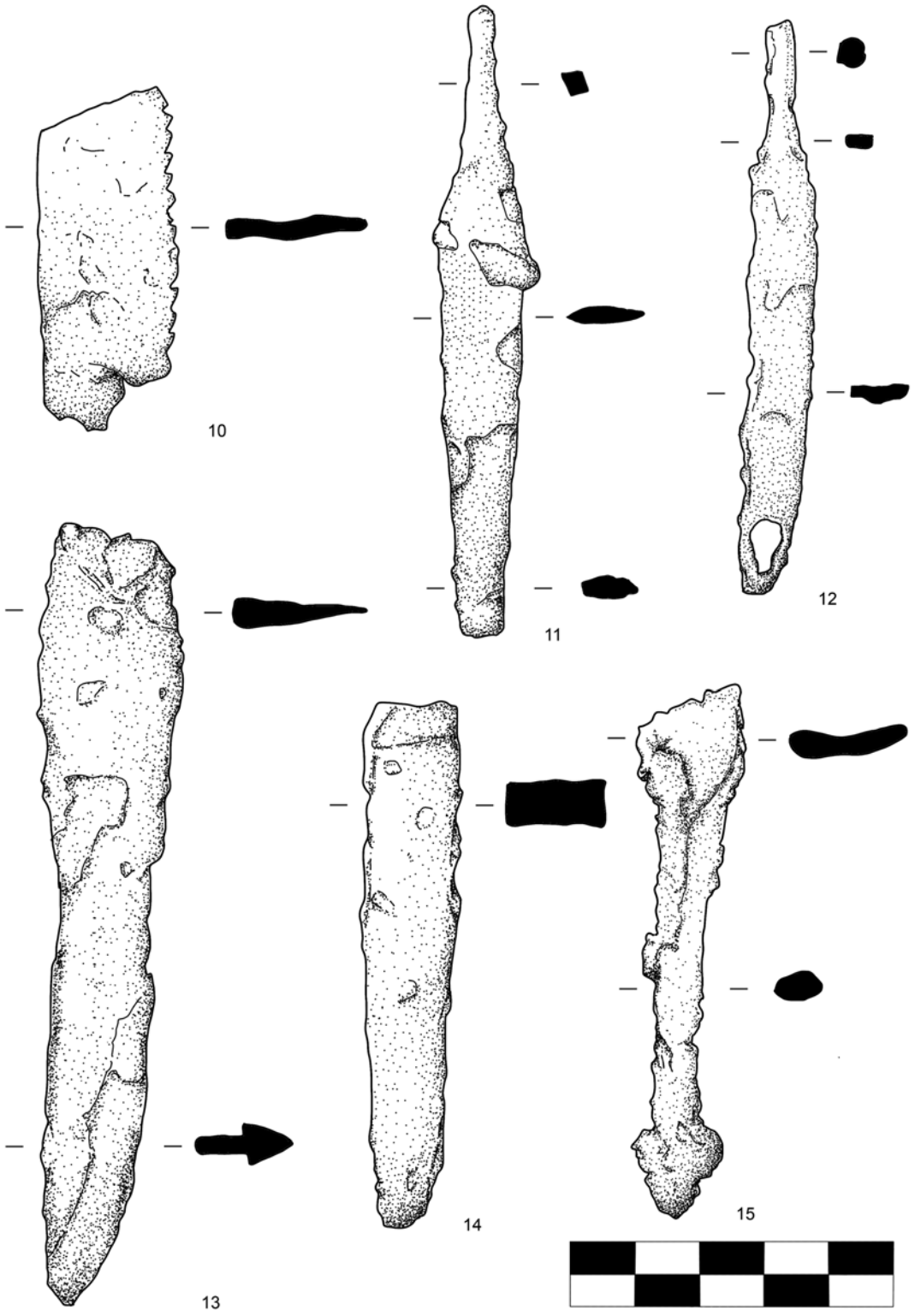


Fig. 2: tools; all iron. 10: saw, 11–13: knifes, 14: wedge (?), 15: auger.

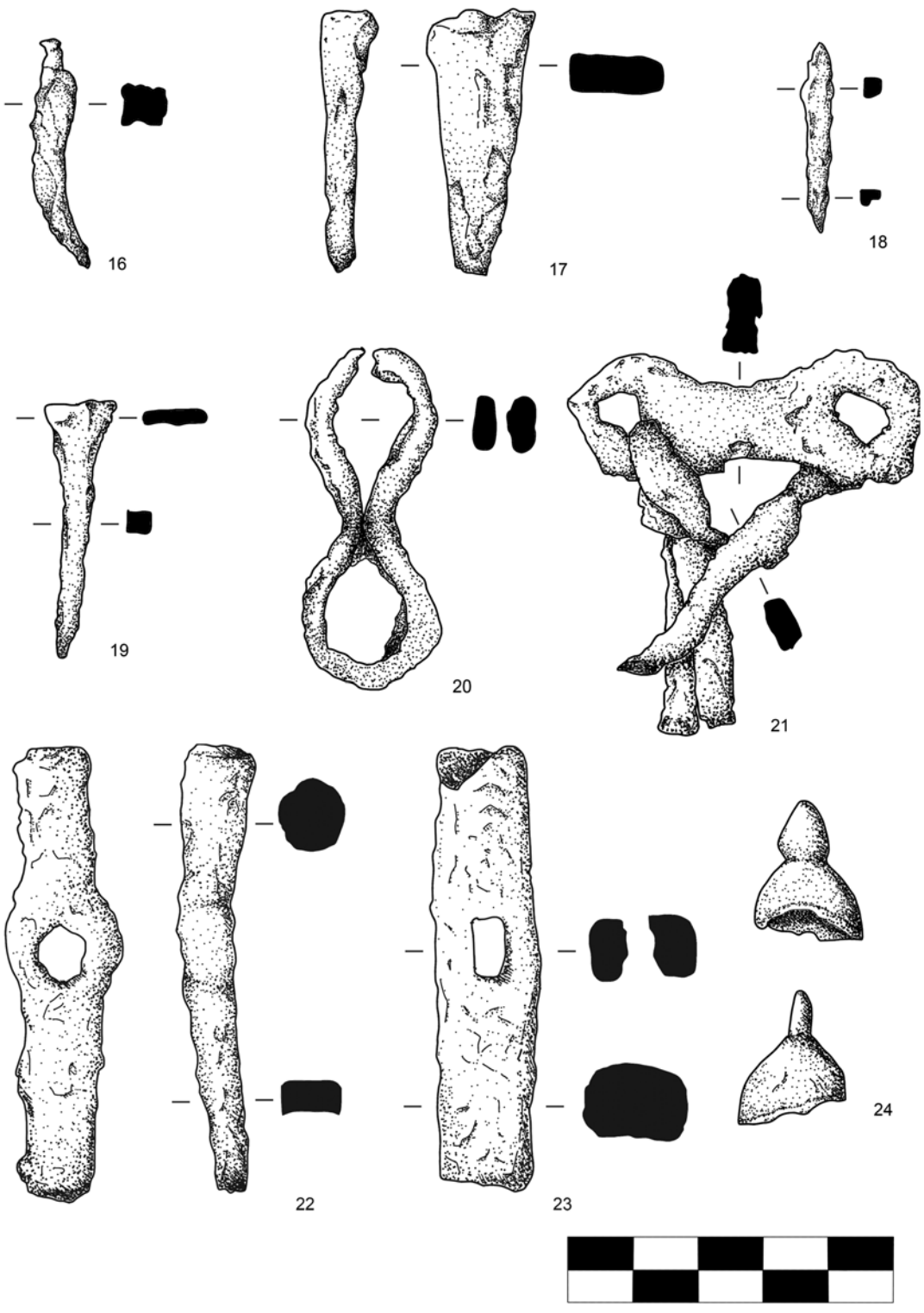


Fig. 3: tools; 16–23 iron, 24 bronze/copper alloy. 16–19: punch/awl, 20–21: chains, 22–23: hammer, 24: bell.

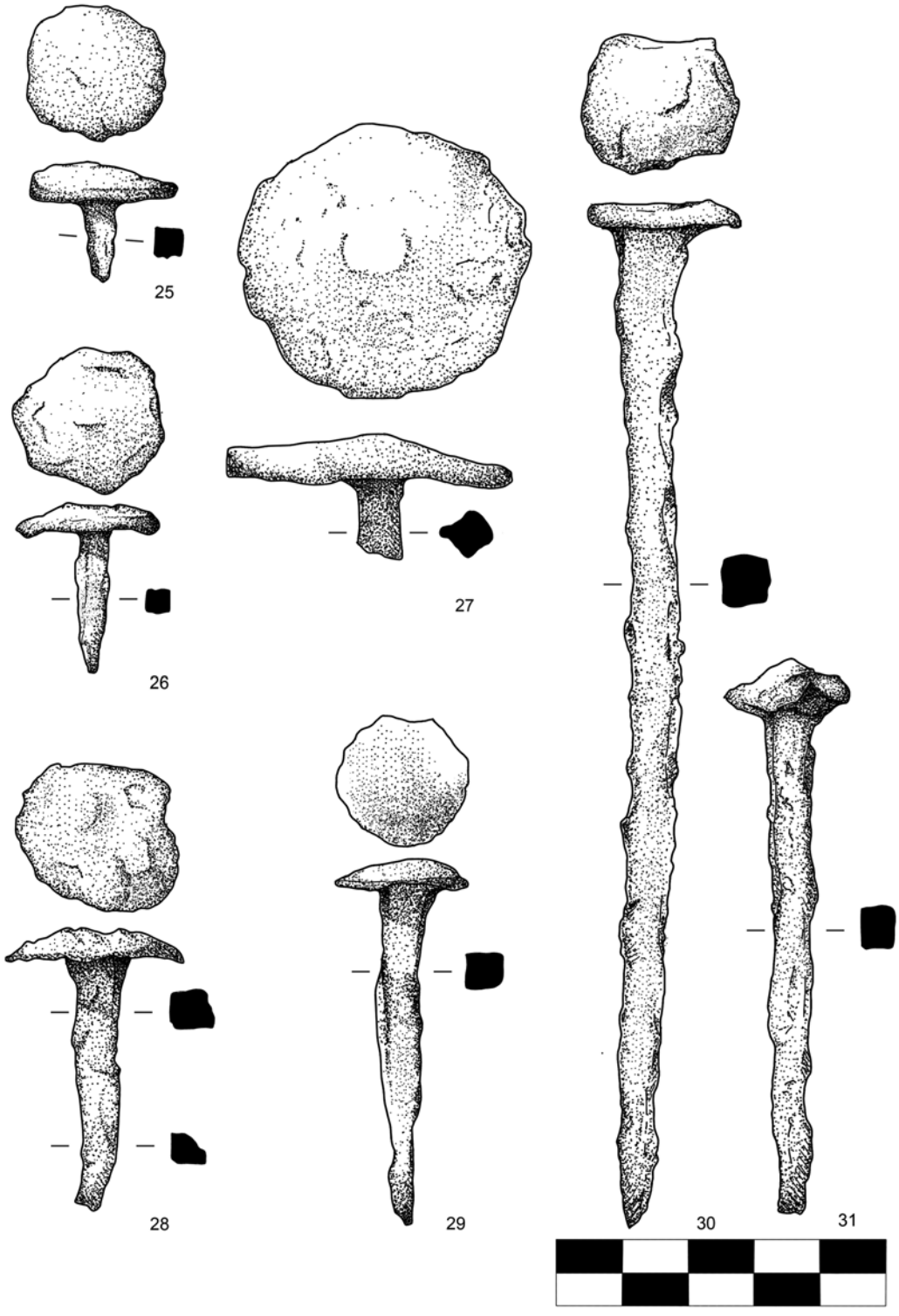


Fig. 4: construction elements; all iron. 25–31: nails.

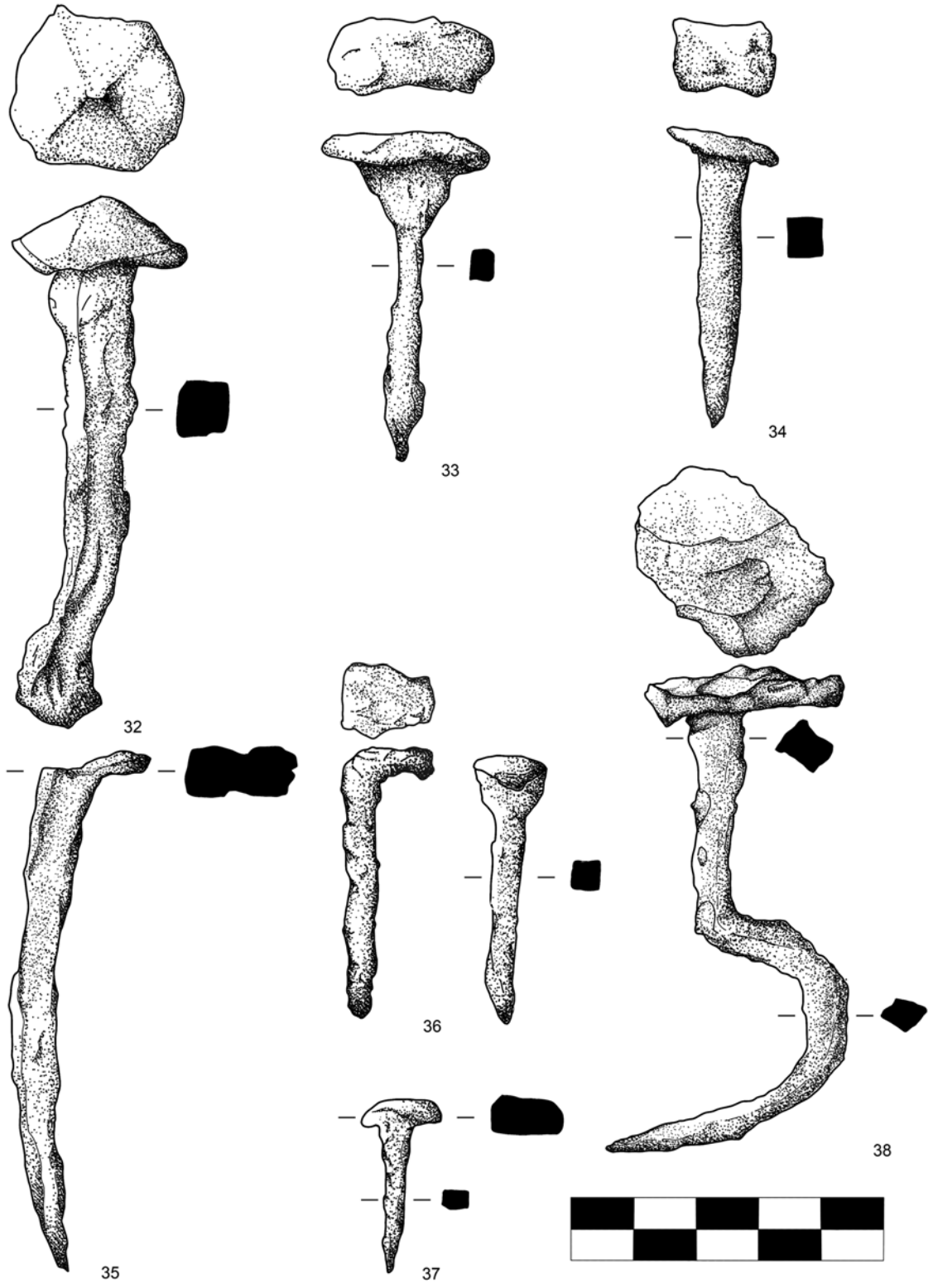


Fig. 5: construction elements; all iron. 32–38: nails.

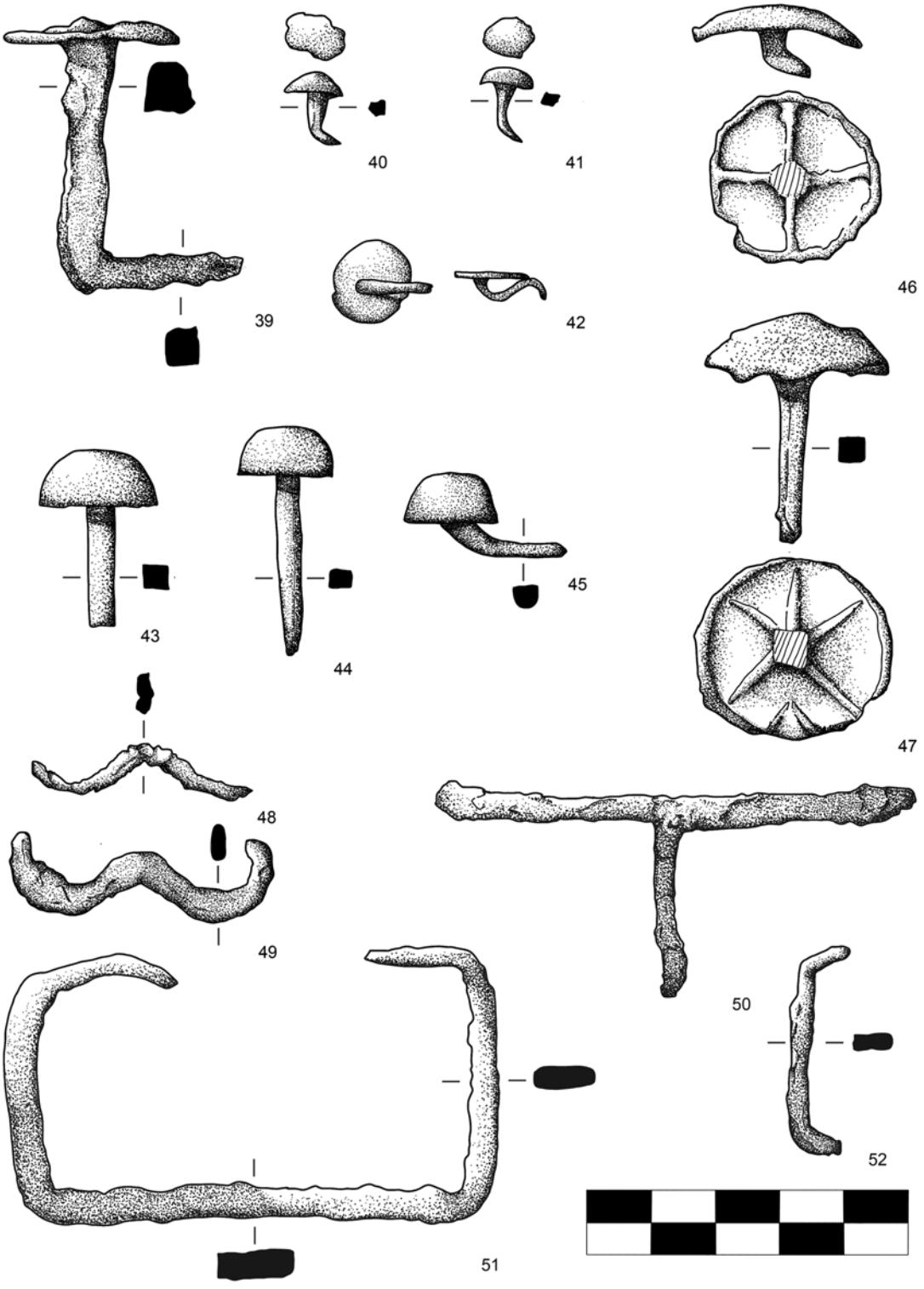


Fig. 6: construction elements; 42–47 bronze/copper alloy, rest iron. 39: nail, 40–41: hobnails, 42–47: fitting nails, 48–52: dogs/clamps.

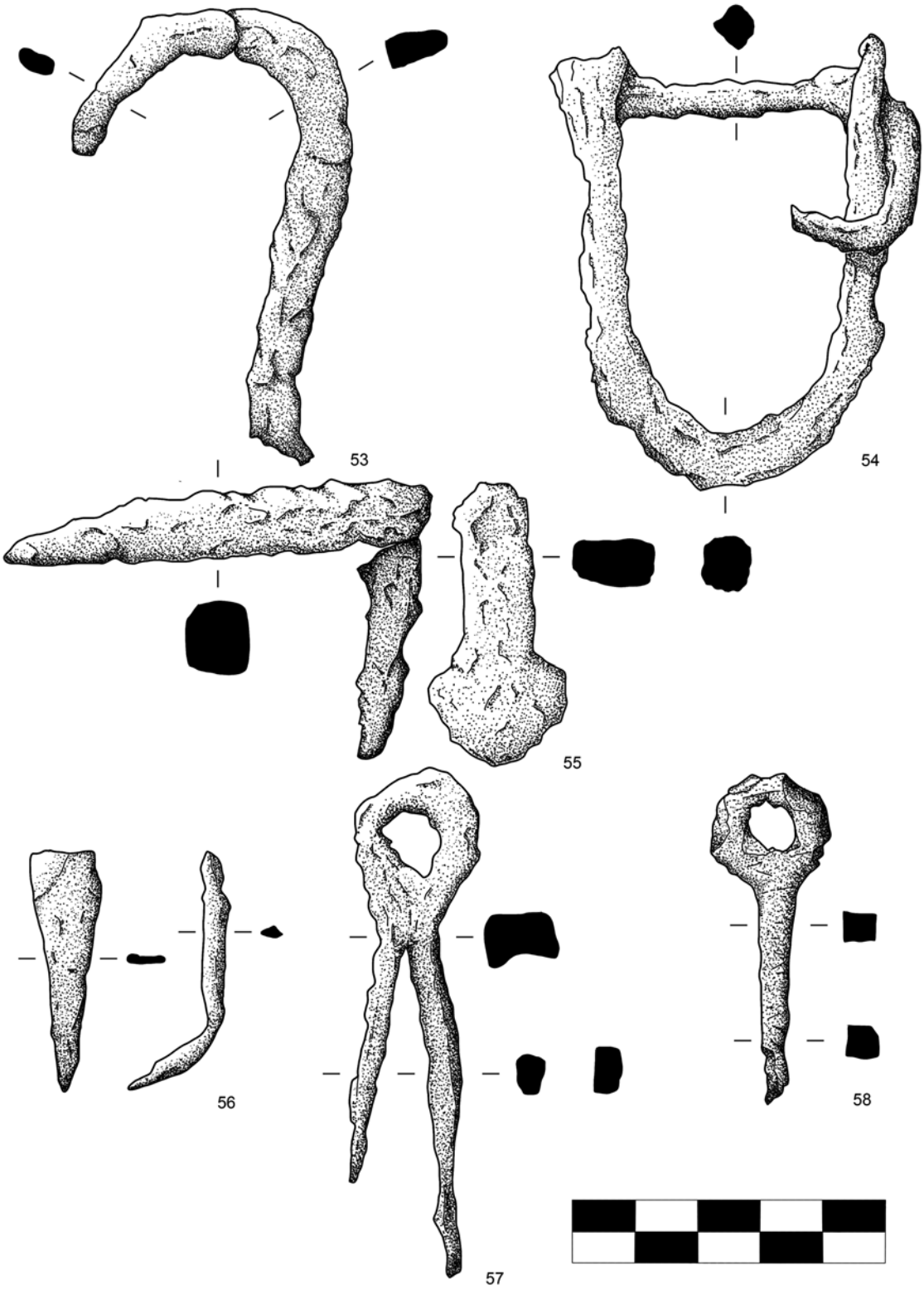


Fig. 7: construction elements; all iron. 53–56: dogs/clamps, 57: double spike loop, 58: ring headed spike.

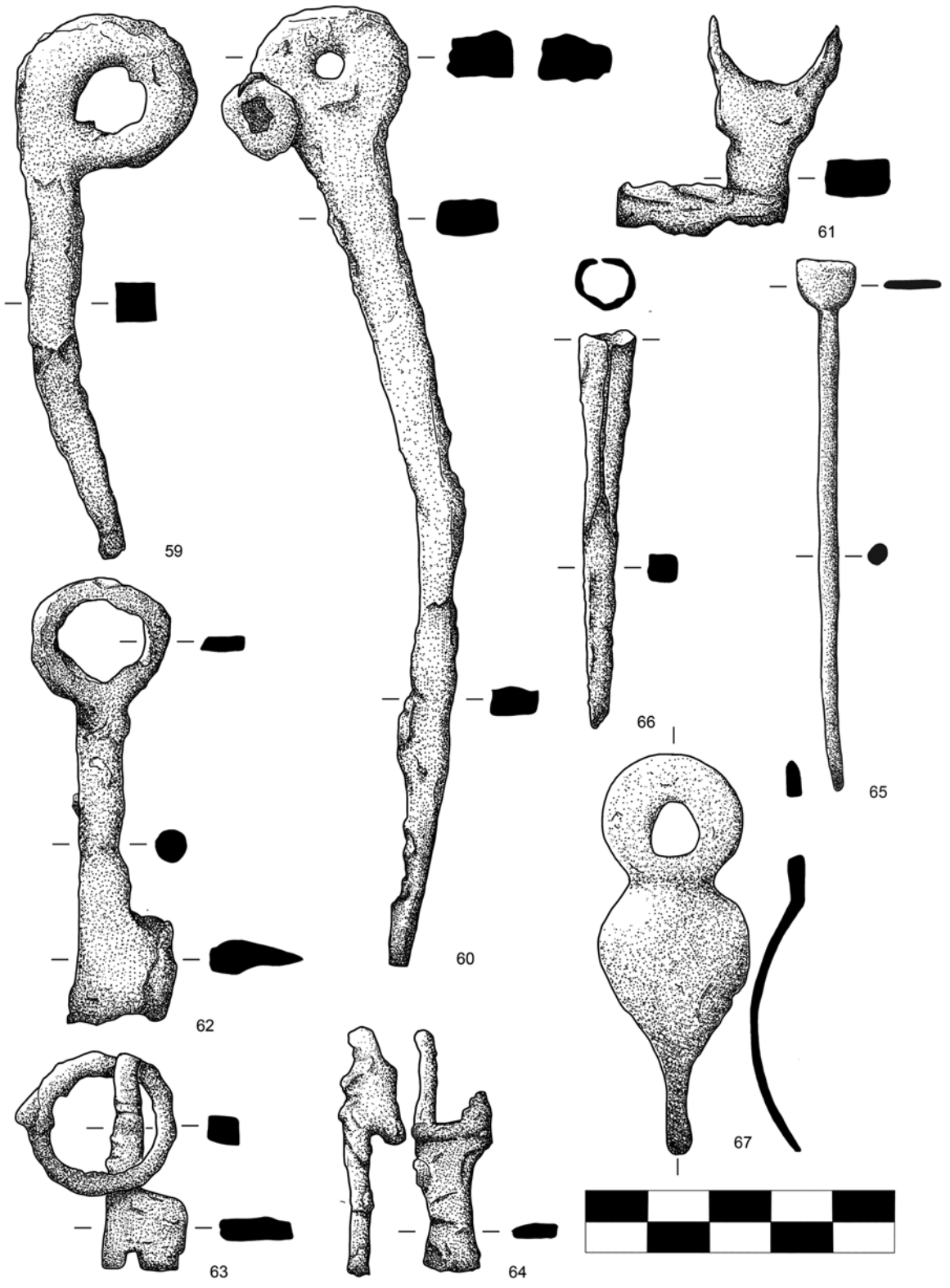
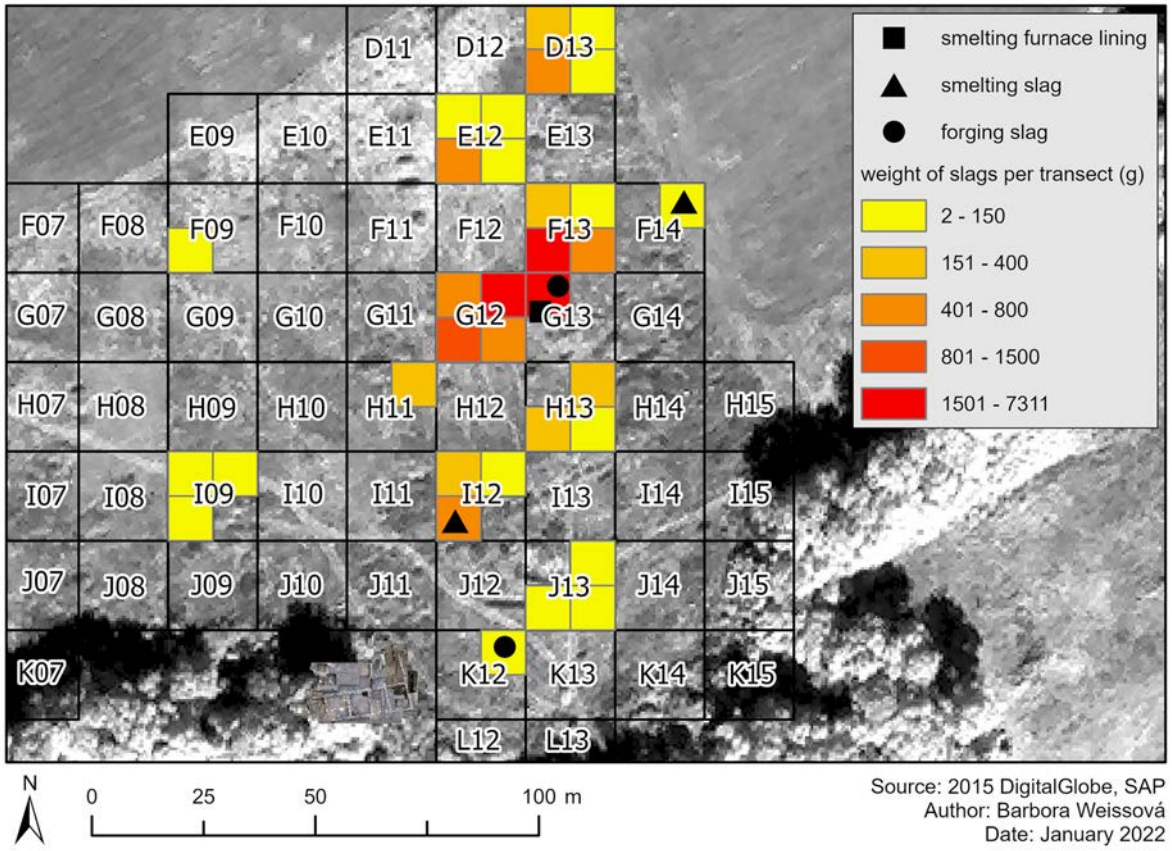


Fig. 8: construction elements and miscellanea; 65 and 67 bronze/copper alloy, rest iron. 59–60: ring headed spike, 61–63: keys, 64: locker, 65: stylus, 66: bolt-head, 67 vessel attachment.

A bronze leaf-shaped vessel attachment **no. 67** (**Fig. 8:67**) with an oval-shaped hole for the handle, might be associated with different bronze vessel forms, but most frequently with buckets and cauldrons. The fitting found at Yurta-Stroyno corresponds best to bell-shaped bronze buckets common in the Danubian provinces, especially in Noricum and Pannonia (Sedlmayer 1999, 102–109). For the area of the Lower Danube and Balkan Peninsula, these buckets were assigned a special sub-type Raev 3 of the type "Balchik" (Mustaţă 2017, 142–143). In Bulgaria, such buckets were found e.g., at Novi Banovtsi, Sliven, Sofia, Kaloyanovec, Stara Zagora and Balchik; all in the contexts of the 2nd half of the 2nd and 3rd c. AD (Raev 1977, 628–630). Similar leaf-shaped attachments were found in a burial mound in Slokoshititsa (Kyustendil District), dated from the mid-2nd till the 1st half of the 3rd c. AD (Meshekov – Staikova 1998). Production centres of bronze vessels in Thrace and Moesia Inferior are known from Augusta Traiana, Pautalia, Philippopolis, Marcianopolis and Odessos. Local workshops produced basic bronze vessel shapes with simple elements which could be easily manufactured. Nevertheless, in the context of the provinces of Moesia Inferior and Thrace even simple bronze vessels were considered to be higher quality household equipment (Nenova-Merdyanonova 2008, 32–44).

EVIDENCE OF METALWORKING



Map 1: Concentrations of smelting and forging slags and fragments of smelting furnace located at the surveyed area of Yurta-Stroyno.

During the surface survey of the Yurta-Stroyno settlement, several concentrations of bronze and lead production waste and piles of iron slag were identified. Besides these concentrations, specific fragments of daub, interpreted as parts of a furnace, were also detected. The total

amount of iron slag from the surface survey amounts to 19 kg with the main concentration in sectors: G13 – 7300 g, G12 – 4000 g and F13 – 2500 g (**Map 1**).

Selected representative samples of the lining of the smelting furnace, smelting slags, and forging slags (**Fig. 9**) were analysed by metallography and the X-Ray diffraction method (XRD). An overview of the analysed samples and applied methods is given in **Tab. 2**. The chemical formulas and quantified content of individual mineralogical phases of all samples analysed by XRD is given in **Tab. 3**. The microstructures of the slag samples **ST_02–05** are shown in **Fig. 10**. For a detailed description of the applied methodology of the analyses see Kmošek *et al.* 2016.

Sample	Polygon	Sect.	Analytical methods of study	Descriprion of the artefact
ST_01	G13	NW	XRD	smelting furnace lining
ST_02	I12	SW	XRD, metallography	smelting slag
ST_03	F14	NE	metallography	smelting slag
ST_04	K12	NE	XRD, metallography	forging slag
ST_05	G13	NW	XRD, metallography	forging slag

Tab. 2: Overview of analysed metallurgical samples and methods applied.

Mineral	Chemical formula	ST_01	ST_02	ST_04	ST_05
Spinel	$MgAl_2O_4$	15			
Quartz	SiO_2	37	8	6	20
Indialite	$K_{0.168}Ca_{0.042}Mg_{1.939}Fe_{0.061}Al_{4.251}Si_{4.749}O_{18}$	9			
Clinochlore	$Mg_5Al(AlSi_3O_{10})(OH)_8$	3			
Sepiolite	$Mg_4Si_6O_{15}(OH)_2 \cdot 6H_2O$	2			
Anorthoclase	$Na_{0.75}K_{0.25}AlSi_3O_8$	14			
Anorthite	$Na_{0.45}Ca_{0.55}Al_{1.55}Si_{2.45}O_8$	20			
Magnetite	Fe_3O_4		21	7	22
Fayalite	Fe_2SiO_4		8		
Wustite	FeO		31	49	26
Iscorite	Fe_7SiO_{10}		30		
Goethite	α-$Fe^{3+}O(OH)$		2	15	19
Leucite	$KAlSi_2O_6$			12	
Akaganeite	β-$Fe^{3+}O(OH,Cl)$			4	
Lepidocrocite	γ-$Fe^{3+}O(OH,Cl)$			5	
Iron	Fe				1
Clinoferrosilite	$Ca_{0.3}Fe_{1.7}Si_2O_6$				7
Kyanite	Al_2SiO_5				5

Tab. 3: Phase composition of metallurgical samples analysed by X-Ray diffraction method.

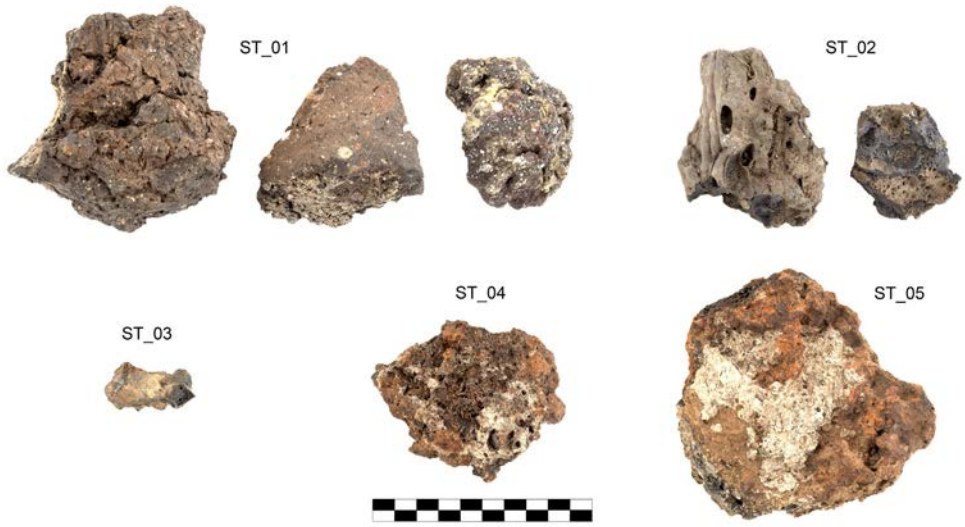


Fig. 9: Photo documentation of analysed metallurgical samples, author J. Kmošek.

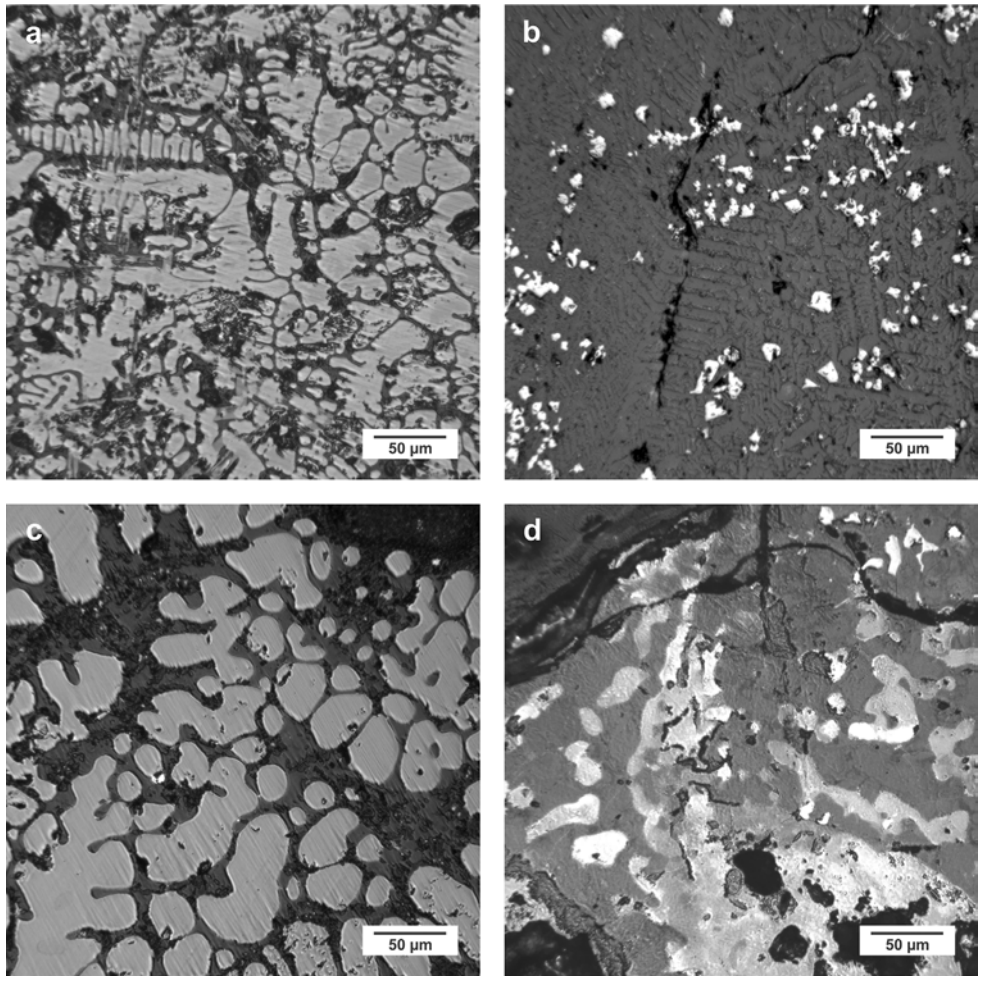


Fig. 10: Microstructures of analysed smelting and forging slags; a: ST_02, b: ST_03, c: ST_04, d: ST_05; author J. Kmošek.

The lining of the smelting furnace is identified on the basis of their complete firing and intensive surface vitrification, always visible on one side, caused by their exposure to high temperatures. The samples of the lining of the smelting furnace from Yurta-Stroyno (**Fig. 9:ST_01**) were analysed by XRD in order to gain information on the mineralogical composition of the material used for the construction of the metallurgical furnace. The analysed material consists predominantly of quartz, in smaller quantities of anorthite, spinel, anorthoclase and indialite, and admixtures of clinochlore and sepiolite.

On the basis of characteristic morphology and phase composition, the slag samples **Fig. 9:ST_02** and **ST_03** were identified as tapping slags, originating from the iron smelting process. The slag sample **Fig. 9:ST_02** with a dark grey colour and high density shows a typical phase composition, formed by the phases iron oxides (wustite, magnetite and goethite), iron silicates (iscorite and fayalite) and a glassy matrix with a portion of crystalline quartz phase (**Fig. 10:a**). In the slag microstructure there are visible light grey dendritic phases of wustite, middle grey laths of fayalite, surrounded by the dark grey magnetite phases and glassy matrix. In the microstructure of the second analysed smelting slag sample (**Fig. 9:ST_03**) there are visible light grey individual phases of iron spinels and laths of iron silicates in a glassy matrix (**Fig. 10:b**). The forging slags **Fig. 9:ST_04** and **ST_05** were identified on the basis of their characteristic plan-convex morphology, high content of corroded metallic iron and their phase composition. The slag sample **Fig. 9:ST_04** is mostly amorphous but also contains unequally distributed phases of iron oxides (wustite, magnetite and goethite), metallic iron and degradation products of metallic iron (akaganeite and lepidocrocite) and a phase of leucite in a glassy matrix (**Fig. 10:c**). The phase composition of the slag sample **Fig. 9:ST_05** is very similar to the previous sample and contains iron oxides (wustite, magnetite and goethite), metallic iron and phases of clinoferrosilite and kyanite, associated with a glassy matrix (**Fig. 10:d**).

The finds of iron slag and parts of a smelting furnace can be considered as evidence of local iron smelting activities. The concentration of the iron slags was located close to the glass workshop (Weissová – Tušlová – Bakardzhiev 2022, map 5), and we may assume the possible existence of a bigger production area located at the Yurta-Stroyno settlement. The traces of iron production are known also from other Roman period settlements in Bulgaria. In Nicopolis ad Istrum iron production activities took place in the 2nd c. AD (Cholakova 2006, 179); in Serdica a Roman workshop with traces of bronze production and iron smelting is known (Cholakova 2020); traces of iron smelting are also well known from *Regio Montanensium* – including the villages Gagantsy, Govezhda and Dylgi-Del (Alexandrov 1980, 393–396). Another example of iron smelting is known from *villa rustica* no. 3 in Montana (Alexandrov 1984, 15–17).

CONCLUSION

Even though the majority of the metal finds from Yurta-Stroyno do not have a precise archaeological context, it is still possible to identify and classify a number of them based on parallels from other Roman provincial sites. The studied assemblage shows typical items and trends characteristic for Roman provincial settlements. The majority of the metal finds were identified as constructional elements – nails, clamps, dogs, etc. – items which are by their nature the most numerous metals finds on almost every Roman period settlement. These objects (**Figs. 4–8**) are not chronologically sensitive and cannot help us with the dating of the settlement, however, they might bring us supplementary information about its construction. Besides the quite multifunctional nails of the 2nd and 3rd size group, nails of the 4th and biggest

size group were used for fixing robust wooden constructions and/or were meant to join roof timbers or parts of solid wood doors. Dogs and clamps were used as fastening elements for the wooden or metal sheets or panels. Selected nails or clamps might be used as decorative elements, both for furniture and building.

The most important part of the assemblage are the bronze belt/strap fittings (**Fig. 1:1–2**) which have numerous parallels at other Roman sites. The peltate fitting and belt fitting in the shape of plant tendrils are dated to the mid-2nd – first part of the 3rd c. AD. These fittings, as well as the two bronze appliques (**Fig. 1:3–4**), have direct parallels in the context of the Roman military settlements, and were quite common in the Roman western provinces (Radman-Livaja 2009, 1503). Another find that could be connected with the Roman army is an iron bolt-head, which might be used as a projectile for *catapulta*.

The fibula with a returned foot (**Fig. 1:6**) could not give us a precise chronology, but based on the other finds from Bulgaria and the surrounding countries we can date it to the 3rd–4th c. AD. One of the most interesting finds is the small bronze axe pendant (**Fig. 1:7**), which could be connected with Barbaricum and the Gothic cultural area. At the settlement there were also identified items dated to the Early Medieval period, such as the bronze cross-pendant (**Fig. 1:8**) and thr iron ring key (**Fig. 8:63**).

The collection of tools is quite heterogenous (**Figs. 2–3**), with the prevailing finds of punches and awls, typical for Roman and Late Antique settlements. There is only one example of a Roman bronze vessel, the small leaf shaped attachment (**Fig. 8:67**), identified as part of a bell-shaped bronze bucket of the type "Balchik" and dated to the mid-2nd – first part of the 3rd c. AD.

The identified metal finds from Yurta-Stroyno are mainly dated from the mid-2nd till the 3rd c. AD. However, several artefacts such as the fibula, the axe shaped pendant and the bronze belt buckle could be also dated to Late Antiquity (the 4th–5th c. AD; see **Tab. 4**). The cross-pendant and a folding key on a ring, both found during the surface survey, belong among the typical finds from the Early Medieval / High Medieval period. From the surface survey there are also finds of smelting slags, forging slags and parts of a smelting furnace (**Fig. 9**) which might be interpreted as evidence of metalworking taking place directly on the settlement. The identification of a Roman iron smelting workshop in the area is an important contribution towards the understanding of the local production and economy.

ACKNOWLEDGEMENT

This work was financially supported by the Ministry of Culture of the Czech Republic (DKRVO 2019–2023/17.VI.a, the National Museum, 00023272) and the DOC Fellowship of the Austrian Academy of Sciences at the Institute of Science and Technology in Art, Academy of Fine Arts Vienna. We would like to thank Dorothea Mildová for redrawing and digitalization of all the metal finds presented in the text.

No.	SF #	SU	Trench / Polygon	Sect.	SU specification	Group
1	SF14_151	SU023	100E_105N	SE	levelling layer	decoration
2	SF14_195	SU007	100E_100N	NE	virgin soil	decoration
3	SF14_017	SU001	100E_100N	NE	RT soil	decoration
4	SF15_083	SU040	100E_105N	NE	levelling layer	decoration
5	SF15_053	SU015	100E _105N	NE	topsoil	decoration
6	SF14_089	SU015	100E_105N	SW	topsoil	decoration
7	SF16_001	SU075	110E_100N	E	topsoil	decoration
8	SF16_F13_SE_13	×	F13	SE	survey	decoration
9	SF16_D13_NW_19	×	D13	NW	survey	decoration
10	SF16_159	SU083	110E_115N	N	wall	tools
11	SF16_D13_SE_14	×	D13	SE	survey	tools
12	SF16_F13_NE_08	×	F13	NE	survey	tools
13	SF16_I12_SE_02	×	I12	SE	survey	tools
14	SF15_222	SU052	100E_105N	NE	levelling layer	tools
15	SF15_217	SU052	100E_105N	NE	levelling layer	tools
16	SF14_149	SU023	100E_105N	SE	levelling layer	tools
17	SF16_179	SU084	100E_110N	SE	levelling layer	tools
18	SF16_D13_SE_23	×	D13	SE	survey	tools
19	SF16_E09_SW_11	×	E09	SW	survey	tools
20	SF16_F13_SE_14	×	F13	SE	survey	tools
21	SF16_J13_NE_02	×	J13	NE	survey	tools
22	SF15_126	SU036	100E_105N	SE	foundation trench of the wall SU018	tools
23	SF14_118	SU001	100E_105N	SE	RT soil	tools
24	SF14_079	SU001	100E_105N	N	RT soil	tools
25	SF14_040	SU005	090E_105N	×	topsoil	construction elements
26	SF16_E09_NE_08	×	E09	NE	survey	construction elements
27	SF15_259	SU020	105E_100N	SW	topsoil	construction elements
28	SF14_117	SU018	095E_105N	SE	wall	construction elements
29	SF14_136	SU013	105E_100N	NW	inner floor level	construction elements
30	SF16_E12_SE_09	×	E12	SE	survey	construction elements
31	SF14_020	SU001	100E_100N	S	RT soil	construction elements
32	SF16_G12_NE_23	×	G12	NE	survey	construction elements
33	SF16_012	SU074	105E_105N	NE/SE	wall	construction elements
34	SF16_062	SU078	100E_110N	SE+NE	levelling layer	construction elements

Type	Dimensions (mm)	Material	Chronology
belt fitting	l. 43, w. 13, th. 4	copper alloy	mid-2nd to mid-3rd c. AD
peltate mount	l. 28, w. 33, th. 3	copper alloy	mid-2nd to mid-3rd c. AD
fitting/stud	d. 26, l. 5, th.1	copper alloy	mid-2nd to mid-3rd c. AD
bronze boss	d. 18, h.16	copper alloy	mid-2nd to mid-3rd c. AD
bridle-fitting	l. 37, w. 22	copper alloy	×
fibula	l. 51, w. 6, th. 2	copper alloy	3rd–4th c. AD
pendant	l. 21, w. 8	copper alloy	3rd–5th c. AD
pendant	l. 38, w. 19, th. 4	copper alloy	11th–13th c. AD
ring	l. 9,5, w. 11, th. 1.5	copper alloy	1st–3rd c. AD
saw	l. 53, w. 22, th. 2	iron	×
knife	l. 98, w. 13, th. 4.5	iron	×
knife	l. 89, w. 10, th. 4	iron	×
knife	l. 121, w. 26, th. 5	iron	×
wegde (?)	l. 79, w. 15	iron	×
auger	l. 81, w. 17	iron	×
punch/awl	l. 35, w. 6	iron	×
punch/awl	l. 41, w. 16	iron	×
punch/awl	l. 28, w. 3	iron	×
punch/awl	l. 39, w. 11	iron	×
chain	l. 51, w. 21	iron	×
chain	l. 52, w. 48	iron	×
hammer	l. 70, w. 48	iron	Roman
hammer	l. 66, w. 17	iron	Roman
bell	l. 22, w. 17	copper alloy	×
nail	d. 22, th. 7	iron	×
nail	d. 24, th. 6	iron	×
nail	d. 46, l. 18	iron	×
nail head Type 1	l. 40, th. 6	iron	×
nail head Type 1	l. 56, th. 7	iron	×
nail head Type 1	l. 154, th. 10	iron	×
nail head Type 2	l. 82, th. 6	iron	×
nail head Type 2	l. 68, th. 8	iron	×
nail head Type 3	l. 51, th. 5	iron	×
nail head Type 3	l. 45, th. 6	iron	×

No.	SF #	SU	Trench / Polygon	Sect.	SU specification	Group
35	SF16_E09_NE_03	×	E09	NE	survey	construction elements
36	SF16_092	SU001	110E_110N	S	RT soil	construction elements
37	SF14_059a	SU001	100E_100N	N	RT soil	construction elements
38	SF16_021	×	115E_110N	NW	×	construction elements
39	SF14_002	SU001	100E_100N	×	RT soil	construction elements
40	SF14_063a	surface	surface	×	survey	construction elements
41	SF14_063b	surface	surface	×	survey	construction elements
42	SF14_100	SU020	105E_100N	NW	topsoil	construction elements
43	SF16_197	SU001	110E_115N	×	RT soil	construction elements
44	SF16_G12_NE_29	×	G12	NE	survey	construction elements
45	SF15_068	SU038	100E_105N	NE	levelling layer	construction elements
46	SF14_024	×	100E_100N	SE	×	construction elements
47	SF16_E12_NW_16	×	E12	NW	survey	construction elements
48	SF15_019	SU001	100E_105N	SW	RT soil	construction elements
49	SF15_237	SU059	100E_105N	NE	levelling layer	construction elements
50	SF16_180	FA08	105E_105N	NW	levelling layer	construction elements
51	SF16_F13_NE_09	×	F13	NE	survey	construction elements
52	SF16_E12_NE_15	×	E12	NE	survey	construction elements
53	SF16_020	SU075	110E_100N	NE	topsoil	construction elements
54	SF15_233	SU057	100E_105N	SE	fill of a ditch	construction elements
55	SF15_173	SU001	95E_100N	×	RT soil	construction elements
56	SF15_137	SU033	95E_100N	NE	levelling layer	construction elements
57	SF14_115	SU001	100E_100N	SE	RT soil	construction elements
58	SF14_001	SU001	100E_100N	×	RT soil	construction elements
59	SF15_298	SU065	100E_105N	NE	virgin soil	construction elements
60	SF16_G11_NE_03	×	G11	NE	survey	construction elements
61	SF16_G12_SE_21	×	G12	SE	survey	miscellanea
62	SF15_170	SU001	95E_100N	Room B	RT soil	miscellanea
63	SF16_E12_NW_07	×	E12	NW	survey	miscellanea
64	SF16_157	SU084	100E_110N	SE+SW	levelling layer	miscellanea
65	SF14_155	SU001	100E_100N	SE	RT soil	miscellanea
66	SF16_E12_NW_11	×	E12	NW	survey	miscellanea
67	SF15_147	SU052	100E_105N	NE	levelling layer	miscellanea

Tab. 4: Selected metal finds from Yurta-Stroyno. All dimensions in millimetres; l. = length, h. = height, w. = width, th. = thickness, d. = diameter.

Type	Dimensions (mm)	Material	Chronology
nail head Type 4	l. 80, th. 7	iron	×
nail head Type 4	l. 42, th. 4	iron	×
nail	l. 28, th. 5	iron	×
nail	l. 77, th. 6	iron	×
nail	l. 43, th. 6	iron	×
hobnail	l. 13, th. 3	iron	×
hobnail	l. 13, th. 4	iron	×
fitting nail	d. 2, th. 2	copper alloy	×
fitting nail	l. 28, th. 3	copper alloy	×
fitting nail	l. 37, th. 3.5	copper alloy	×
fitting nail	l. 27, th. 3	copper alloy	×
fitting nail	d. 26, th. 5	copper alloy	×
fitting nail	d. 34, th. 5	copper alloy	×
dog/clamp	l. 34, th. 6	iron	×
dog/clamp	l. 41, th. 4	iron	×
dog/clamp	l. 45, w. 34	iron	×
dog/clamp	l. 75, w. 34	iron	×
dog/clamp	l. 32, w. 6	iron	×
dog/clamp	l. 75, w. 55	iron	×
dog/clamp	l. 78, w. 53	iron	×
dog/clamp	l. 67, w. 46	iron	×
dog/clamp	l. 40, th. 11	iron	×
double spike loop	l. 82, w. 21	iron	×
ring headed spike	l. 51, th. 6	iron	×
ring headed spike	l. 86, th. 29	iron	×
ring headed spike	l. 150, th. 12	iron	×
key	l. 36, w. 27, th. 7	iron	2nd–4th c. AD (?)
key	l. 81, w. 26	iron	1st–3rd c. AD (?)
key	l. 35, th. 4	iron	Roman–Medieval period
locker	l. 40, w. 12, th. 2	iron	×
stylus	l. 82, w. 21, th. 8	copper alloy	1st–3rd c. AD
bolt-head	l. 64, d. 5.5	iron	×
vessel attachment	l. 62, w. 23	copper alloy	mid-2nd– mid-3rd c. AD

ABBREVIATIONS

AB = Archaeologica Bulgarica
AOR = Археологически открития и разкопки
BAR = British Archaeological Reports
SH = Studia Hercynia

BIBLIOGRAPHY

Alexandrov, G. 1980: Goldgewinnung im Gebiet von Montana in der Antike. In: R. Vulpe (ed.): *Actes Du II Congres International De Thracologie, Histoire et Archeologie.* Bucureşti, 389–397.

Alexandrov 1984 = Александров, Г. 1984: Антична вила N 3 край Михайловград. *Известия на музеите от Северозападна България* 9, 9–45.

Almgren, O. 1923: *Studien über Nordeuropäische Fibelformen der ersten nachchristlichen Jahrhunderte mit Berücksichtigung der provinzial-römischen und südrussischen Formen*. Leipzig.

Ambroz = Амброз, А. 1966: *Фибулы юга европейской части СССР*. Археология СССР. *Свод археологических источников*. *Выпуск* Д1-30. Москва.

Bakardzhiev 2008 = Бакърджиев, С. 2008: Сондажни археологически проучвания в м. Юрта при с. Стройно, община Елхово. *AOR през 2007 г.*, 471–473.

Biernacki, A. – Różycki, Ł. 2018: Early Byzantine Arms and Weapons from the Episcopal Complex in Novae. In: L. Vagalinski – M. Raycheva – D. Boteva – N. Sharankov (eds.): Proceedings of the First International Roman and Late Antique Thrace Conference "Cities, Territories and Identities". Plovdiv, 3rd–7th October 2016. Sofia, 453–466.

Bishop, M.C. – Coulston, J.C.N. 2006: *Roman military equipment. From the Punic Wars to the fall of Rome*. Oxford.

Cholakov 2010 = Чолаков, И. 2010: *Римски и ранновизантийски метални инструменти от територията на България (I – началото на VII век)*. София.

Cholakova 2006 = Чолакова, А. 2006: *Металургични производства в ранната история на Никополис ад Иструм*. Известия на Националния археологически институт XXXIX, 163–183.

Cholakova, A. 2020: Metalworking in Serdica – summary of the data from the excavations at St. Nedelya Square (2015–2018 campaigns). In: V. Katsarova – K. Petkova (eds.): *The Archaeological Heritage at St. Nedelya Square*. Sofia, 155–166.

Crummy, N. 1981: *The Roman Small Finds from Excavations in Colchester, 1971–1979*. Colchester Archaeological Reports 2. Colchester.

Deschler-Erb, E. 1999: *Ad arma! Römisches Militär des 1. Jahrhunderts n. Chr. in Augusta Raurica*. Augst.

Diaconu, Gh. 1971: Über die Fibel mit umgeschlagenem Fuss in Dazien. *Dacia* 15, 239–267.

Fischer, T. 2014: *Die Armee der Caesaren: Archäologie und Geschichte*. Regensburg.

Florek, M. 2008: Nowe znaleziska zawieszek w kształcie miniaturowego topora z okresu rzymskiego. *Archeologia Polski Środkowowschodniej* 10, 249–252.

Fütterer *et al.* 2018 = Fütterer, F. – Krebstakies, S. – Reich, Ch. – Eilbracht, H. – Reiche, I. – Schwerdtfeger, S. 2018: Silber oder Zinn? Kaiserzeitliche Objekte mit Oberflächenveredelung aus dem Gräberfeld von Oberhof (Aukštkiemiai). *Acta Praehistorica et Archaeologica* 50, 323–383.

Gacuta, W. 1993: Przedmioty metalowe z Novae. 6 kampanii wykopaliskowych ekspedycji archeologicznej Uniwersytetu warszawskiego w latach 1977–1987. In: L. Press (ed.): *Novensia. Badania Ekspedycji Archeologicznej Universitetu Warszawskiego w Novae* 5. Warszawa, 7–177.

Genčeva, E. 2000: Metalowe części wyposażenia żołnierskiego z Novae. *Novensia* 12, 49–98.

Gencheva 2004 = Генчева, Е. 2004: *Римските фибули от България от края на I в. пр. н. е. до края на VI в. на н.е.* Велико Търново.

Gencheva, E. 2016: Metal finds from large military thermae in Novae. In: A.B. Biernacki (ed.): *The Large Legionary Thermae in Novae (Moesia Inferior) (2nd–4th cent. A.D.)*. Poznań, 187–222.

Ghey, E. 2019: Small finds, excluding iron and bone. In: A.G. Poulter (ed.): *The Transition to Late Antiquity on the Lower Danube: Excavations and Survey at Dichin, a Late Roman to early Byzantine Fort and a Roman Aqueduct*. Oxford, 281–320.

Gomolka-Fuchs, G. 1982: Die Kleinfunde vom 4. bis 6. Jh. aus Iatrus. In: B. Böttger (ed): *Iatrus – Krivina. Spätantike Befestigung und frühmittelalterliche Siedlung an der unteren Donau* II. *Ergebnisse der Ausgrabungen 1966–1973*. Schriften zur Geschichte und Kultur der Antike 17. Berlin, 149–205.

Greiner, B.A. 2008: *Rainau-Buch II. Der römische Kastellvicus von Rainau-Buch (Ostalbkreis). Die archäologischen Ausgrabungen von 1976 bis 1979*. Forschungen und Berichte zur Vor- und Frühgeschichte in Baden-Württemberg. Stuttgart.

Greiner, B.A. 2010: *Rainau-Buch II. Der römische Kastellvicus von Rainau-Buch (Ostalbkreis). Die archäologischen Ausgrabungen von 1976 bis 1979.* 1 – Text; 2 –Katalog und Tafeln. Forschungen und Berichte zur Vor- und Frühgeschichte in Baden-Württemberg. Stuttgart.

Gschwind, M. 2004: *Abusina. Das römische Auxiliarkastell Eining an der Donau vom 1. bis 5. Jahrhundert n. Chr*. Munchen.

Heřmánková, P. 2022: The Numismatic Finds. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 133–144.

Inkova 2011 = Инкова, М. 2011: *Кръстовете от Якоруда*. София.

Kmošek *et al.* 2016 = Kmošek, J. – Odler, M. – Jamborová, T. – Msallamová, Š. – Kmoníčková, M. 2016: Archaeometallurgical Study of Copper Alloy Tools and Model Tools from the Old Kingdom Necropolis at Giza. In: M. Odler (ed.): *Old Kingdom Copper Tools and Model Tools*. Oxford, 238–248.

Kokowski, A. 1995: *Grupa Masłomęcka. Z badań nad przemianami kultury Gotów w młodszym okresie rzymskim*. Lublin.

Kokowski, A. 1997: Metalowe wisiorki w ksztalcie topora na terenie Barbaricum na pólnocny-wschód od limes rzymskiego, w okresie rzymskim i we wczesnym okresie wędrówek ludów. In: A. Kokowski (ed.): *20 lat archeologii w Masłomeczu* I. Lublin, 99–116.

Könemann, P. 2018: *Die kaiserzeitlichen Bunt- und Edelmetallfunde von Kamen-Westick. Verarbeitung römischer Metallimporte in einer germanischen Siedlung*. Raw Materials, Innovation, Technology of Ancient Cultures RITaK 5. Der Anschnitt Beiheft 37. Bochum.

Laharnar, B. 2015: The Roman Army in the Notranjska Region. In: J. Istenič – B. Laharnar – J. Horvat (eds.): *Evidence of the Roman Army in Slovenia*. Catalogi et Monographiae 41. Ljubljana, 9–41.

Laharnar, B. 2016: Small Finds from the Roman Fort at Nadleški Hrib, the Notranjska Region (SW Slovenia). In: J. Horvat (ed.): *The Roman Army between the Alps and the Adriatic*. Opera Instituti Archaeologici Sloveniae 31/Studium Alpium et Adriae I. Ljubljana, 85–97.

Litwinowicz, P. 2010: Wstęp do typologii gwoździ brązowych *ze* stanowiska *w* Risan. *Novensia* 21, 165–176.

Magomedov 2001 = Магомедов, Б. 2001: *Черняховская культура. Проблемы этноса*. Monumenta Studia Gothica I. Lublin.

Manning, W.H. 1985: *Catalogue of Romano-British Iron Tools, Fittings and Weapons in the British Museum*. London.

Manning, W.H. 2019: The ironwork. In: A.G. Poulter (ed.): The Transition to Late Antiquity on the Lower Danube: Excavations and Survey at Dichin, a Late Roman to early Byzantine Fort and a Roman Aqueduct. Oxford, 321–370.

Meshekov, J. – Staikova, L. 1998: A Rich Tracian Mound Burial from the Roman Period at the Village of Slokoshtitsa, Kiustendil District (South-Western Bulgaria). *AB* II/3, 51–67.

Mustaţă, S. 2017: *The Roman Metal Vessels from Dacia Porolissensis*. Patrimonium Archaeologicum Transylvanicum 12. Cluj-Napoca.

Müller, M. 2011: Schüssel und Schloss im römischen Alltag. In: M. Reuter – R. Schiavone (eds.): *Gefährliches Pflaster: Kriminalität im römischen Reich.* Mainz, 19–41.

Nenova-Merdyanova, R. 2008: Roman Bronze Vessels from Moesia and Thracia. In: R.T. Ivanov (ed.): *Archaeology of the Bulgarian Lands* 3. Sofia, 28–49.

Oldenstein, J. 1976: *Zur Ausrüstung römischer Auxiliareinheit. Studien zu Beschlägen und Zierat an der Ausrüstung der römischen Auxiliareinheiten des obergermanisch-raetischen Limesgebiet aus dem zweiten un dritten Jahrhundert n.Chr*. Bericht der Römisch-germanischen Kommission Band 57/1976. Frankfurt am Main.

Olędzki, M. – Ziętek, J. 2014: Fibule typu A.162 na obszarze kultury przeworskiej. In: A. Jaszewska – M. Olędzki (ed.): *Kultura przeworska: odkrycia, interpretacje, hipotezy* 3. Zielona Góra, 113–151.

Peltz, U. 2010: *Nägel, Stifte*, Niete... Eine Typologie der Befestigungstechnik im Heraion von Samos. *Archäologischer Anzeiger* 2, 23–38.

Peltz, U. 2011: *Nägel, Stifte*, Niete. Befestigungstechnik im samischen Heraion. BAR International Series 2266. Oxford.

Pencheva 2016 = Пенчева, Е. 2016: Ключове и части от заключващи механизми, открити в сграда от римската епоха в м. Дана бунар, в землището на с. Георги Добрево, общ. Любимец. In: Н. Кирова (ed.): *Сборник в памет на Магдалина Станчева* 6. Сердика – Средец – София, 111–117.

Petković, S. 2010: *Rimske fibule u Srbiji ot I do V veka n. e*. Beograd.

Poulter, A.G. 2007: The Metalwork. In: A.G. Poulter (ed.) 2007: *Nicopolis ad Istrum: A Roman to Early Byzantine City. The Pottery and Glass*. London, 15–65.

Radman-Livaja, I. 2009: Roman Horse Harness Fittings from Burgenae. In: A. Morillo – N. Hanel – E. Martín (eds.): *Limes XXth International Congress of Roman Frontier Studies*. Madrid, 1499–1508.

Riha, E. 1990: *Der römische Schmuck aus Augst und Kaiseraugst mit naturwissenschaftlichen Beiträgen*. Forschungen in Augst 10. Augst.

Rodzińska-Nowak, J. 2001: Transkarpatische Kontakte der Bevölkerung der Przeworsk-Kultur in der römischen Kaiserzeit am Beispiel der Funde aus Siedlung in Jakuszowice, Gde. Kazimierza Wielka, Woiw. Świętokrzyskie. In: E. Istvánovits – V. Kulcsár (eds.): *International Connections of the Barbarians of the Carpathian Basin in the 1st–5th centuries A.D*. Aszód – Nyíregyháza, 320–323.

Rothkegel, R. 1994: *Der römische Gutshof von Laufenburg*. Forschungen und Berichte zur Vor- und Frühgeschichte in Baden-Württemberg 43. Stuttgart.

Rybová, A. 1988: Addenda zu dem Gräberfeld vom Beginn der Völkerwanderungszeit in Radotín. *Památky archeologické* 79, 170–182.

Schaltenbrand Obrecht, V. 2012: *Stilus. Kulturhistorische, typologischchronologische und technologische Untersuchungen an römischen Schreibgriffeln von Augusta Raurica und weiteren Fundorten*. Forschungen in Augst 45/1–2. Augst.

Schleiermacher, M. 2000: Römisches Pferdegeschirr aus den Kastellen Saalburg, Zugmantel und Feldberg. *Saalburg Jahrbuch* 50, 167–193.

Scholz, M. 2009: *Das Reiterkastell Aquileia/Heidenheim. Die Ergebnisse der Ausgrabungen 2000–2004*. Forschungen und Berichte zur Vor- und Frühgeschichte in Baden-Württemberg 110. Stuttgart.

Tejral, J. 2011: *Einheimische und Fremde. Das norddanubische Gebiet zur Zeit der Völkerwanderungszeit*. Spisy Archeologického ústavu AV ČR v Brně, v. v. i. 33. Brno.

Torbatov, S. 2013: Small Finds. In: S. Torbatov (ed.): The Sanctuary of the Thracian Horseman by Sostra. Troyan, 201–228.

Uenze, S. 1992: *Die spätantiken Befestigungen von Sadovec (Bulgarien): Ergebnisse der deutsch-bulgarisch-österreichischen Ausgrabungen 1934–1937*. Münchner Beiträge zur Vor- und Frühgeschichte 43. München.

Vikan, G. 1980: *Security in Byzantium. Locking, Sealing, Weighing*. Washington D.C.

Walke, N. 1965: *Das römische Donaukastell Straubing-Sorviodurum*. Limesforschungen 3. Berlin.

Weissová, B. – Tušlová, P. – Bakardzhiev, S. 2022: Systematic Selective Survey of Yurta-Stroyno. A Methodological Approach to Sites Heavily Disturbed by Looters. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 53–69.

Ziemlińska-Odojowa, W. 1999: *Niedanowo, Ein Graberfeld der Przeworsk- und Wielbark-Kultur in Nordmasowien*. Monumenta Archaeologica Barbarica VII. Kraków.

Viktoria Čisťakova
Department of Prehistory and Classical Antiquity
National Museum
Vinohradská 1, CZ-110 00 Prague 1
viktoria.cistakova@nm.cz

Jiří Kmošek
Institute of Science and Technology in Art
Academy of Fine Arts Vienna
Schillerplatz 3, A-1010 Vienna, Austria
&
Nuclear Physics Institute
Czech Academy of Sciences
Řež 130, CZ-250 68 Řež
kmosekj@gmail.com

Archaeological and Archaeometric Study of the Roman and Late Antique Glass

Viktoria Čisťakova – Zuzana Zlámalová Cílová

ABSTRACT

1413 glass fragments were found at the settlement of Yurta-Stroyno during the three years of excavation and one year of the surface survey. Most of the retrieved glass was highly fragmented, which is a result of the fragility of the material itself as well as of its deposition in secondary contexts. The glass collection from Yurta-Stroyno includes a wide range of vessels and glass items, such as personal ornaments and windowpanes. For the vessels, high quality glass was used, resulting in thin-walled fragments made of translucent, colourless glass, with a minimum of impurities. The glass was decorated by wheel-cutting, mould blowing and applied threads. During the surface survey, a group of specific glass fragments was found, later identified as waste from glass production. These include threads, drops, moils, heat-melted fragments and fragments of raw glass, with the latter counting 81 pieces with total weight of 189 g.

The retrieved glass material was first typologically classified and preliminary dated based on comparative data from other settlements, further, the method of XRF analysis was chosen to complement the data needed to interpret the finds. The analysed set of samples represents a selection of different glass objects (89 pcs.), and fragments of the raw glass and the production waste (including production indicators; 28 pcs.).

KEYWORDS

Thrace; Roman glass; Late Antique glass; XRF analyses; Roman settlement; *vicus*.

INTRODUCTION

In total 1413 glass fragments were found at the Roman rural settlement of Yurta–Stroyno (**Tab. 1**), counting together the material collected during the excavations of the house in 2014–2016 (Tušlová – Weissová – Bakardzhiev 2022), and during the surface survey of the settlement in 2016 (Weissová – Tušlová – Bakardzhiev 2022). The majority of the finds are small fragments of glass vessels accompanied by much smaller amounts of personal ornaments (beads, ring, and bracelets), windowpanes and other variable items (such as a gaming counter and *tessera*). A specific group of finds is represented by glass production waste and by raw glass.

Year	Excavation (pcs.)	Surface survey (pcs.)	Total (pcs.)
2014	167	×	167
2015	290	96	386
2016	230	630	860
Total (pcs.)	687	726	**1413**

Tab. 1: An overview of glass fragments found at Yurta-Stroyno.

The glass fragments were either found on the surface of the settlement area, in the soil excavated by looters, or in the levelling layer, which is a mixture of settlement waste with a material dated from the 2nd till 5th c. AD. Consequently, there were no original contexts to help to date the finds and the chronological classification of the whole material was mostly based on comparison with well dated glass finds published from Bulgaria and other countries, as well as on glass finds exhibited in local regional museums. Additionally, chemical analysis was applied to the selection of fragments (117 pcs.) to confirm, or improve, the chronological classification of the glass collection.

Due to the physical nature of glass, its fragmentation is quite high. The state of its preservation meant that almost 71% of all glass fragments (997 pcs.) could not be accurately identified and classified. From the rest, about 17% of all the sherds could be attributed to specific type of a vessel. The decorated fragments are represented by ca. 4% of the material; and the windowpanes identified in the assemblage features only little over 1% (see **Tab. 2**), which is significantly lower amount than at other Roman period settlements. E.g., at Nicopolis ad Istrum is known rich collection of windowpanes with different amount of findings, ranging from 1.8% (in area B) to 37.73% (in area R) (Shepherd 1999, 304–311). The raw glass, together with the glass production waste, make up almost 8% of the total amount of glass finds.

The Roman glass can have very variable colours, and dozens of different shades might be recognized.[1] Consequently, it was necessary to divide and to define the colour groups as accurately as possible (see **Tab. 3**). The group of colourless glass (57%) includes translucent

Main group	Fragments (pcs.)	Fragments (%)
classifiable glass vessels	233	16.5
decorated fragments	51	3.6
windowpanes	19	1.3
raw glass	81	5.7
glass waste	32	2.3
unidentifiable fragments	997	70.6
Total (pcs.)	**1413**	**100**

Tab. 2: General overview of glass groups from Yurta-Stroyno.

Colour of the glass	Fragments (pcs.)	Fragments (%)
colourless	803	56.8
blue-green	550	38.9
green/olive green	29	2
light-yellow	18	1.3
amber	5	0.4
other (blue, purple, red, violet-grey)	8	0.6
Total (pcs.)	**1413**	**100**

Tab. 3: Overview of glass colour groups from Yurta-Stroyno.

1 The glass colour identification often depends on the subjective perceptions of the observer.

glass. The so-called blue-green glass (39%) is a naturally tinted glass that has not undergone a complete decolouring process.[2] Glass fragments with some variations in shade (ranging from light turquoise to intense blue shades) are also included in this group. In addition, few smaller groups of uncoloured glass were set aside – the green/olive green (2%) and light-yellow glass (1.3%). Glass with a specific amber colour and glass intentionally coloured by blue, cobalt blue and purple colour (1%) are listed separately.

TYPOLOGICAL CLASSIFICATION OF THE GLASS VESSELS AND OTHER OBJECTS

The glass vessels were classed into the two basic groups: drinking vessels, and bottles/jars/flagons (**Tab. 5**; **Figs. 1–7**).[3] Decorated fragments are presented separately, not in relation to a vessel type. Due to the high fragmentation, some of the vessels were difficult to classify as a particular type, and only general identification was given, e.g. drinking vessel, or a cup, beaker, or bowl. Several typological systems were used to determine the vessel type, especially Isings 1957, Arveiller-Dulong 1985, Barkóczi 1988 and Rütti 1991. The glass collection from Yurta-Stroyno was also compared with chronologically and type-related finds from other Roman settlements from Bulgaria, namely with Dichin (Cholakova 2009), Yatrus-Krivina (Gomolka-Fuchs 1991; 2007), Karasura (Gomolka-Fuchs 1992), Novae (Stawiarska 2014) and Nicopolis ad Istrum (Shepherd 1999). For the description of the glass beads, M. Tempelmann-Mączyńska (1985) typology was used.

DRINKING VESSELS

Beakers, bowls, and cups

The majority of the glass rims, including 140 fragments, belongs to fire rounded rims of beakers or bowls. The rims of these vessels were rounded and shaped by reheating while the vessel was held on the pontil. Rims could be folded in, straight or outsplayed. Some fragments have traces of simple linear decoration. The glass is usually blue-green or colourless. The fragmentary state of the finds did not allow to restore the complete shape, however, these rims are commonly associated with bell-shaped beakers and also lamps. Some of them could also belong to stemmed goblets or to hemispherical bowls of different size (Golofast 2009, 305).

The first group of rims with diameter between 58–70 mm could belong to smaller bowls/cups or beakers (**Fig. 1:1–4**). The second group of rims with diameter between 71–120 mm could relate to glass bowls with straight or outsplayed rims (**Fig. 1:5–13**; **Fig. 2:14–29**), such as type I 85 from Augst/Kaiseraugst. These bowls were very popular in the Roman Empire from the 2nd to the 3rd century AD, with continuation till the beginning of the 4th century AD (Isings 1957, 101–103; Rütti 1991, 49). Similar rims are known from numerous Late Antique/Early Byzantine settlements in Bulgaria: e.g. from Gradishteto near Dichin (Cholakova 2009, 304–305), Yatrus-Krivina (Gomolka 1979, 146–150) and Nicopolis ad Istrum (Shepherd 1999, 342–344). These vessels were in use from the 1st to the 6th century AD.

Rims with a wide diameter (130–240 mm) could be part of deeper bowls or plates (**Fig. 1:12–13**; **Fig. 3:30–38**; **Fig. 4:39**). Bowls or plates with fire rounded and outsplayed rims are

2 Combination of II and III iron cation.

3 The vessel fragments have an unique number (**nos. 1–112**) under which they might be also found in **Figs. 1–7** and **Tab. 5**.

widely known from the contexts dated to the 3rd or 4th century AD (Hamel – Greiff 2014, 150). The glass fragment (**Fig. 4:40**) could be part of wider vessel with diameter near 240 mm. Similar rims are known from numerous Roman settlements and could be identified as bowls with horizontal rims, which are dated to the time range of the mid-1st to 4th century AD (Arveiller-Dulong 1985, 66; Rütti 1991, 50).

Conical beakers or lamps

A group of seven rim fragments with diameter 60–100 mm can be identified as conical vessel type (**Fig. 4:41–43**). The conical form is characteristic both for glass lamps and for conical beakers type I 106. Finds of this form are well known from all Roman provinces and are dated to the end of the 3rd to 6th century AD (Rütti 1991, 46; Baydo 2009, 190). Similar rims could be also parts of stemmed goblets or stemmed lamps with conical body, which were also popular during the same period (Baydo 2009, 190–191). The conical beakers and lamps are well known from Bulgarian settlements, e.g. from Nicopolis ad Istrum and Gradishteto near Dichin, where they are dated to the period of the 4th–6th century AD (Shepherd 1999, 337–340; Cholakova 2009, 304). Similar rims might be found as well on a group of smaller conical goblets or lamps (I 111), also popular during the Late Antiquity (see below).

Conical beaker on a foot

Specific pushed-in bases with a hollow tubular base ring belong to the conical beakers on the foot, which were one of the most popular form of a glass vessel in the Roman Empire. The seven bases from Yurta-Stroyno can be related with type I 34 (**Fig. 4:44–49**), which was popular during the 2nd and 3rd century AD, or with I 109, a conical beaker on the foot, which was common during the 4th and 5th century AD (Isings 1957, 48–49, 136–137; Barkóczi 1988, 78, 80–81; Rütti 1991, 47, Taf. 67–68). The conical beakers of the early period (2nd–3rd c. AD), were products of a high-quality material – colourless or naturally coloured translucent glass. For the later vessels (end of the 4th–5th century AD) green or yellow-green glass with higher proportion of bubbles and impurities is common (Devái 2016, 260). The finds from Yurta-Stroyno are alike with the earlier production of higher quality. Beakers might have simple cut decoration, which is most often located under the rim. Conical beakers I 34/109 are known from the Bulgarian settlements of the Roman period and are dated to the third quarter of the 2nd till the mid-4th century AD (Minchev 1988, 47; Shepherd 1999, 324, 354).

Goblets

Two base fragments (**Fig. 4:50–51**) are close in shape to specific stemmed goblets with a pushed in base – type I 111 (Isings 1957, 139). These goblets[4] were one of the most common vessels during Late Antique/Early Byzantine period and are usually dated to the 4th–6th century AD (Minchev 1988, 50; Shepherd 1999, 372–373; Cholakova 2009, 274–277; Stawiarska 2014, 60). The provenience of the stemmed goblets is disputable, but it was one of the most popular types in the Eastern Mediterranean at the end of the 3rd century AD. In the territory of northern

4 The goblets were probably intended for everyday use. The finding of a large collection of these vessels from the Christian Basilica in Pella (Greece) offers the possibility of using these vessels for ecclesial purposes (Shepherd 1999, 373). However, goblets could be also used as lamps (Czurda-Ruth 1989, 135; Chevalier 1997/98, 180–181; Cholakova 2009, 275).

Bulgaria these goblets appeared at the turn of the 3rd and 4th century AD and continued up to the 6th century AD (Olczak 1995, 60–62). It should be mentioned here that similar vessels also appear in the early medieval period (Dankova 1993, 82). These goblets are commonly present at Late Antique/Early Byzantine settlements at Gradishteto near Dichin (Cholakova 2009, 274–275), Yatrus-Krivina (Gomolka 1979, 164; Gomolka-Fuchs 2007, 299–300), Nicopolis ad Istrum (Shepherd 1999, 337), Novae (Olczak 1998, 44–48; Turno 1989, 163–165) and Sadovec (Uenze 1992, Taf. 50). Moreover, local production of the stemmed goblets is attested at several Bulgarian settlements, such as Dichin (Cholakova 2009, 275–276), Novae (Olczak 1995, 17–18; 1998, 44–48) and Odessos (Minchev 1988, 46–50, 75).

Beaker with straight and cut rim

The rim fragment (**Fig. 4:52**) is made of yellow-green glass. The rim was cut and polished, and it is decorated with a single engraved line. The fragment might belong to a cylindrical or conical beaker type I 106. For this type of vessel a simple linear engraved decoration and unworked or slightly polished rim is characteristic. These beakers were in use from the late 3rd to the 5th century AD (Isings 1957, 127–129; Rütti 1991, 46). Similar fragments are known from Gradishteto near Dichin, where they are dated to the 5th century AD (Cholakova 2009, 304). Similar rims might also belong to larger conical lamps, dated to the 4th–5th century AD (Hamel – Greiff 2014, 152).

Beaker/bowl with tubular ridge

This group is formed by six fragments with outsplayed and fire rounded rims and thick tubular ridges (**Fig. 4:53–56**). The fragments are made of high-quality blue-green or colourless glass, without bubbles or impurities, and with extra thin sherd. The appearance of the tubular ridge on these vessels belongs to a very specific technological element. The ridge itself is made from pressing the wall inwards and then attaching the fold to the vessel outside. The closest parallel to this decoration technique is the beaker with tubular ridge from the Israel Museum in Jerusalem collection, dated to the 2nd–3rd century AD (Israeli 2003, 163). Similar rim shape and appearance of the tubular ridge might be seen on small glass bowls (Vesseberg type CII) from Israel Museum in Jerusalem and Corning Museum of Glass which were most probably produced in Syro-Palestinian glass workshops. The specific decoration with tubular ridge appears on other glass bowls from Israel territory, which are dated to the 3rd–4th century AD (Israeli 2003, 158; Whitehouse 1997, 79). Similar vessels are also known from Cyprus, Conimbriga and Kaiseraugst (Mazanek 2014, 298; Whitehouse 1997, 79–80; Rütti 1991, taf. 152). The fine glass material of these beakers and the specific decorative technique (tubular ridge) required a highly skilled glass master and a well-developed workshop. It seems very likely these vessels were imported to Yurta-Stroyno, probably from the Near East.

Ovoid beakers

Four fragments of strongly outsplayed rims relate to the so-called ovoid beakers (**Fig. 4:57– 60**) (type AR 96/I 131). Isings (1957, 160) dates the ovoid beaker to the 3rd century AD, with possible continuation to the early 4th century AD (Arveiller 1985, 174). Ovoid beakers are known from Kaiseraugst, where they are dated to the second half of the 2nd century till the end of the 3rd century AD (Rütti 1991, 95). Shape-closed vessels are also known from the 5th–6th century AD, however the quality of glass is poor with thick walls and yellow or green tint (Minchev 1988, 46).

Based on the high-quality glass material and well skilled technology used for their production, we may date the four fragments from Yurta-Stroyno to the 2nd–3rd century AD.

BOTTLES/JARS/FLAGONS

Square or cylindrical bottles

Based on the shape and size, one fragment from Yurta-Stroyno (**Fig. 5:61**) seems to come from square or cylindrical bottle (types I 50 and I 51). Both these types were mould-blown. Square bottles were produced since the mid-1st century AD and were found in most parts of the Roman Empire. The peak of their popularity dates to the 2nd–3rd century AD (Isings 1957, 63–69; Whitehouse 2003, 163), however, in Egypt, the square bottles continued to be used during the 4th century AD. The square bottles are usually made from thick blue/blue-green glass of high quality and were used as transport containers for liquids (Charlesworth 1966, 26, 32; Minchev 1990, 56–57). The earliest examples of square bottles found on Bulgarian territory are dated to the 2nd half of the 1st century AD and the latest to the early 3rd century AD (Turno 1989, 169; Cholakova 2006, 214).

The production of cylindrical bottles began around the end of the 1st century AD. The same as the square bottles, the cylindrical bottles were used as storage vessels for different types of liquids. These bottles continued to be in use until the beginning of the 4th century AD (Isings 1957, 63–69; Rütti 1991, 54–55). The earliest cylindrical bottles in Bulgarian territory are known from Novae, where they are identified as a Roman import and dated to the 2nd half of the 1st century AD; otherwise, they are common till the mid-4th century AD[5] (Dimitrova – Popov 1977, 240–241; Cholakova 2006, 227–228).

Bottles with a straight neck

Two glass fragments (**Fig. 5:62–63**) seem to relate to the bottle with a straight cylindrical neck, such as the cylindrical bottle (I 100) or the spherical bottle (I 103).

The spherical and cylindrical bottles are common vessels in settlement as well as in funeral contexts. These bottles were produced mainly from the 3rd to 4th century AD, both in the eastern and western provinces (Isings 1957, 119, 122; Keller 1971, 134; Rütti 1991, 54; Whitehouse 1997, 177). However, the tradition of their production continued until the 5th– 6th century AD (Stern 2001, 301). Vessels with similar shape to cylindrical and spherical bottles are also known from the North Black Sea region and from the territory of Bulgaria, where they are dated from the end of the 2nd century AD to the 4th century AD (Minchev 1990, 67–68; Dyczek 1999, 103; Cholakova 2006, 230).

Bottles with a funnel-shaped mouth

The rim fragment (**Fig. 5:65**) seems to be a part of a bottle with a spherical body and a funnel--shaped mouth. Bottles of this type are known from the eastern as well as from the western provinces. Their production is generally associated with the territory of Syro-Palestine. Bottles I 104 are similar in shape and were produced mainly in the 3rd and 4th century AD (Whitehouse

5 The base fragment (**Fig. 5:64**) is thicker, made of light-yellow glass. Similar bases are known from Smyrna, where they are identified as cylindrical bottles, close in shape to a form I 102 (Isings 1957, 120; Gürler – Lafli 2010, 124). However, different types of vessel forms cannot be excluded.

1997, 254), with the production continuity until the 5th century AD (Harden 1936, 194; Isings 1957, 122–124; Gürler – Lafli 2010, 126). Bottles with a funnel-shaped mouth are however also known from the 6th–7th century AD (Fünfschilling – Lafli 2013, 62).

Two smaller fragments (**Fig. 5:66–67**) could be identified as a part of a mouth of a jug, or as a part of a bottle with a funnel-shaped neck and a rim folded inwards and flattened from outside. Vessels of similar shape are known from Nicopolis ad Istrum, where they are dated to the 2nd–4th century AD (Shepherd 1999, 322). Bottles or jugs with a funnel-shaped neck appeared in the 2nd century AD, but they are also known from the 4th–5th century AD (Hamel – Greiff 2014, 154; Fünfschilling 2014, fig. 15:2; Devái 2016, 263–264).

Jugs

Only two fragments from Yurta-Stroyno could be identified as jugs.[6] One thick rim fragment of a specific shape (**Fig. 5:68**) might relate to a larger jug. Jugs with a thick mouth and a distinctive wavy application under the rim appear in the period from the 2nd to 4th century AD (Israel 2003, 177–181). Similar jugs are also known from the western Black Sea coast, where they are dated to the 2nd–4th century AD (Minchev 1989, 22–23).

Rim fragment (**Fig. 5:69**) is characterized by irregular shape which might relate to the group of jugs – oinochoes (trefoil-mouthed jug). Similar vessels are found in contexts dating back to the 2nd–4th century AD (Shepherd 1999, 320).

Unguentaria

A separate group of vessels is formed by small bottles – the so-called *unguentaria*. These bottles were widely used throughout the Roman Empire to store cosmetics, medicines, oils, or other liquids (Stern 1977, 100). In the Yurta-Stroyno assemblage, 27 fragments of *unguentaria* were identified (**Fig. 5:70–78**). The glass of these fragments can be described as lower quality, with a higher concentration of bubbles or other impurities. The glass is mostly colourless or blue-green, only in the case of the neck fragment (**Fig. 5:74**) the colour is light yellow. Several fragments correspond in a shape to the *candlestick unguentaria* series, type I 82b (Isings 1957, 97). Unguentaria of this group have a long neck, and a flattened conical body with a slightly concave base. The base fragment (**Fig. 5:75**) has a moderate transition between the neck and the conical body and corresponds in shape to the type I 82 b1. Fragments (**Fig. 5:77**) and (**Fig. 5:78**) may also belong to this type. *Unguentaria* I 82b are known from the eastern and western provinces, where they are dated from the end of the 1st to the first half of the 3rd century AD (Isings 1957, 98–99; Lazar 2003, 188; Gregl – Lazar 2008, 116, 145). The base fragment (**Fig. 5:76**) has a conical, slightly concave body and base, and may be a transitional type between I 82 b1 and I 82 b2. Similar bottles are dated to the range of the 2nd and 4th century AD (Svobodová 2017, 86–87). Finds of the *candlestick unguentaria* are known from Novae, where the majority of them are dated to the 2nd–3rd century AD, and several of them also to the 4th century AD (Budzyńska 2016, 288). Unguentaria used to be consumer goods, which confirms their frequent occurrence at the Roman settlements (Rütti 1991). The bottles from Yurta-Stroyno are characterized by lower glass quality and often poor workmanship, which may evoke local/regional production.

6 With jugs or drinking vessels could be also connected the two fragments of a handle under **Fig. 6:95–96.**

FURTHER UNDETERMINED BASES

Many bases found in Yurta-Stroyno were impossible to be attributed to specific types and forms of vessels. Consequently, they were divided and classified without any connection to a specific form, according to their size, profiling (concave or flat), and a presence of the base ring.

Bases with base rings

The most represented type are bases with applied base ring (29 pcs.; **Fig. 6:79–85**). Four of these base fragments are too small to have determined the original diameter, the rest might be further divided into the two size categories:

– Smaller vessels with base diameter of 40–60 mm (21 pcs.).
– Larger vessels with base diameter of 70–90 mm (4 pcs.).

The bases of the first group may have belonged to the so-called drinking vessels, such as smaller bowls, goblets, and cups. The second group corresponds in size to the serving vessels, such as larger bowls or jugs. Bowls were very popular throughout the Roman Empire and are one of the most common finds at the settlements. During the 3rd–4th century AD the popularity of the glass bowls grew even more, and they became one of the most common vessels with variable typology. In the 5th century AD, the number of bowls gradually decreased (Gorin-Rosen – Winter 2010, 166).

Interesting examples are fragments of bases with a high base ring (**Fig. 6:86–87**). Similar finds are known from Augst / Kaiseraugst where they were identified as large bowls with a high base ring (I 87). These bowls were in use from the second half of the 1st until the 3rd century AD (Isings 1957, 104; Rütti 1991, 48).

Simple concave pushed-in bases

Six fragments of simple concave pushed-in bases were found in Yurta-Stroyno. The bases are made of high-quality blue-green translucent glass. Apart from one fragment (**Fig. 6:89**), all bases have a pontil mark. Two fragments are too small to identify their original diameter, the rest can be classified into the two size categories:

– Smaller vessels with base diameter of 30–32 mm (2 pcs.) (**Fig. 6:88–89**).
– Larger vessels with base diameter of 39–48 mm (2 pcs.) (**Fig. 6:90–91**).

Pushed-in bases could belong to a wider group of vessels such as beakers or bottles with a spherical body (Burdajewicz 2017, 673; Hamel – Greif 2014, 152; Mazanek 2014, 302). We can relate them to bottles I 103 / I 104, which were very popular in Late Antique period, and which are dated to the 3rd–4th century AD, with continuation till the 5th century AD (Isings 1957; Antonaras 2010, 99, 101). Similar bases were found at Late Antique fortresses at Yatrus-Krivina and Gradishteto near Dichin, where they are interpreted as bases of bottles with spherical body and are dated to the 4th–6th century AD (Gomolka 1979, 146–149; Cholakova 2009, 272–273). Spherical bottles are known from numerous sites of the west Black Sea coast, where they are dated to the 2nd–4th century AD (Bucovală 1968, 61–63; Minchev 1990, 66).

DECORATION

An important group of finds consists of glass with traces of decoration. The decorated fragments might be divided into two basic groups: decoration performed either on hot glass (blowing into a mould, applied decoration, mechanical shaping of the vessels body), or on cold glass (cutting/engraving, polishing).

Mould-blown vessels

Eight fragments were identified as mould-blown vessels (**Fig. 6:92–94**). Of these, five fragments have rib decoration, one fragment has traces of a wavy pattern, and one fragment has a specific pattern in the form of honeycombs. The rib/wavy decoration is one of the most popular motifs in the Roman glassmaking with continuity until the early Middle Ages. The vessels were first shaped with blowing into a mould, while from the 3rd to 5th c. AD a technique of pre-blowing into a mould and subsequent free mould blowing was used (Whitehouse 2002, 17, 109–110).

The fragment (**Fig. 6:93**; **Pl. 7/6:141**) is characteristic for its strong amber colour and for a pattern of relief ribs. Amber-coloured glasses (orange-brown) are known from Gradishteto near Dichin, where they are dated to the 5th–6th century AD (Cholakova 2009, 305). Whitehouse (2002, 164–165) published similar fragment (number 1179) from the Corning Museum of Glass, identified as a part of a bowl or beaker, dated to the 4th century AD. One more fragment which belongs to the mould-blown vessels (**Pl. 7/6:144**) features the same amber colour.

The small fragment (**Fig. 6:94**) relates to the mould-blown vessels with decoration of the so-called honeycomb motif. This ornament appears in the first half of the 4th century AD, when mould-blown glass vessels became popular again, and when the production of vessels with honeycomb ornament is traditionally attributed to Syro-Palestine (Barkóczi 1971, 23). The honeycomb motif appears on various vessels, but predominantly on beakers, where the ornament covers almost the entire surface (Doppelfeld 1966, 46). The majority of vessels with this ornament are known from the Syro-Palestine area, Near East (Damascus, Tyre, etc.) and central and western Europe, such as present-day Germany and Hungary (Barkóczi 1971, 21–24; Friedhoff 1989, 47). Vessels decorated with a honeycomb motif are commonly dated to the first half of the 4th century AD (Whitehouse 2002, 113–114).[7] Only a few vessels are known from the Black Sea area. In Bulgaria, one example comes from Yatrus-Krivina, dated to the end of the 4th century AD (Gomolka 1979, 146), another one is from Nicopolis ad Istrum, with a broader date of the 3rd–4th century AD (Shepherd 1999, 336).

Trailed decoration

About 16 glass fragments feature remains of simple relief trailed decoration. Applied threads or trails are always of the same colour as are the vessels, and in most of the cases they create simple linear decoration. On hot blown glass vessels hot glass trails were applied, formed to different shapes of decoration, which could be further smoothed by the heat. The trailed decoration appeared no later than at end of the 1st century AD and was widely used during the Roman period and Late Antiquity (Whitehouse 2002, 137).

One of the most frequent variations is a trail fixed below the rim of a vessel (see **Fig. 4:60**, **Fig. 7:99**). From the territory of Bulgaria there are numerous examples of glass vessels decorated with trails. These finds are in the most cases dated to the 2nd–3rd century AD (Minchev 1989, 23; Cholakova 2006, 223).

More complex decoration might be seen on the base fragment (**Fig. 6:97**) and on the body fragment (**Fig. 7:98**). Unfortunately, due to the fragmentary state of the finds, the original pattern cannot be reconstructed. A similar style of decoration is known from Pergamon vessels, which are dated from the 3rd century with continuity until the 7th century AD (Schwarzer 2009, 8).

7 However, one vessel from Pannonia comes from a context dated from the end of the 4th to the beginning of the 5th century AD (Stern 1977, 92).

The small body fragment (**Fig. 7:100**) has a fine leaf ornament which was applied to the hot vessel and shaped into the final appearance. This type of decoration is close to the so-called "snake-thread decoration" / "*Schlangenfadengläser*", which was popular both in the northwestern and eastern provinces of the Roman Empire. The majority of such decorated vessels are monochrome (colourless or blue-green) with floral and/or zoomorphic motifs. The first vessels with this "snake-thread decoration" were made at the end of the 2nd century AD, they enjoyed their popularity mainly in the 3rd century AD,[8] with the last examples dated to the early 4th century AD (Whitehouse 2002, 138).

Wheel-cut decoration

The glass fragments with wheel-cut decoration belong to the most numerous group. These are 33 fragments, from which 12 pcs. have traces of faceted cutting (**Fig. 7:101–104**, **106–107, 111**) and 21 pcs. are decorated with a simple linear ornament (**Fig. 7:105**, **109–110**, **112**).

The technique of wheel-cutting glass became popular in the 1st century AD, when translucent blown glass vessels began to be widely produced. The popularity of simple geometric or linear motifs persisted until the 4th century AD (Price 1976, 121; Whitehouse 1997, 221; Israel 2003, 297).

Most of the decorated fragments from Yurta-Stroyno are made of high-quality translucent colourless or blue-green glass. Simple cut lines often appear on cups or bowls (Price 1976, 123), as in the case of rim fragments **Fig. 7:105** and **112**. Simple lines can also be combined with more complex faceted decoration such as bowls fragments **Fig. 7:101** and **111**.

Fragment **Fig. 7:108** has a distinctive wheel-cut decoration, but it is not possible to reconstruct the original motif. The fragment has a deep wheel-cut geometric/linear decoration which has parallels in the motif appearing on the vessels dated to the 3rd century AD (Whitehouse 1997, 261). The period of the 3rd and 4th century is characteristic for the vessels with decoration in the form of deep and wide cut lines (Doppelfeld 1966, 64–65, pl. 148–153). This type of decoration appears predominantly on the outer side of bowls or larger plates (Whitehouse 1997, 261). As an illustrative example, we can mention bowls and plates with a deep wheel-cut ornament from the collection of the Museo Nazionale Romano in Rome, which date back to the 4th century AD (Tommaso 1989, 104).

The facet decoration often uses facets of various shapes or sizes (commonly in the shape of "rice grain" or oval). In several cases, the facets are complemented by a simple linear decoration (e.g. **Fig. 7:104**, **107**). Fragments with facet decoration mostly belong to thick-walled vessels made of high-quality glass, with a minimum of impurities or bubbles (such as body fragment **Fig. 7:106**). The oldest evidence of facet cutting is known from the end of the 1st century AD and this technique was used until the turn of the 4th and 5th century AD (Whitehouse 1997, 221). The combination of facet and linear wheel-cut is typical for the 2nd–3rd centuries AD (Czurda-Ruth 1989, 133).

The best example of a facet decoration is a body fragment with facets and a cut linear motif (**Fig. 7:111**). The fragment is made of high quality translucent colourless glass, with a minimum of bubbles. Another similar fragment (**Fig. 7:101**) is part of a bowl, where facet and linear decoration are also combined. Both fragments come from a group of hemispherical bowls with wheel-cut decoration, form I 96b I (Isings 1957, 114–115). Similar bowls are known

8 A complete glass bowl with very similar decoration was found at the burial mound in the village of Botevo, Yambol District, together with a coin of Caracalla. The vessel from Botevo is currently placed at the depository of the Regional Historical Museum of Yambol.

from Dura Europos, where they are dated to the late 2nd century AD (Clairmont 1963, 65–70). Hemispherical bowls are known from various Roman sites, where they are dated according to the context to the 2nd–4th century AD. Similar bowls were manufactured in a glassworks in Cologne till the 4th century AD (Isings 1957, 115; Rütti 1991, 95–96). Hemispherical bowls are also widely known from the northern and western Black Sea coast, where they are dated from the second half of the 2nd century to the 3rd century AD (Stawiarska 2014, 84–85; Shepherd 1999, 359–360). Due to the very high-quality design, fragments with wheel cut decoration from Yurta-Stroyno seem to come from imported vessels. Glassworks producing these vessels probably existed on the Black Sea coast, as in the ancient city of Tanais, where glass production took place until the mid-3rd century AD (Stern 2001, 137).

OTHER GLASS FINDS

Beads

Several types of glass beads were found during the excavations: prismatic beads with hexagonal section (6 pcs.; **Pl. 7/1:1–6**); flat rounded beads (4 pcs.; **Pl. 7/1:7–10**); segmented beads (2 pcs.; **Pl. 7/1:11–12**) and rounded bead with dots (1 pcs.; **Pl. 7/1:13**; see **Tab. 6:1–13**).

The most common find are prismatic beads with hexagonal section, known under several different types, such as Tempelmann-Mączyńska XVI/145, Benea Type II and Gopkalo monochrome beads VIII/2. This type is widespread over the territory of the Roman provinces during the 2nd and 3rd century AD, and it is known both from settlement and funeral contexts. These beads remained popular until the Late Antiquity – to the turn of the 4th and 5th century AD (Swift 2000, 90–94). Elongated hexagonal beads are also known from Barbaricum, where they occurred from the 2nd to 5th century AD (Tempelmann-Mączyńska 1985, 35; Gopkalo 2008, tab. II). These beads commonly appear at the sites on the northern and western Black Sea coast, where they are dated to the 2nd and 3rd century AD. Their local workshop was identified at Tibiscum, in the territory of present-day Romania, which operated from the end of the 2nd to 4th century AD (Benea 2004, 100–101; Riha 1990, 89).

Another common type is a flat rounded bead (type Tempelmann-Maczyńska IX/89–90; Benea Type I). Beads of this type found in Yurta-Stroyno are made of opaque blue or white glass (**Pl. 7/1:7–10**). This type was widely distributed throughout the Roman provinces and similar beads are also known from Barbaricum, where they are dated to the 2nd century AD (Tempelmann-Maczyńska 1985, 33). Flat rounded beads were one of the most popular shapes across the Roman Empire, and their number even increased in Late Antiquity[9] (Swift 2000, 90–94).

Finds of both flat rounded beads and prismatic beads with hexagonal section are known from the tumuli necropolis near Straldzha (Yambol District), where they were found in contexts dated to the 2nd–3rd century AD (Cholakov *et al.* 2016). The hexagonal and rounded types are exhibited both in the Regional History Museum in Stara Zagora and in the Regional History Museum in Yambol, where they are dated from the 2nd to 3rd/4th century AD.

The group of colourless segmented beads is represented by one bead with three segments (**Pl. 7/1:11**) of Tempelmann-Maczyńska IX/91–103 type, and by one elongated bead with two

9 One of the reasons for their popularity is the relatively simple production process, which did not require special skills. The glass was wound on a metal rod and formed with a knife or other tool with a flat surface. In the case of flat beads, the glass mass was compressed into the desired shape (Kozáková 2011, 19–20).

segments (**Pl. 7/1:12**). Segmented beads were popular during the 2nd–3rd century AD, but their production continued till the 4th–5th century AD (Tempelmann-Maczyńska 1985, 33; Riha 1990, 88). The elongated bead with two segments (**Pl. 7/1:12**) is of white glass with gold foil. This bead type appeared in the territory of the provinces Thrace and Moesia Inferior between the 2nd and 3rd century AD and continued to be in use until Late Antiquity (Gomolka-Fuchs 1991, 184; Roberts 2007, 80–83). Similar examples were found in Late Antique period graves in Altenstadt, Germany (dated to the 2nd half of the 4th century AD) and Burgheim, also Germany (dated to the mid-4th century AD) (Keller 1971, 91, 156, 164).

The rounded dark blue bead (**Pl. 7/1:13**) is decorated by light blue and yellow dots. Typologically it relates to Tempelmann-Maczynska Group XX/198; Benea IX; Gopkalo polychrome beads I/10. In the context of the Balkan peninsula, occurrence of these beads is dated into the period stretching from the last quarter of the 2nd century AD to the 4th century AD (Tempelmann-Maczyńska 1985, 47–48; Benea 2004, 107–110; Gopkalo 2008, tab. I). Workshops of these beads have been found in Dacia (Tibiscum and Porolissum), and in Moesia Inferior (Novae) (Stawiarska 2014, 30, 47, 56). Similar beads continued to be produced during the Byzantine period (Alekseeva 1975, 51).

Ring

The one ring fragment (**Pl. 7/1:14**; **Tab. 6:14**) is made of translucent purple glass. Glass rings had already appeared in Hellenistic period, but their greatest popularity dates to the Roman period. Roman glass rings are supposed to imitate metal or semi-precious stone items, consequently, their most common colour is dark brown or dark purple. These are often small rings that were intended for children or young women (Spaer 2001, 193–194; Benea 2004, 81). The finds of glass rings fall commonly into the 2nd–4th century AD; they are also known from the Byzantine period, where they are however less common (Riha 1990, 48).

Bracelets

Fragment of one glass bracelet was found during the excavation (**Pl. 7/1:15**), two more fragments were detected during the surface survey (**Pl. 7/1:16–17**; **Tab. 6:15–17**). These are simple bracelets with a circular or D-cross-section that occurred throughout the Roman period and continued into the Early Medieval period (Spaer 2001, 193–194; Fünfschilling – Lafli 2013, 64). Bracelets close in shape were found in Nicopolis ad Istrum, where they were dated to the post-medieval period (Roberts 2007, 83). Similar bracelets may be found in the permanent exposition in the Archaeological Museum of the Thracian and Ancient town Kabile dated to the Early Medieval period.

Tessera

During the surface survey, one glass *tessera* was found (**Pl. 7/1:18**; **Tab. 6:18**). The nature of the object as a surface find, does not allow us to identify exactly where it comes from, whether it can be connected to a mosaic placed *in situ*, or whether it was only a cullet for the subsequent remelting, or even a product of the local glass workshop. Regarding Bulgaria, there is a well-known glass workshop from Sandanski (dated to the 5th century AD), where glass *tesserae* were produced (Shapova 1998, 44; Stawiarska 2014, 65).

Gaming counter

An interesting find is the so-called gaming counter (**Fig. 7:113**; **Pl. 7/1:19**; **Tab. 6:19**). This find has numerous parallels in the Roman Empire but also in Barbaricum. Similar stones were also used during Late Antique/Byzantine period (Knápek – Šedo 2017). Consequently, the chronological classification might be very wide, covering the 1st to 6th c. AD.

Secondary worked glass fragments

There are two glass fragments with traces of secondary modification (**Tab. 6:20–21**). The first one is a piece of glass processed into a token (**Pl. 7/1:21**), which could be used as a gaming piece. This is a relatively common object; however, there are mostly ceramic tokens made from sherds. Similar finds are known from Nicopolis ad Istrum (Shepherd 1999, 324–325). Secondary traces of working are also visible on another fragment (**Pl. 7/1:20**), which could have served as a simple tool. Findings of secondarily processed glass fragments are not exceptional at the Roman settlements (Fünfschilling 2014, 170–172). However, they are often ignored due to their incorrect identification.

Windowpanes

A total of 19 fragments of windowpanes were found at the settlement (**Tab. 6:22–27**). The quality of the glass is highly variable: from colourless glass with a minimum of bubbles to blue-green glass with a high proportion of bubbles and other impurities. The thickness of the individual fragments is between 1.5 and 3.5 mm. Traces of the production process are visible on some of them. Only three fragments have retained the original rim, these fragments have rounded, irregular edges (**Pl. 7/1:24b**, **26–27**). According to the production traces, most of the windowpanes found in Yurta-Stroyno could be made using the casting technique. This is the so-called "matt-glossy" type, where the side adjacent to the mould has a matt surface (Jennings 2015, 155). In the case of fragment (**Pl. 7/1:22**) and possibly also fragment (**Pl. 7/1:24a**), we can consider blowing. A typical feature of this technique is the concentration of elongated bubbles and the uneven surface (Kanyak 2009, 38–39; Jennings 2015, 162). Fragments of glass windowpanes are common finds at the Roman and Byzantine settlements. From Bulgaria, numerous window fragments are known from Novae, where they are dated from the 2nd–3rd century AD to 6th century AD. Other finds of Late Antique to Byzantine windowpanes are known from Goleman's Kale (Uenze 1992, Taf. 145), Yatrus-Krivina (Gomolka-Fuchs 1991, 184) and Kabyle.[10]

Glass waste

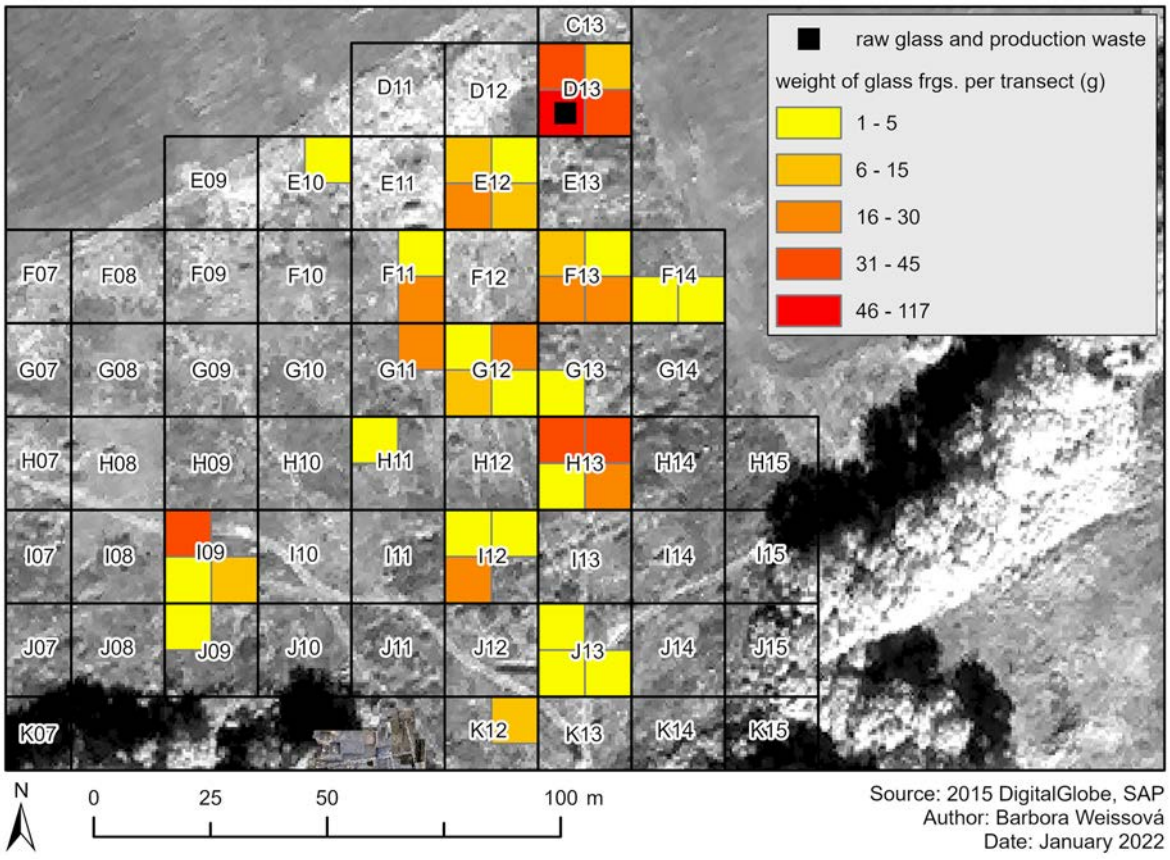
During the surface survey in 2015 and 2016 specific glass fragments were uncovered at the north-eastern part of the settlement core, which were identified as glass production waste (see in **Tabs. 9–10, 12**). They include threads, drops, melted fragments and moils. A separate group is represented by fragments of raw glass, counting 81 pcs. of total weight 189 g. The raw glass is of a good quality, translucent, mostly of blue-green colour (76 pcs.) with three colourless and two light-yellow pieces (**Pl. 7/7**:**153**, **157**). Although the glass kiln was not found

10 Similar fragments were found during excavation of Late Antique contexts at the settlement and are now stored at the archaeological base in Kabile.

as the area was not excavated, the presence of raw glass and glass waste can be considered as evidence of glass working at the settlement.

The glass waste can provide significant information on the technical specifics of the local glass workshop. Based on the finds of detachments from the glass pipes – the moils –, the vessels were made by blowing (**Fig. 7:114**; **Pl. 7/7:151**, **152**, **154**). None of the moils have been preserved in their entirety, which may serve as an indication of the method of removing the moil with cold water. Glass threads might come from the so-called glass viscosity test, or from an attempt to clean molten glass. The tiny glass drops (**Pl. 7/7:155**) are a common side product of every glass workshop as they are formed during the melting of the glass (Wardle – Shepherd 2015, 46–47).

The highest concentration of glass fragments was found in the square D13 (**Map 1**) featuring mostly small sherds of diverse nature. This glass can be described as cullet for secondary melting. The deposition of glass fragments near furnaces is nothing special and similar finds are known from other sites (Lazar 2003, 224–230; Wardle – Shepherd 2015, 42–43). Finds of molten fragments can be also identified as evidence of the glass recycling, which was a relatively common practice in the Roman period workshops (Stern 1999, 451, 467; Silvestri *et al.* 2008). The nature of the production indicators makes it difficult to determine the operational period of the local glass workshop, consequently, the method of chemical analysis of selected glass fragments was used to address this question.



Map 1: The settlement of Yurta-Stroyno with marked amount of glass finds in each sector and the main concentration of the production waste and raw glass.

DISCUSSION ON THE TYPOLOGICAL CLASSIFICATION OF THE GLASS VESSELS AND OTHER OBJECTS

Despite the majority of the glass fragments being found without context, it was still possible to conduct a basic typological study of the vessels. The collection of glass from Yurta-Stroyno includes vessels of different forms and various glass items, such as beads, a ring, bracelets, windowpanes, etc. The decoration of the vessels is represented by wheel-cutting, mould blowing and thread decoration. For the vessel fragments use of high-quality glass, thin walls and translucent colourless glass, with a minimum of impurities is characteristic. This kind of glass was widely used from the 1st to the mid-3rd century AD, while in the later periods the quality of glass gradually declined (Shepherd 1999, 301; Shepherd – Wardle 2009, 9, 57). Only 49 fragments are green/olive green and light yellow, five fragments are amber/yellow brown. These colour tints are typical for glass dated to Late Antiquity or early Byzantine periods (Cholakova 2009, 305; Cruz 2014, 59). Several of the examined fragments show a significant proportion of impurities and bubbles; particularly interesting are the glass impurities caused by the use of an iron tool, perhaps a blowing pipe. Finds of coloured glass fragments are unnumerable.

Based on the classification of vessel fragments it was possible to establish, that the so-called drinking vessels prevail, including forms such as cups, beakers, goblets, and bowls. Due to the great popularity of these forms in Roman period as well as in the Late Antiquity, it is difficult to precisely date these individual pieces. Based on the shape and specific decoration, it was possible to identify several fragments as hemispherical bowls with faceted decoration, dating to the end of the 2nd and 3rd century AD (Whitehouse 1997, 221). Another fragment with a specific relief decoration can be related to the group of vessels called "*Schlangenfadengläser*" / "snake-thread decorated vessels", which was popular mainly during the late 2nd and 3rd century AD. A separate group consists of fragments of small bottles, *unguentaria*. Several fragments from this group can be identified as type I 82b I, which dates from the second half of the 1st century to the 3rd century AD. For the period of the 2nd and 3rd century AD are typical conical

	Century (AD)					
Vessel type	1st	2nd	3rd	4th	5th	6th
Beakers / bowls with fire rounded rims	■	■	■	■	■	■
Bowls / plates	▬	▬	■	■		
Conical beakers / lamps			■	■	■	■
Conical beaker on foot	■	■	■	■	▬	
Goblets			▬	■	■	■
Beaker with straight cracked rim			▬	■	■	
Beakers / bowls with outsplayed rim and tubular ridge		■	■	▬		
Ovoid beaker		■	■			
Quadratic / cylinder bottle	▬	■	■	▬		
Bottles with straight mouth			■	■		
Bottles with funnel mouth		■	■	■	▬	
Bulbous bottles			■	■	▬	▬
Unguentaria I 82	▬	■	■	▬		
Bowls with a high base ring	▬	■	■			
Hemispherical bowls with engraved decoration		▬	■	▬		

Tab. 4: Chronological overview of selected glass vessel types.

beakers on foot and ovoid beakers, which are also known from Yurta-Stroyno. An interesting group consists of the beakers/bowls with outsplayed rim and tubular ridge, which can be dated to the 2nd–3rd century AD. Due to the specific production technique, this type of vessels could relate to the production of glass workshops in the Eastern Mediterranean.

A specific group of rims can be identified as coming from conical beakers or lamps, typical for the 4th–6th century AD. Fragments of bottles with a straight neck and bottles with a funnel-shaped mouth could also be dated to Late Antique period. A small body fragment with honeycomb ornament could be part of a beaker/bowl dated to the 3rd–4th century AD. Several fragments can be tentatively connected with a group of goblets, which are one of the basic shapes of the 4th–6th century AD.

A specific group of finds consists of personal glass ornaments: beads, bracelets, and a ring. The beads are dominated by hexagonal and flat rounded types. Due to the unification of the Roman fashion of glass ornaments and the continuity of some shapes until later times, it is difficult to determine their precise chronological classification and we may only state their wider chronological frame stretching from the 2nd to 6th century AD, with possible continuity to the Medieval period.

An even more specific group of finds includes glass waste featuring moils, glass drops and glass threads and fragments of raw glass. Part of the glass fragments can be interpreted as the cullet for secondary melting. We can consider the above-mentioned finds (production waste and the raw glass) as a proof of the existence of a glass workshop at the settlement of Yurta-Stroyno.

COMPOSITIONAL IDENTIFICATION OF THE GLASS FINDS

Contemporary research (Jackson – Paynter 2016; Freestone 2016; Maltoni *et al*. 2016) distinguishes between two types of Roman glass production centres. The first type designates primary production centres where glass was melted from raw materials on a relatively large scale (from 8 to 20 tons during one melting cycle). These centres were located mainly on the coast of Egypt, Syria, and Palestine, and they distributed raw glass[11] to the secondary workshops, where it was subsequently used to produce/shape a variety of different items and objects. This production model is described by Pliny the Elder in his *Naturalis Historia* (36, 193), and it is supported by the finds of raw glass and the traces of glass workshops throughout the whole of Europe and the Mediterranean (Maltoni *et al*. 2016).

Although the primary centres appear not to be plentiful (which is also given by the current state of archaeological investigation), a whole range of the secondary glassworks have been documented (Freestone 2016). Several authors even consider a possibility of primary glass production centres being located outside the above-mentioned Mediterranean areas and suggest certain European sites (Foster – Jackson 2009; Jackson – Foster 2015; Jackson – Paynter 2016).

The production of Roman glass used natron, which is a raw material introducing alkalis into the glass to reduce its melting temperature. At the turn of the 8th/9th century AD, the use of natron was abandoned, and it was replaced by plant ash (Shortland *et al.* 2006; Freestone 2016). Another basic component of the glass batch consists in quartz raw material (such as sand, quartz pebbles) as a source of silica. Based on a higher content of Al_2O_3 and other components found in the Roman glass, it is supposed that sand was actually used for its production (Freestone 2016) as it was well available in all Mediterranean production centres and there was no need for its further modification (crushing, etc.). The sand of seaside areas commonly

11 The glass was distributed in a form of pieces (in the literature known as *chunks*) created by breaking large plates of glass.

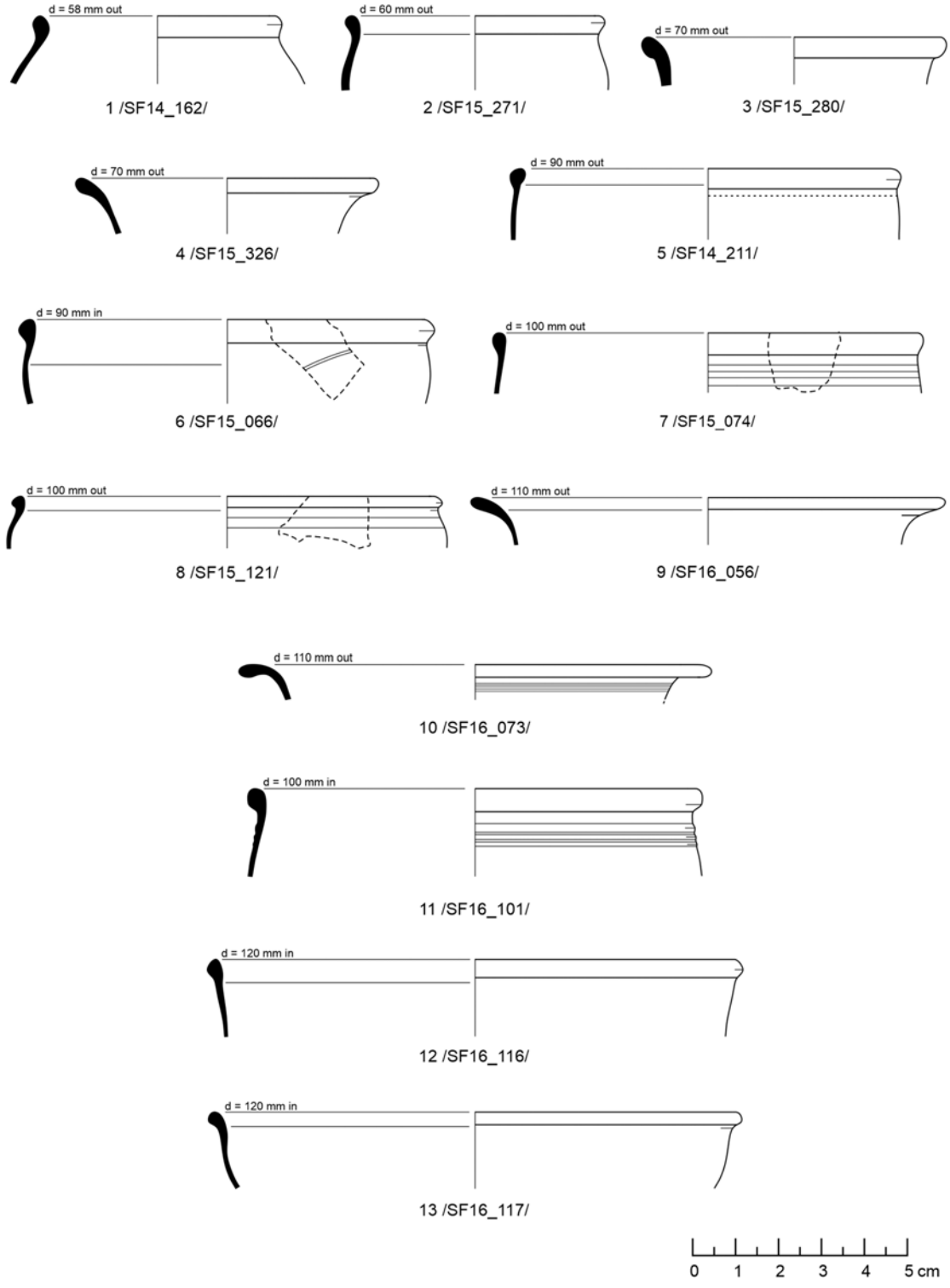


Fig. 1: Drinking vessels; 1–4: beakers/cups with smaller diameter; 5–13: beakers/bowls with middle diameter.

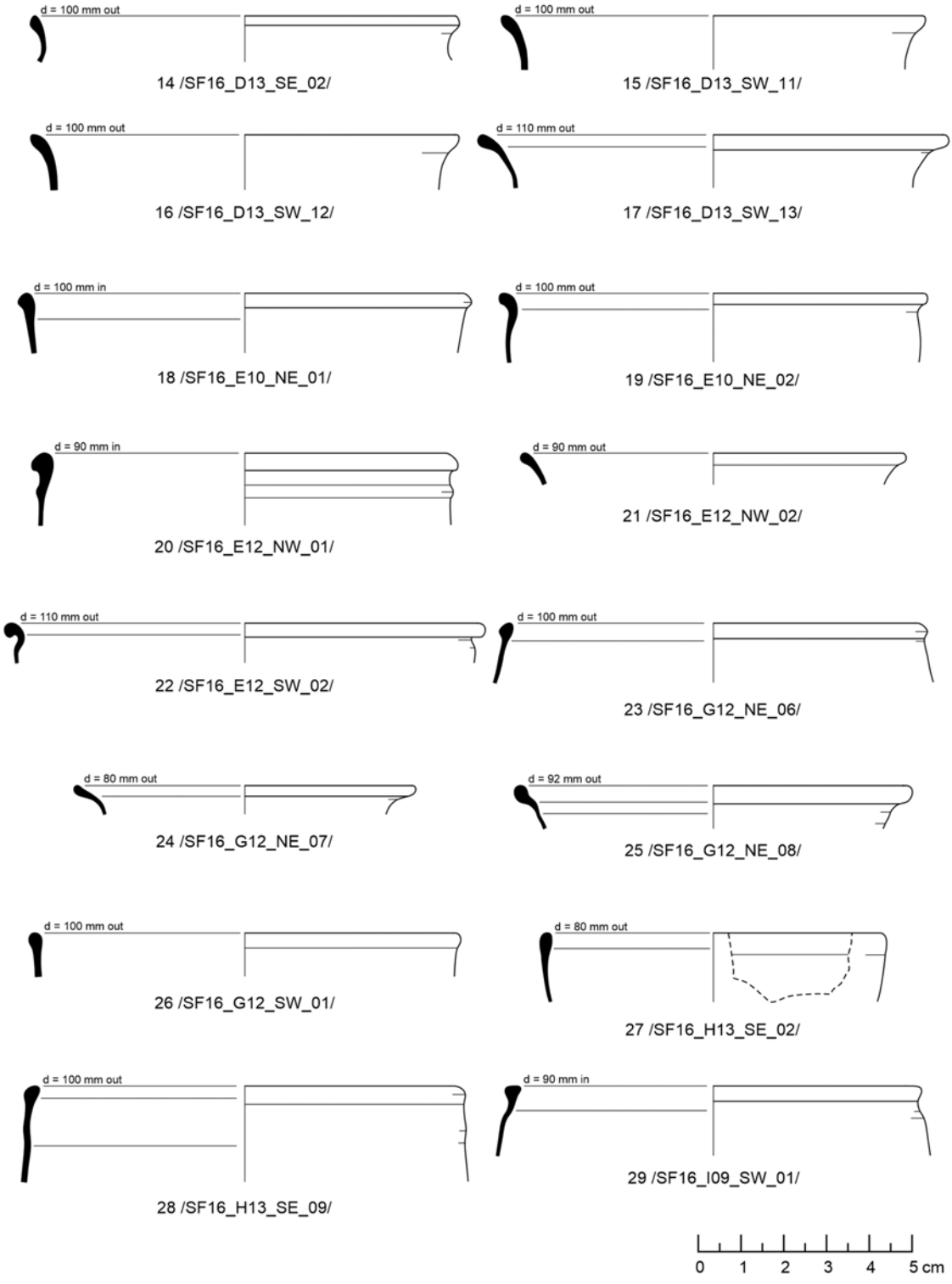


Fig. 2: Drinking vessels; 14–29: beakers/bowls with middle diameter.

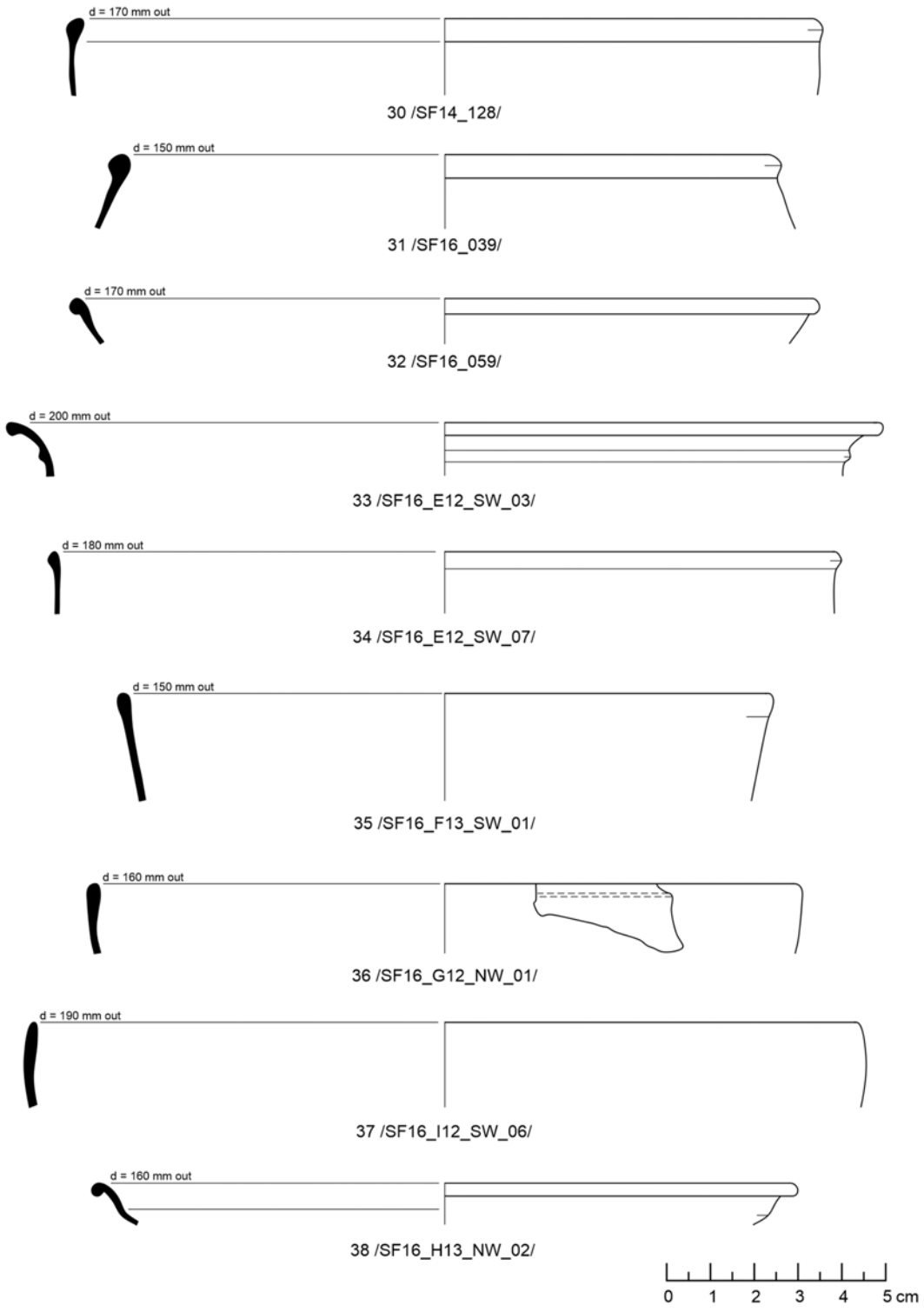


Fig. 3: Drinking vessels; 30–38: plates/bowls.

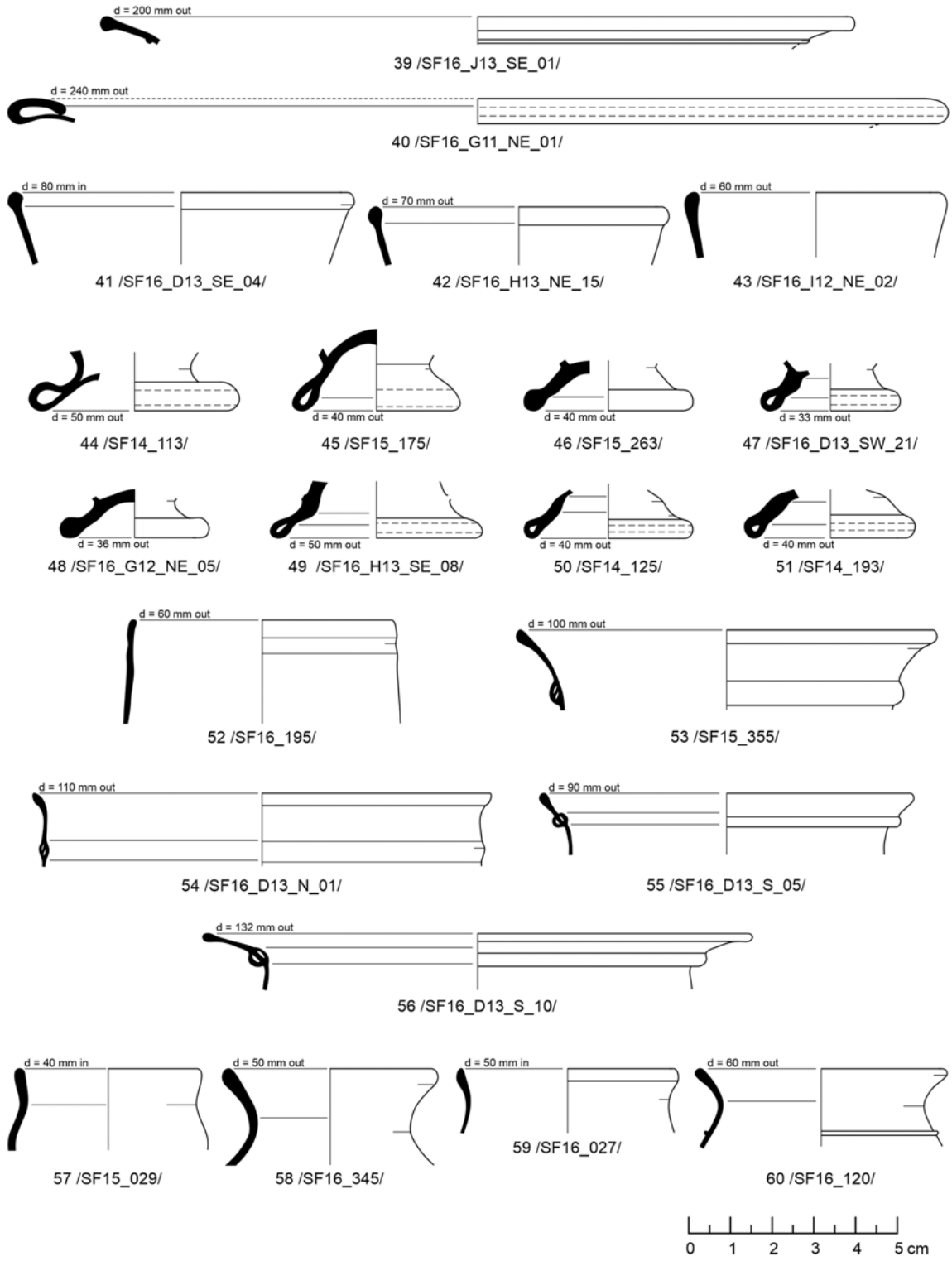


Fig. 4: Drinking vessels; 39–40: plates/bowls; 41–43: conical beakers/lamps; 44–48: conical beakers on foot; 49: conical beaker on foot/bowl; 50–51: stemmed goblets; 52: beaker/lamp; 53–56: beakers/bowls with tubular ridge; 57–60: ovoid beakers.

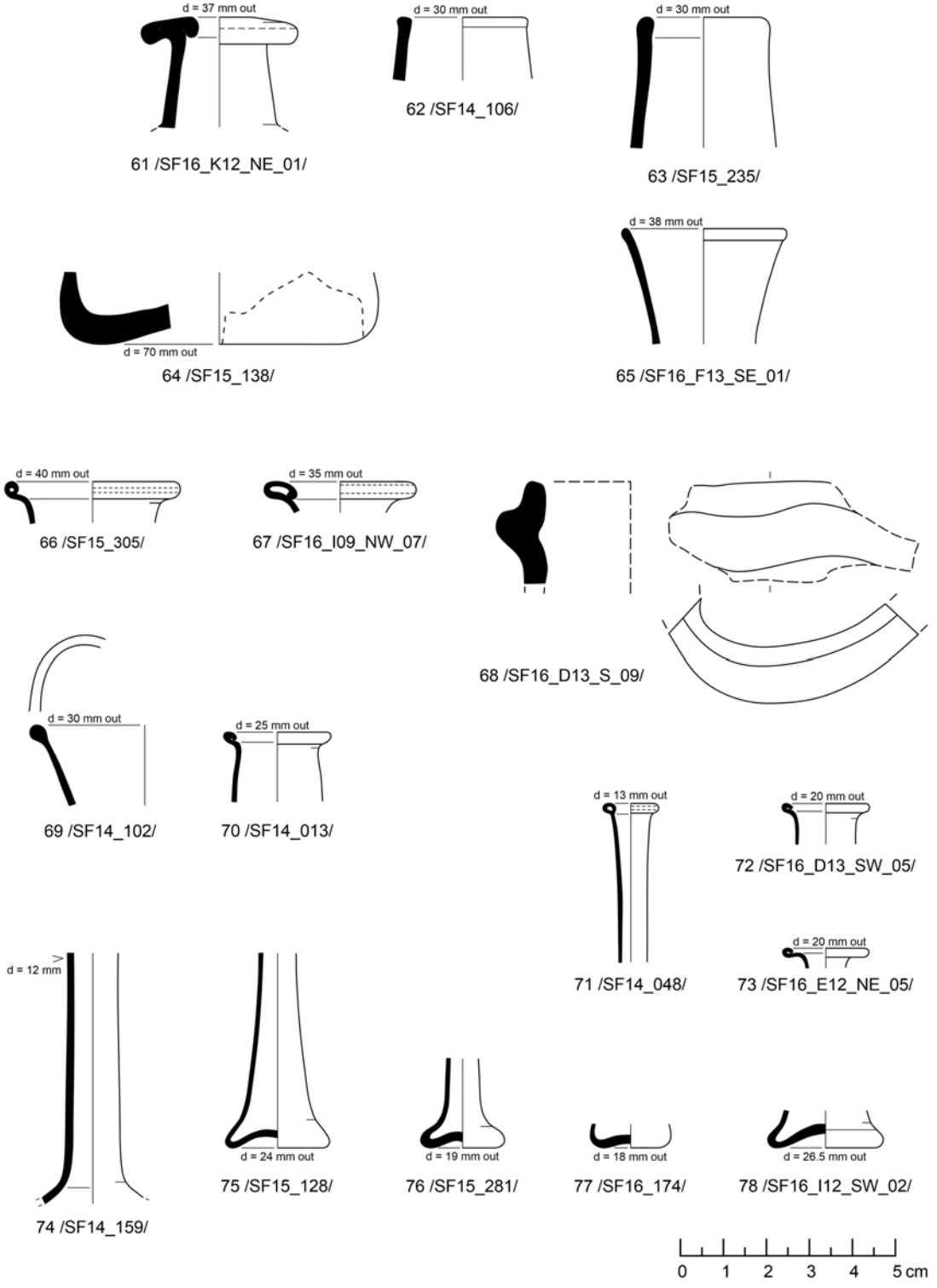


Fig. 5: Bottles and jugs; 61: quadratic/cylindrical bottle; 62–63: bottles with straight rim; 64: base of a bottle; 65–69: jugs; 70–78: *unguentaria*.

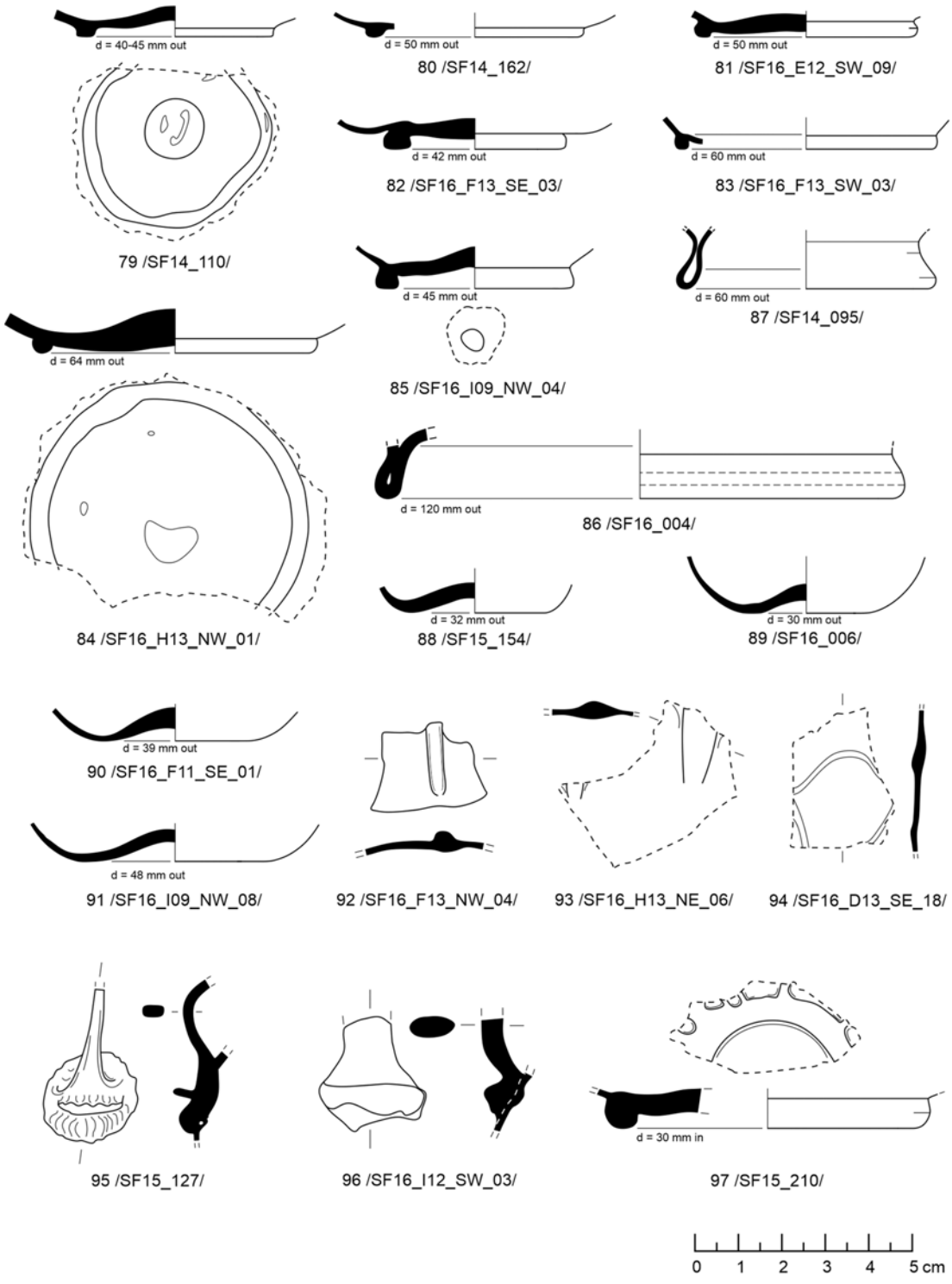


Fig. 6: Bases; 79–85: bases with simple ring; 86–87: bases with tubular ring; 88–91: convex bases. Decoration; 92–94: fragments with relief/mould blown decoration; 95–96: handles; 97: base with a simple ring and relief/thread decoration.

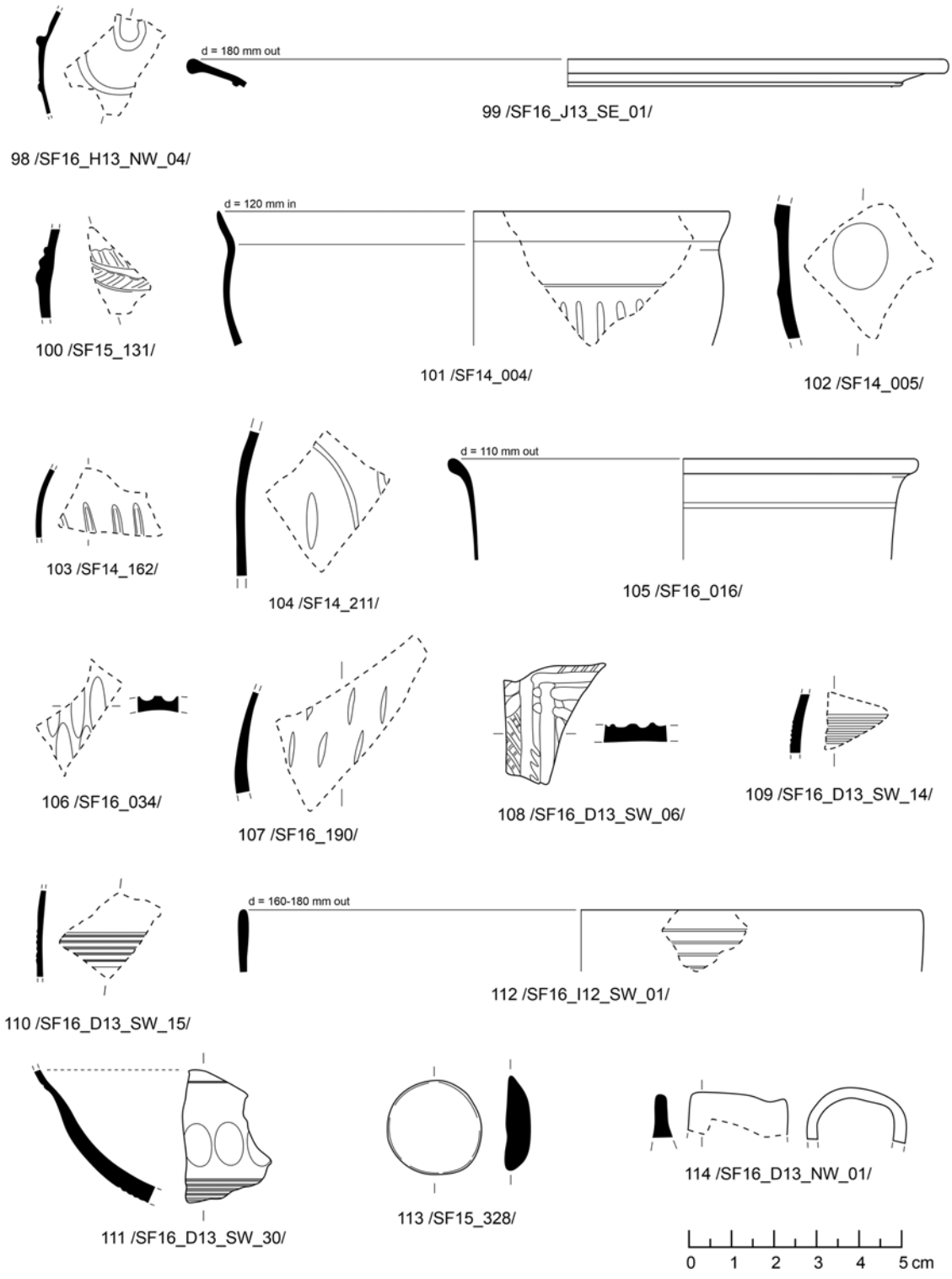


Fig. 7: Decoration; 98–100: relief/threads; 101–112: engraved lines and facets. Miscellaneous; 113: gaming counter; 114: glass moil.

contains shells or their fragments, providing the source of a stabilizing component (CaO), which was in this way introduced into the glass. Besides the listed raw materials, colourants or decolourants were added and even glass sherds as a material for recycling.

MATERIALS AND ANALYTICAL METHODS

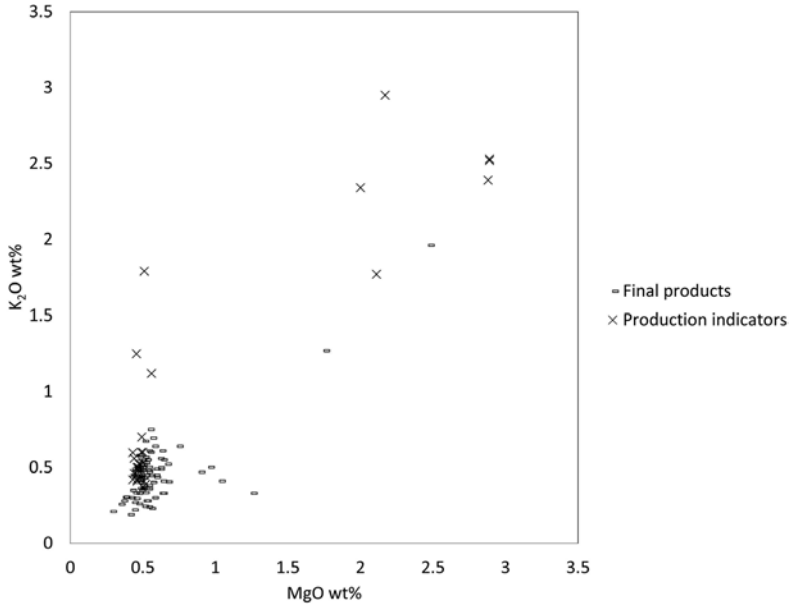
Differing in colour, form and possibly in time of their production, several glass fragments were selected to be analysed[12] in terms of their chemical composition. On the basis of the analysis, we expected that it would be possible: (a) to distinguish the groups of glass and their origin in comparison with the available literature, (b) to determine how colourless glass was decolourised, (c) to determine colouring components in coloured glass, and (d) to find out more about the glass production at the settlement of Yurta-Stroyno based on examining the indicators of the glass production.

The analysed set includes 89 samples from different glass objects (61 pcs.) and representatives of raw materials and production waste (the so-called production indicators[13]; 28 pcs.). Most of the glass samples are translucent or naturally coloured with shades of green or yellow. Other samples are colourless or of green-blue shades, which are typical colours of the Roman glass. Four glass samples are of amber/honey colour. Six samples can be identified as intentionally coloured with intense shades of blue (five samples) and red (one sample). The evaluated set also contains a small, colourless, bead (**Pl. 7/1:12**, **Pl. 7/2:52**) with traces of gold detected on its surface (as confirmed by the XRF method).

One criterion which is frequently used for the evaluation of glass is the content of alkaline components serving as a basis to determine input materials. Roman glass is characterised by a high content of Na_2O (sodium oxide) ranging from 11 to 22 wt. % (Freestone 2016), which corresponds with the majority of the samples analysed (with the exception of sample **Pl. 7/2:28** containing 22.75% of Na_2O). The glass made from natron can be distinguished from the glass produced with the ash of halophytic plants due to different contents of MgO (magnesium oxide) and K_2O (potassium oxide). Natron glass is characteristic by the content of both oxides reaching up to 1.5% (Aerts *et al.* 2003; Shortland *et al.* 2006; Freestone 2017; Barfod *et al.* 2018). From the **Graph 1** it is obvious that just one sample representing the final product (the red coloured fragment **Pl. 7/1:15**) contains both mentioned oxides at levels above 1.5%. Only the blue bracelet fragment **Pl. 7/1:17** contains a higher content of MgO (1.75%). The contents of both oxides exceeding 1.5% were detected for the indicators of local glass production under **Pl. 7/6:133–140**.

12 Sequential WD-XRF spectrometer ARL 9400 XP (Central Laboratories, UCT Prague) was used to perform XRF analysis of the samples. The spectrometer was equipped with an Rh anode end-window x-ray tube of the 4GN type and fitted with a 75 μm Be window. The peak intensity data was collected in vacuum by WinXRF software. The generator settings and collimator-crystal-detector combinations were optimised for all 79 measured elements with the analysis time of 6 s per element. The data acquired was assessed by the Uniquant software. To perform glass measuring, Standard Corning glass B had been obtained in advance from the Corning Museum of Glass, New York. Concentrations of individual oxides are expressed in weight %. The tables show the oxides that are normally assessed by the software applied. However, this does not, in any way, indicate the valences (oxidation stages) in which the particular colouring elements are represented. Moreover, certain colours can occur in glass at multiple oxidation levels simultaneously. Crystalline phases were determined by RTG diffraction analysis (XRD, PANalytical X'Pert PRO diffractometer).

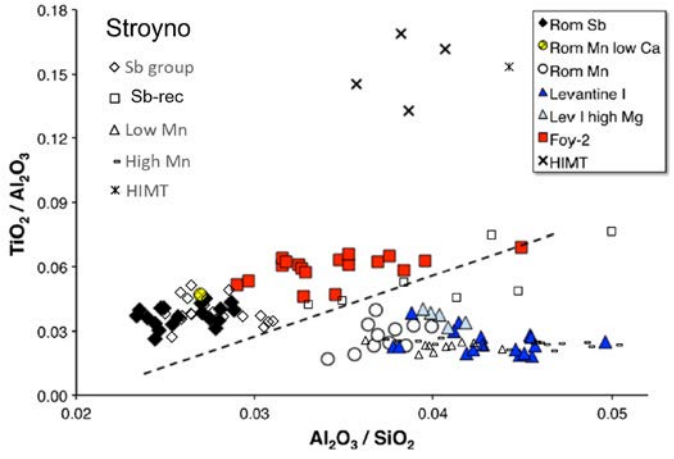
13 The term glass-making/glass-working/production indicators is used for vitreous masses, raw glass chunks, glass drops or cuttings.



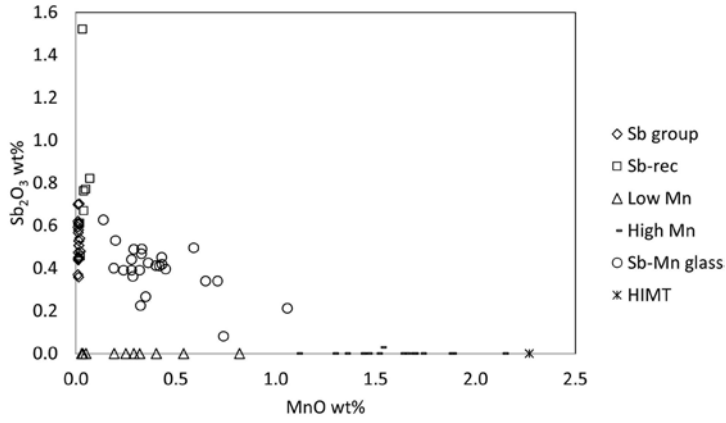
Graph 1: Correlation of K_2O and MgO contents in glass of finished products and production indicators from Yurta-Stroyno.

IDENTIFIED COMPOSITIONAL GROUPS

The group of natron glass can be divided even further. The literature has so far identified only a certain number of groups created by assessing the chemical composition of natron glass produced in the first millennium AD. Obviously, the composition of any glass is given by the raw materials applied. To distinguish the discussed groups, it is suitable to assess, for example, the oxides occurring in sand: SiO_2, Al_2O_3 and TiO_2 (see **Graph 2**) (Freestone 2016; Schibille *et al.* 2017; Barfod *et al.* 2018). Another criterion is the content of manganese (as MnO in **Tab. 7**) or antimony (as Sb_2O_3 in **Tab. 7**) indicating whether and how the glass was decolourised (see **Graph 3**).



Graph 2: Comparison of samples from Yurta-Stroyno with primary production groups based on the mineralogy of the glassmaking sand. The dashed line indicates the proposed division between Levantine and Egyptian primary production groups. After Schibille *et al.* 2017.



Graph 3: Diagram comparing Sb_2O_3 vs. MnO levels in Roman glass from Yurta-Stroyno. The limit for the intentional addition of manganese is 1%, and 0.2% for antimony (Maltoni *et al.* 2016). The higher MnO limit of 1.5 wt. % belongs to deliberately coloured purple glass (Jackson 2015). Sb-Mn glass is probably a mixture of Sb glass and high-manganese glass.

The glass finds from Yurta-Stroyno can be classified into the following groups (the division is based on **Graph 2**, **Graph 3**, and **Tabs. 7–13**):

(1) Antimony glass

Fifteen glass samples from this group (containing 19 fragments in total) are colourless;[14] however, greenish, or yellowish shades of the glass were also noted. These samples represent fragments of final products (**Tab. 7**).

This group is characteristic due to a higher content of antimony[15] (0.37–0.7% Sb_2O_3) and a low manganese content (the maximum value of 0.025% MnO; after Schibille *et al.* 2017; Gliozzo 2017). The glass contains rather lower amounts of aluminium, titanium, and iron, which confirms the use of high-quality sand.

Also, higher Na_2O contents were detected, which corresponds well with published research on this type of glass (Freestone 2016; Jackson-Paynter 2016; Gliozzo 2017; Schibille *et al.* 2017). The exception is constituted by sample **Pl. 7/2:44** with the Na_2O value of 15.23% and lower contents of MgO, CaO, TiO_2 and Fe_2O_3 (the values are compared to the other group samples). They could have been made of the glass commonly designated as the so-called Sb/low-Ca group (Jackson – Paynter 2016), but this group is typically represented by the glass with a higher content of Sb_2O_3 and a lower content of Al_2O_3.

14 In order to produce colourless glass, it is necessary to select either very pure raw materials or to add such materials during the glass melting that decolourise it. This process can be either of a physical or of a chemical nature (Fanderlik 2009). During physical decolouring, the glass colour is compensated for to obtain so-called neutral grey. The nature of chemical decolouring lies in the addition of substances that affect the iron present there in favour of Fe^{3+} ions (a less intense colouring form of iron). Manganese or antimony based raw materials (Schibille *et al.* 2017) were used to achieve glass decolouring – both of the elements were indeed identified in the glass from the set examined. In several cases, both elements were even found to be present simultaneously in significant quantities.

15 Intentional addition of the antimony raw material during glass production is suggested when the level of Sb_2O_3 in the glass reaches 0.2% and more (Maltoni *et al.* 2016).

The work of Schibille *et al.* (2017) suggests that *Antimony glass* was not recycled, claiming it to be the "original" material coming from the area of Egypt rather than the Levant (Gliozzo 2017; Schibille *et al.* 2017). Egyptian origin was also confirmed by hafnium isotopic study (Barfod *et al.* 2020).

Glass decolourised by antimony was used to produce high-quality products, but the composition of this type of glass changed over the time (Jackson – Paynter 2016). *Antimony glass* is mostly associated with the period of the 1st–3rd century AD; to a lesser extent it is also described in relation to the period of the 4th–7th century AD. The use of antimony as a decolouring agent was gradually abandoned (Freestone 2016; Gliozzo 2017); the end of the decolouring technology is primarily linked to the mid-4th century AD[16] (Freestone 2016; Maltoni *et al.* 2016) and its total termination dates to the 8th century AD (Gliozzo 2017).

The samples from Yurta-Stroyno containing antimony were compared with the data plotted for natron glass, see **Graph 2** for oxides related to introduced sand: SiO_2, Al_2O_3 and TiO_2. These samples correspond well with the group designated as *Roman Sb* and it can also be stated that the glass originates from Egypt. Due to the high quality of the design and conditions of the glass, we are inclined to date its origin to the 2nd–3rd century AD.

(2) Antimony glass II

Based on the data presented in **Graph 2**, it is obvious that seven samples (**Tab. 8**) with higher antimony (0.46–1.52% Sb_2O_3) content do not correspond with the *Antimony glass* group. These samples also appear to be made of the glass originating from Egypt (see the points in the graph plotted above the dashed line separating the production of *Egyptian* and *Levantine)*. The samples labelled as *unguentarium* **Fig. 5:74** and vessel fragment **Pl. 7/2:49** are quite distinctive and both display yellowish colours. Compared to the group of *Antimony glass,* both of the glass samples mentioned above contain higher amounts of TiO_2 (above 0.2%), Fe_2O_3 (at least 0.9%), ZrO (about 0.02%), MgO (ca. 1%) and, as already mentioned, Sb_2O_3 (at almost 0.8%). Although later produced glass containing antimony is rather rare, in this specific case, later production may be considered as possible option. The chemical composition of these two samples (according to the above-mentioned oxides) is similar to the representatives (designated as YAS-031) of the Foy-2 type group published by Schibille *et al.* (2017) and dated to the 5th–6th century AD. Except for the elevated levels of iron, titanium and magnesium oxides, the Foy-2 glasses are similar to the Rom-Mn group with regard to their lime (7.8% CaO) and alumina contents (2.6% Al_2O_3) (Freestone 2016; Schibille *et al.* 2017). Soda concentrations[17] are on average just below those of Rom-Sb glasses (17.8% Na_2O in Foy 2.1 glass; Freestone 2016) and they have added manganese (1.25% MnO) rather than antimony. Glass with similar characteristics has previously been linked to the *HIMT glass* type and referred to as "weak *HIMT*" or *HIMT* 2 (Schibille *et al.* 2017).

The content of TiO_2 and ZrO in natron glass is dealt with in the work of Aerts *et al.* (2003). The authors came to the conclusion that a higher content of these oxides was characteristic for glass dated to the 4th–5th century AD and they link it to new sources of sand discovered at that time. This again indicates a later production date of both discussed samples (**Fig. 5:74** and **Pl. 7/2:49**).

16 Just as the 4th century AD is considered as the borderline between the Roman period and the Late Antiquity, a visible change in technology can be seen between the Roman and Byzantine glassmaking industry (Maltoni *et al.* 2016).

17 However, samples **Fig. 5:74** and **Pl. 7/2:49** have higher contents of Na_2O (more than 21%).

Other samples containing Sb_2O_3 to a greater extent and, according to **Graph 2**, displaying the ratios questionable for their unambiguous classification as specimens from the *Antimony glass* group, are the following: **Pl. 7/2:48**, **52–53**. This also applies to samples **Pl. 7/2:50** and **51** with limit manganese content (0.02% MnO). The work of Gliozzo (2017) characterises the colourless glass of the *Antimony group* with the MnO content of <0.025%. Therefore, the discussed samples (**Pl. 7/2:50** and **2:51**) could be included in the *Antimony group*, but they still show higher values of Al_2O_3 (more than 2.2% Al_2O_3) and MgO (0.62%) as well as those of Fe_2O_3 (ca. 0.5%) and TiO_2 (ca. 0.1%) when compared to other samples.

Therefore, another glass group from Yurta-Stroyno had been defined, containing antimony and, at the same time, higher levels of Fe, Ti, Mg and Al. It is not clear whether the elements under consideration were introduced by refractory materials, sand or due to glass recycling.[18] Antimony glass is predominantly a product of the 3rd century AD, and, when combined with the listed oxides, it may be assumed to have been recycled with the use of different types of sand in the later period (ca. in the 4th–5th century AD).

(3) Low-manganese / High-manganese glass

A total of 29 final product fragments and 17 production indicators was included in this group displaying mostly green, blue-green, and purple glass shades, with only four colourless samples (**Tab. 9**). The prevailing colour of the 17 glass production indicators was blue/green represented both by the raw glass chunks (5 pcs.) and the waste material (12 pcs.). Out of these, two moil fragments[19] are very interesting as they are related to the shaping of objects by blowpipes.

This group represents glass in which the selected method detected antimony in the maximum quantity of 0.03%[20] (border limit taken from Lesigyarski *et al*. 2013). Unlike the *Antimony glass* group, the glass here contains aluminium and calcium. A higher content of aluminium, compared to the values detected in most of the European Roman glass (2.5% and 2% Al_2O_3 in natron glass groups Rom-Mn and Rom-Sb [Freestone 2016, tab. 1]), was also described for the glass from the area of SE Bulgaria (max. content 6% Al_2O_3; Lesigyarski *et al.* 2013). Lesigyarski *et al.* (2013) refer to the work of Freestone (2016), which states that during the 4th century AD there was a change either in the production practice or in the source of sand (as also mentioned by Aerts *et al.* 2003).

The 17 fragments of the production indicators of predominant blue-green colour form a relatively large part of this group. From the chemical point of view, this group is relatively homogeneous and comparable to the Roman blue-green glass dated to the 1st–3rd century AD which is assumed to originate from the Syro-Palestinian region (Freestone 2016; Jackson-Paynter 2016; Maltoni *et al.* 2016). An exception is the sample **Pl. 7/4:89** (the only sample with a yellowish shade) with an increased MnO content (1.41%). In this case, the glass was decolourised due to the increased amount of MnO. A higher MnO content was found in a number of fragments of the final products (see below – subgroup 3 of MnO more than 1%), however, they were not decolourised. Some of the samples were even observed to have possibly intentional purplish shade, see **Pl. 7/4:95**, **97**, **99**, and **103–104**. The resulting colour of glass

18 It can be assumed a mixture of *Antimony* and *HIMT glass*.

19 Moil, or overblow, is a by-product of mould blowing, representing the portion of the parison that remains outside the mould. The moil is usually removed by cracking off (https://www.cmog.org/glass-dictionary/overblow, visited 03/12/2021).

20 Here, the exception is sample **Pl. 7/3:77** (0.06% Sb_2O_3).

is also affected by melting conditions. In this case, the oxidation atmosphere with prevailing Mn^{3+} might have been the source of the colouring effect.

In this group of glass, manganese is found in a relatively wide range (0.03–2.14% MnO; see **Graph 3**; **Tab. 9** – MnO and the colour distinction). The samples in the group can be divided into the three following subgroups:

1. Four samples of predominantly yellow colour show significantly lower content of MnO (in hundredths of percent) compared to other samples from the group of manganese glass. It could be assumed that no manganese raw material was introduced into them, nor that they were made by recycling the glass decolourised by manganese (see below). Value MnO over 0.07% indicates addition of manganese in some form.
2. Eight samples of final objects and 16 of production indicators with mostly blue-green colour reach up to max. 0.85% MnO. In a number of works, glass with a lower MnO content is dated to the 1st–3rd century AD (Freestone 2016; see Jackson – Paynter 2016, Appendix 2).
3. Eighteen samples have MnO content of more than 1%.[21] These glass fragments are greenish, dark green, purple, or colourless. Most likely, manganese raw material was used in its production. This glass can roughly be dated to the 2nd–4th century AD according to Jackson and Paynter (2016, Appendix 2).

The low content of MnO (below 0.04% MnO) in glass is usually described in the context of "naturally coloured" glass, when MnO is unintentionally introduced into glass with sand during production. The background level in the sand is about 0.03–0.05 MnO (Schibille *et al.* 2017).

Another common ingredient of sand is iron that provides glass with a greenish colour shade. Iron in glass is always present in the form of two ions of Fe^{2+} (colouring the products with a blue-green shade) and Fe^{3+} (creating yellow-green to yellow shades). If the MnO content is insufficient, corresponding to its unintentional introduction, the glass retains greenish shades due to the presence of iron.

The limit content of MnO in the glass is discussed in several works and its value has been published as ranging from 0.1 to 1% (Foster – Jackson 2009; Brems *et al.* 2012; Maltoni *et al.* 2016). Additions of raw manganese material are considered intentional when exceeding the value of 1%[22] (Brems *et al.* 2012). The subject of the work of Brems and his colleagues was the characterization and determination of the sand from the Western Mediterranean region suitable as a raw material for the Roman glass production. The authors concluded that the maximum amount of MnO in the glass attributable to sand impurity was less than 0.1%. For the MnO contents within the above-mentioned range, the authors assume that these were introduced into the material by the glass (containing MnO) used during recycling (Brems *et al.* 2012; Maltoni *et al.* 2016).

The **Graph 2** clearly demonstrates that the glass of this group is plotted in the area of glass labelled according to Schibille *et al.* (2017) as Rom Mn and Levantine. *Manganese glass*[23] *and*

21 In the Levant, glass was produced with varying amounts of MnO up to 2% or even more. It was deliberately added, but it looks as if they did not control the quantities in detail.

22 This claim is based on the assumption that successful glass decolouring occurs when the ratio of MnO/Fe_2O_3 is greater than 2. If the average value of Fe_2O_3 in Roman glass is 0.62%, the MnO content must be more than 1% (Brems *et al.* 2012).

23 A group of glass known as Roman manganese (Roman-Mn, colourless or blue-green glass) is, together with Roman antimony (Roman-Sb, predominantly colourless) dated to the 1st–3rd century AD and comes from the Levantine area (Freestone 2016).

Levantine glass[24] have no clearly defined boundaries as the groups are similar to each other (Stojanović *et al.* 2015; Jackson – Paynter 2016; Maltoni *et al.* 2016; Schibille *et al.* 2017). In the work of Schibille *et al.* (2017), the authors chose a provisional value of 2.69% Al_2O_3 to distinguish between these two groups; with glass of higher content of Al_2O_3 belonging to a group of later glass – Levantine I.[25] If we use the same criteria for Yurta-Stroyno samples in this group (*manganese glass*), most of the glass[26] containing manganese will be included in the group Levantine I. However, Jackson and Paynter (2016) state that the glass of the Levantine-type usually does not contain any decolouring substances. Freestone (2016) reports that Levantine glass has not been decolourised with manganese since the 5th century AD,[27] which may narrow the dating range of the Yurta-Stroyno samples till the end of the 4th century AD.

(4) Mixed antimony and manganese glass

This large group includes 23 samples of final products and four samples of production indicators (**Tab. 10**). Colourless glass is also represented here (by 14 samples; more than in the previous group) together with greenish and blue-green glass. Several authors (Freestone 2015; Jackson – Paynter 2016; Schibille *et al.* 2017) assume that glass fragments were recycled during the glass production, and two types of glass were mixed – glass decolourised by antimony and glass decolourised by manganese. They made this assumption as it seems unnecessary to use both types of decolouring raw materials in the production of glass. There is a hypothesis that colourless glass pieces were melted/recycled together. Particularly, this applies to the types where it could not be distinguished by the naked eye how they were decolourised (Maltoni *et al.* 2016; Schibille *et al.* 2017). Even though the glass used for the production was probably colourless, some of the final glass samples are greenish. It is therefore possible that contamination occurred during the melting, as it is apparent, for example, in the sample of *unguentarium* **Fig. 5:78**; **Pl. 7/5:131**. The glass is visually rather poor, non-translucent, contains many unmelted particles, and its colour can be unambiguously attributed to the high content of Fe_2O_3. The possibility of the contamination of recycled glass by iron is also explained by Jackson and Paynter (2016) as a result of used glass waste containing iron from blowpipes.

(5) HIMT glass (high iron, manganese, and titanium)

As the group name suggests, this type of glass can be distinguished from other groups due to the increased contents of iron (≥0.7%), manganese (mostly 1–2%) and titanium (≥0.1%) (Foster – Jackson 2009). This type of glass is typical for the late 4th century AD and contains a lower amount of calcium compared to manganese glass (*Roman Mn category*) or *Levantine I* glass (Freestone – Wolf – Thirlwall 2005; Conte *et al.* 2014; Schibille *et al.* 2017). Its colour usually ranges from yellow-green to olive-green contrasting with the blue-green colour typical for the earlier Roman glass (Freestone – Wolf – Thirlwall 2005; Foster – Jackson

24 According to Freestone (2016), the Levantine type of glass is divided according to the date and place of production into Levantine I, dated either to the 4th century AD in Jalame area, or to the 6th–7th century AD in the furnaces of Apollonia/Arsuf; and into Levantine II regarding the furnaces in Bet Eli'ezer near Hadera dated to the 8th century AD.

25 Levantine I has typically higher lime and alumina than Roman glass, often in excess of 8% CaO and 2.8% Al_2O_3 (Schibille *et al.* 2017).

26 Fragments of finished products and the glass production indicators.

27 However, in Egyptian glass making tradition adding of manganese continued until the 8th or 9th century AD.

2009). In the available literature (Foster – Jackson 2009; Conte *et al.* 2014), further *HIMT glass* division appears based on the content of the key oxides of iron, manganese and titanium, classifying the glass into *HIMT* 1 (a higher content of the mentioned oxides) and *HIMT* 2 (a lower content of the mentioned oxides). From the Yurta-Stroyno glass assemblage, only one sample of the greenish colour **Pl. 7/5:132** can be attributed to the *HIMT* group; specifically, to the group *HIMT* 1 (**Tab. 11**).

HIMT glass has already been found in Bulgaria, particularly in the Dichin area. The analysed samples were divided into the three groups according to their chemical composition and were dated to the 5th century AD (Rehren – Cholakova 2010), which corresponds to the above-mentioned information on the data classification of this glass type. The authors distinguished types of glass mainly on the basis of oxides of sodium, iron, titanium, manganese and phosphorus. The composition of the Yurta-Stroyno sample **Pl. 7/5:132** is very similar to the Dichin glass Group I, however, there is a large difference in the content of MnO (2.27% for sample **Pl. 7/5:132** versus 0.05% MnO for the Dichin glass sample). Nevertheless, such a high content of MnO is characteristic for *HIMT glass* (see Freestone 2016, tab. I, MnO 2.02%). Another glass composition comparable to the sample **Pl. 7/5:132** was found in the work focused on glass from South-Eastern Bulgaria (Lesigyarski *et al.* 2013). The work describes a specimen of a green-brown colour originating from the Pomorie area and dated to the 4th–6th century AD (this sample also displays similar content of MnO 2.3%).

The *HIMT glass* is assumed to have been melted in the territory of Egypt[28] (Freestone – Wolf – Thirlwall 2005; Jackson – Paynter 2016). Due to the wide variability of the chemical composition of the *HIMT glass*, this group is believed to have been possibly produced by melting several types of glass. For instance, Jackson and Paynter (2016) define *HIMT glass* with a low content of antimony (possibly produced by recycling antimony glass or antimony-manganese glass and *HIMT glass*) and glass with a higher potassium content (above 1%). Again, the authors of the study presume the introduction of fragments of another glass type into *HIMT glass*. Earlier works (Freestone – Wolf – Thirlwall 2005) also accept the possibility that *HIMT glass* is a mixture of chunks of primary glass made from two different types of sand.

(6) Plant-ash glass

Based on higher contents of K_2O (1.8–3%) and MgO (2–2.9%), only six samples could be characterised as the glass that was produced by using plant ash as a raw material[29] or by recycling plant-ash glass. This technological process is also indicated by PbO present in all samples, which is frequently mentioned in literature as a glass recycling indicator (Degryse – Shortland 2020). Unfortunately, no fragment of a finished object is represented in the assemblage. The examined samples are all indicators of glass production (**Tab. 12**). It is possible to assume that this glass was processed at the settlement, because the production indicators again involved a moil fragment, being related to glass forming/blowing.

By comparing the ratios of Al_2O_3/SiO_2 (over 0.03) and TiO_2/Al_2O_3 (ca. 0.06) and the data provided in **Graph 2**, it can be assumed that all the six samples are more of the "Egyptian character" and that they belong to the Foy-2 glass area. The samples from Yurta-Stroyno contain both already discussed decolouring agents (manganese and antimony); as mentioned in the introduction, ash additions are discussed rather in the relation to the change of the sodium

28 HIMT can be regarded as a continuation of the Rom– Sb tradition (Freestone *et al.* 2018).

29 Possible contamination of the glass by the ash from furnace fuel cannot be ruled out completely (Jackson – Paynter 2016).

raw material in the later period (ca. 8th century AD). Closer characterisation of these samples is likely to be the subject of further work. No analogy was found between the glass production indicators and the settlement final product samples, but this could be also due to the selection of samples for the analysis. Ash glass representatives are rather rare in the Roman glass, and the specific place of origin of this glass still remains unclear (Jackson – Paynter 2016).

DELIBERATELY COLOURED SAMPLES

The colour of ten glass fragments is affected by the introduced colouring ions (**Tab. 13**). Based on the XRF analysis, the ***blue glass*** (5 pcs.) was found to contain copper and cobalt; occurring in glass as Cu^{2+} and Co^{2+} (Fanderlik 2009). Copper and cobalt raw materials were commonly used to obtain a blue shade of glass. The resulting colour was also affected by the content of iron, which is relatively high in this type of glass (around 1% Fe_2O_3). In three samples **Pl. 7/6:146–148** (**Pl. 7/1:7**), MnO and Sb_2O_3 were identified simultaneously. Based on the data above, it can be assumed that recycled glass was used in the production of these three samples[30] (similar to *Mixed antimony and manganese glass* group). Another sample of a blue colour is **Pl. 7/6:145**, which does not contain Sb_2O_3, belonging to the group of *low manganese glass*. A completely different sample is then the fragment of a bracelet **Pl. 7/6:149** (**Pl. 7/1:17**). In contrast to the other samples of the blue glass, it contains a higher amount of K_2O (1.3%), MgO (1.8%), CaO (7.7%) and Fe_2O_3 (1.6%), and it will be discussed later in the text along with the following sample of a bracelet.

A unique find is a bracelet fragment **Pl. 7/1:15** which has deep ***red colour***. Ash of plants (K_2O and MgO contents above 1.5%) was probably used in the production of this glass, and a copper-containing raw material was added to colour it (XRD confirmed copper in a crystalline form). Another crystalline phase was found to consist of wollastonite with an iron admixture. Both of these phases cause the glass not to be translucent but opaque. The addition of the metals to the glass is also related to the presence of other oxides – PbO (0.22%) and SnO_2 (0.07%). A higher content of MnO (0.96%) was also detected in the glass sample, which could as well affect the resulting colour. However, MnO was also found in other examined samples in the amount of about 1%.

The two mentioned bracelet fragments are quite unique in terms of their intense colour and chemical composition. On the basis of the increased contents of K_2O and MgO, it seems appropriate to consider the possibility that ash was used in the glass production. However, from a chemical perspective, these two samples differ from the group of plant ash glass evaluated within the scope of this work. This primarily applies to the absence of antimony and a lower content of P_2O_5 (ca. 0.2%; phosphorus is a typical component of plant ash).

In the works of Freestone and Stapleton (2015), Boschetti *et al.* (2016) and Schibille *et al.* (2017) is mentioned that a red shade of glass is related to deliberate additions of ash during glass melting. In this case, ash serves as a reducing agent, and we may speak of the glass of a natron type. Due to its high content, Fe_2O_3 could also be used as a reducing agent. Higher levels of Fe_2O_3 in blue glass are associated with the introduction of cobalt ore.

Assuming that plant ash was used as a reducing agent and it was not a typical *plant ash* representative, the red coloured sample **Pl. 7/1:15** cannot be unambiguously assigned to any of the natron glass groups (ratios of Al_2O_3/SiO_2 0.04% and TiO_2/Al_2O_3 0.1%; see **Graph 2**). The second sample of a blue colour, **Pl. 7/6:149**, may belong to the *Foy*-2 group.

30 For example, blue mosaic cubes might have been used as well.

For the formation of ***amber tones***, the presence of sulphur and iron is necessary with melting taking place under reducing conditions (Fanderlik 2009; Maltoni *et al.* 2016). The colour intensity increases with the content of alkalis, iron and sulphur. There were four samples of this colour present in the set (**Pl. 7/6:141–144**). The first three samples are very similar in composition. Sample **Pl. 7/6:144** primarily differs from the others by a significantly higher MnO content (0.85%). According to their overall composition, these glass samples could be included in the *manganese glass* group as discussed above, although the first three samples contain manganese that was probably introduced there accidentally by sand (see Brems *et al.* 2012).

COMPARISON OF CHEMICAL COMPOSITION OF YURTA-STROYNO GLASS WITH OTHER SETTLEMENTS IN BULGARIA

As is obvious from the available literature dealing with chemical composition of Roman glass from the Bulgarian region, the finds occur in the south-eastern (Lesigyarski *et al.* 2013) as well as in the northern part of the country (Rehren – Cholakova 2010; Cholakova – Rehren – Freestone 2016).

The glass found in Bulgaria exhibits typical natron glass features as they are described in the literature (Maltoni *et al.* 2016), e.g. the use of antimony as a decolouring agent in earlier glass or a decrease in glass quality in the later period of Roman and post-Roman glass (Foster – Jackson 2009).

The subject of many works (Rehren – Cholakova 2010; Rehren – Cholakova 2014; Cholakova – Rehren – Freestone 2016) is the examination of samples from the Dichin area (northern Bulgaria). It is a Late Antique settlement where certain local production is expected (based on the analysis of the finds most likely belonging to production waste). Mostly, glass samples similar to Roman blue/green glass were represented here and they were further divided into three subgroups (Rehren – Cholakova 2014). In a more recent work (Cholakova – Rehren – Freestone 2016), the analysed glass[31] is described as being identical to the so-called *Series 2.1* group defined by D. Foy. To a lesser extent, Levantine I, *HIMT* and *HIT* were represented too (Rehren – Cholakova 2014; Smith – Henderson – Faber 2016).

The last two groups are dealt with in the work of Rehren – Cholakova (2010). The finds were divided into the two groups according to the dating and colour of the glass – group I (blue/green glass) dated to the end of the 5th century AD and group II (yellow-green/yellowish glass) dated to the 4th–5th century AD. The samples have a high content of iron (all samples more than 1.4% Fe_2O_3) and titanium (about 0.6% for TiO_2). Group I has been designated as *HIT* because of the absence of manganese, and the glass of the group II has been designated as *HIMT*, although it shows certain variations in the composition compared to that usually found in the "classic" *HIMT* group.

For the area of South East Bulgaria (Lesigyarski *et al.* 2013), the analysed glass objects were characterized as follows: *antimony glass*, dated to the 1st–2nd century AD (with Sb_2O_3 contents above 0.4%) as well as to the 4th–7th century AD (with approx. 0.2% Sb_2O_3); *manganese glass*, with most of the glass from this group dated to the 4th–7th century AD; *mixed antimony and manganese glass*, dated to the 1st–4th century AD; two more samples were classified as *HIMT glass*.

31 The glass samples were found in Northern Bulgaria (Dichin, Odartsi and Serdica) and were dated to the 6th century AD. They are characterized by higher levels of MgO, TiO_2 and Fe_2O_3 compared to earlier types of Roman glass (to the average composition of Roman glass from Foster and Jackson 2009). The glass contains more than 1% MnO but Sb_2O_3 only in hundreds of ppm.

Naturally, in terms of the representation of individual glass groups/types, the results from this area are closer to the samples from Yurta-Stroyno than are the finds from Northern Bulgaria. Even in the case of glass samples from Yurta-Stroyno, the observations of Lesigyarski *et al.* (2013) can be agreed upon when concluding that archaeological sites near the Black Sea coast provide more abundant glass finds with a possibility to distinguish more chemical types.

If we compare the results of the glass analysis from the south-eastern regions of Bulgaria with our data, the group of *Antimony glass* from Yurta-Stroyno, due to its higher contents of Sb_2O_3 and the conditions of the finds, corresponds to the glass production dated to the period around the 3rd century AD. We find a certain discrepancy concerning the group of *Manganese* glass, which is dated to the 4th–7th century AD by Lesigyarski *et al.* (2013). However, other works indicate the presence of manganese in the glass (from the Levantine region) with the maximum of the 5th century AD (Freestone 2016) set as a border limit. We see this dating to be more likely in the case of the manganese glass from Yurta-Stroyno (according to **Graph 2** it is of the Levantine origin). It seems that some of the samples published in the work of Lesigyarski *et al.* (2013) could be rather included in the Foy-2 group (glass from Egypt), which would explain the presence of manganese in the glass samples of the later origin.

With respect to the overall chronology of the settlement and to typological classification of the finds, glass of *Mixed antimony and manganese glass* from Yurta-Stroyno could be dated to the 2nd–4th century AD, which corresponds well with published work of Lesigyarski *et al.* (2013) (see above) and the sets of glass of this composition listed in the work of Jackson and Paynter (2016, Appendix 2).

Furthermore, chemical types of glass that have not yet been discussed to a greater extent in connection with Bulgaria (this conclusion is based on available literature) are also present among the material from the investigated settlement. This namely applies to the groups of glass listed here as *Antimony glass II* and *Plant-ash glass*.

Only one analogy was found in the literature for the *Antimony glass II* group, the glass from the deposit at the Yasmina Necropolis in Carthage (Schibille *et al.* 2017). This type of glass also occurs in the northern part of Bulgaria, but it contains MnO, which seems more common for this group. MnO was found in our samples in hundredths of a percent; on the other hand, the samples contained higher levels of Sb_2O_3. With regard to the content of ZrO in our samples, we assume their later origin, dated from about the 5th century AD onwards. The classification of *plant ash glass* production indicators remains ambiguous; these samples are generally less frequent, and the final products are still missing.

CONCLUSION

1413 glass fragments were uncovered from the Roman rural settlement of Yurta-Stroyno, both from the excavation and the surface survey. The processing and evaluation of the glass collection was in certain aspects challenging, as the settlement was heavily damaged by looting, resulting in disturbed contexts.

The aim of the presented study was a typological analysis of the glass finds, supplemented by an elemental composition analysis of selected artifacts. Chemical analysis of the elemental composition was used to clarify and to complete the chronological framework of the presented collection. Another goal was to define the provenience of the raw glass found on the settlement and to describe the specifics of the local glass production. For these purposes, 116 samples from the settlement were analysed including 83 samples from glass vessels, 28 from glass waste, and five from personal ornaments (two bracelets and three glass beads). Sampling

considered both the most represented types of vessels and type-exceptional pieces. Attention was also focused on specific groups as production waste and raw glass, that was essential for chronological identification of the local glass production. Based on chemical analyses, six basic groups were defined in Yurta-Stroyno:

(1) Antimony glass
(2) Antimony glass II
(3) Low-manganese / High-manganese glass
(4) Mixed antimony and manganese glass
(5) HIMT glass (high iron, manganese and titanium)
(6) Plant ash glass

The processed glass fragments from Yurta-Stroyno show surprising variability both in terms of the chemical composition and in the vessel typology. Additionally, they cover relatively wide chronological period, stretched from the 2nd–3rd century AD to the Late Antiquity (4th–6th century AD).

The raw glass and glass production waste, which relates to the chemical groups 3, 4 and 6, relate to the above-mentioned chronology covering period from the 2nd–3rd century AD to the 6th century AD. Undoubtedly, the question arises whether the local workshop existed all the time or whether there was a hiatus. The workshop from Yurta-Stroyno has similar chronological framework as other glass workshops known from Bulgaria (Koycheva 1990, 41–43; Cholakova 2008).[32] Hypothesis of possible continuity of the glass workshop till the Early Medieval period (6th–7th century AD) should be also considered, however we do not have enough evidence for this interpretation. Nevertheless, such a situation is attested in Novae, where the last glass workshop operated until the beginning of the 7th century AD (Olczak 1998, 88, 94–95).

Within the set of samples under study, several groups differing in their dating and place of origin were identified on the basis of the chemical composition of the glass. The analysed glass comes from both the Levantine area (*Low-manganese / High-manganese glass* group, predominant in the set with 46 pcs.) and Egypt (*Antimony glass, Antimony glass II and HIMT-type glass* with 27 pcs.). Glass which is supposed to be of the Egyptian origin is only represented by fragments of final products, while the glass of supposed Levantine origin by raw glass, glass waste and fragments of final products. Most of these samples may be dated to the 2nd–3rd century AD. Samples of *HIMT* and *Antimony glass II* are of a later origin.

Based on the finds of the glass manufacturing indicators, it can be assumed that there was some local production at the settlement, namely using the glass of *Manganese and Plant ash* types. Glass of *Mixed antimony and manganese types* was also found at Yurta-Stroyno, indicating the process of glass recycling.

The chemical analysis provided new data that could help us to explain not just the chronology of the glass workshop, but also general development of glass production and glass supply at the settlement. Several chemical glass groups from Yurta-Stroyno have parallels in glass collections from other Bulgarian sites: *Antimony glass* (group 1); *Low-manganese / High-manganese glass* (group 3); *Mixed antimony and manganese glass* (group 4), and *HIMT glass* (group 5).

32 The majority of the glass workshops from Bulgarian territory used to operate between the 4th and 5th century AD. Some smaller – local workshops could still operate until the 6th century AD. In the case of the glass workshop in Novae continuity even into the early 7th century AD is considered, when there is general decrease in the number of glass finds in Bulgaria and probably a complete collapse of glass production centres (Olczak 1998; Stawiarska 2014).

At the same time, we have not detected some groups that are common in northern Bulgarian sites (i.e. Dichin and Odartsi) as Foy 3.2 and Foy 2.1 (see Cholakova 2015; Cholakova *et al.* 2016). It is appropriate to ask whether this is only the state of the current investigation (as we were not able to identify yet the mentioned groups), or whether it is a specific feature of the region. As part of solving this issue we are currently processing further samples from the settlement, mainly samples of the raw glass and the production waste.

The typological analysis of the vessels brought results which, for the most part, correspond with the data from the chemical analysis. A larger group of vessels can be related to the wide chronological period stretching from the 2nd to the first half of the 4th century AD. These types are: conical beakers on a foot (I.34, I.109); beakers/bowls with outsplayed rim and tubular ridge; ovoid beakers (AR 96 or I. 131); candlestick unguentaria (I. 82b); and hemispherical bowls with faceted decoration.

For the period of the Late Antiquity, covering the 4th–5th (or even the 6th) century AD, we have less numerous finds of glass vessels. The colour and structure of glass often becomes an indicator,[33] as for the later period, lower quality glass with green or yellow tint is more characteristic. Some fragments may also contain traces of impurities, which may indicate poor processing of the glass mass or secondary contamination during production process. The following types of vessels can be included in the chronological period of the 4th to 6th century AD: beakers with straight cracked rim; bottles with funnel mouth; conical beakers/lamps; a honeycomb cup/bowl and goblets (I. 111).

ACKNOWLEDGEMENTS

This work was financially supported by the Ministry of Culture of the Czech Republic (DKRVO 2019–2023/17.VI.a, the National Museum, 00023272) and by the University of Chemistry and Technology, Prague (financed from the institutional support of long-term conceptual development of a research organization provided by the Ministry of Education, Youth and Sports of the Czech Republic. We would like to thank Věra Doležálková for drawing and re-drawing of majority of the glass finds from the settlement and for putting together the plates.

33 High quality glass is typical for the 2nd and 3rd century AD. This glass is often colorless or with blue-green tint, without visible impurities (chemical groups 1, 3, 4).

No.	SF #	SU	Trench / Polygon	Sect.	Group	Vessel form
1	SF14_162	SU023	100E_105N	SW	drinking vessels	beaker / cup with smaller d.
2	SF15_271	SU001	105E_100N	E	drinking vessels	beaker / cup with smaller d.
3	SF15_280	SU059	100E_105N	NE	drinking vessels	beaker / cup with smaller d.
4	SF15_326	SU001	×	×	drinking vessels	beaker / cup with smaller d.
5	SF14_211	SU023	100E_105N	SE	drinking vessels	beaker / bowl with middle d.
6	SF15_066	SU038	100E_105N	NE	drinking vessels	beaker / bowl with middle d.
7	SF15_074	SU020	105E_100N	SE	drinking vessels	beaker / bowl with middle d.
8	SF15_121	SU036	100E_105N	SE	drinking vessels	beaker / bowl with middle d.
9	SF16_056	SU078	100E_110N	SE/NE	drinking vessels	beaker / bowl with middle d.
10	SF16_073	SU001	105E_105N	N	drinking vessels	beaker / bowl with middle d.
11	SF16_101	SU001	110E_110N	S	drinking vessels	beaker / bowl with middle d.
12	SF16_116	SU082	105E_105N	N	drinking vessels	beaker / bowl with middle d.
13	SF16_117	SU082	105E_105N	N	drinking vessels	beaker / bowl with middle d.
14	SF16_D13_SE_02	survey	D13	SE	drinking vessels	beaker / bowl with middle d.
15	SF16_D13_SW_11	survey	D13	SW	drinking vessels	beaker / bowl with middle d.
16	SF16_D13_SW_12	survey	D13	SW	drinking vessels	beaker / bowl with middle d.
17	SF16_D13_SW_13	survey	D13	SW	drinking vessels	beaker / bowl with middle d.
18	SF16_E10_NE_01	survey	E10	NE	drinking vessels	beaker / bowl with middle d.
19	SF16_E10_NE_02	survey	E10	NE	drinking vessels	beaker / bowl with middle d.
20	SF16_E12_NW_01	survey	E12	NW	drinking vessels	beaker / bowl with middle d.
21	SF16_E12_NW_02	survey	E12	NW	drinking vessels	beaker / bowl with middle d.
22	SF16_E12_SW_02	survey	E12	SW	drinking vessels	beaker / bowl with middle d.
23	SF16_G12_NE_06	survey	G12	NE	drinking vessels	beaker / bowl with middle d.
24	SF16_G12_NE_07	survey	G12	NE	drinking vessels	beaker / bowl with middle d.
25	SF16_G12_NE_08	survey	G12	NE	drinking vessels	beaker / bowl with middle d.
26	SF16_G12_SW_01	survey	G12	SW	drinking vessels	beaker / bowl with middle d.
27	SF16_H13_SE_02	survey	H13	SE	drinking vessels	beaker / bowl with middle d.
28	SF16_H13_SE_09	survey	H13	SE	drinking vessels	beaker / bowl with middle d.

Part	Rim d. (mm)	Rim shape	Decoration / Surface marks	Colour	Chronology
rim	58 in	fire rounded × folded in	×	transparent, colourless	1st–6th c. AD
rim	60 in	fire rounded × folded in	×	transparent, colourless	1st–6th c. AD
rim	70 in	fire rounded × outsplayed	×	transparent, colourless	1st–6th c. AD
rim	70 in	fire rounded × outsplayed	×	transparent, bluegreen	1st–6th c. AD
rim	90 in	fire rounded × straight	×	transparent, colourless	1st–6th c. AD
rim	90 in	fire rounded × straight	×	transparent, colourless	1st–6th c. AD
rim	100 in	fire rounded × straight	×	transparent, colourless	1st–6th c. AD
rim	100 in	fire rounded × straight	×	transparent, colourless	1st–6th c. AD
rim	110 in	fire rounded × outsplayed	×	transparent, bluegreen	1st–6th c. AD
rim	110 in	fire rounded × outsplayed	engraved / lines	transparent, bluegreen	1st–6th c. AD
rim	100 in	fire rounded × outsplayed	×	transparent, colourless	1st–6th c. AD
rim	110 in	fire rounded × straight	×	transparent, colourless	1st–6th c. AD
rim	120 in	fire rounded × outsplayed	×	transparent, colourless	1st–6th c. AD
rim	100 in	fire rounded × outsplayed	×	transparent, bluegreen	1st–6th c. AD
rim	100 in	fire rounded × outsplayed	×	transparent, colourless	1st–6th c. AD
rim	100 in	fire rounded × outsplayed	×	transparent, green	1st–6th c. AD
rim	110 in	fire rounded × outsplayed	×	transparent, bluegreen	1st–6th c. AD
rim	100 in	fire rounded × straight	×	transparent, colourless	1st–6th c. AD
rim	100 in	fire rounded × outsplayed	×	transparent, colourless	1st–6th c. AD
rim	90 in	fire rounded × straight	relief	transparent, colourless	1st–6th c. AD
rim	100 in	fire rounded × outsplayed	×	transparent, bluegreen	1st–6th c. AD
rim	110 in	fire rounded × outsplayed	×	transparent, colourless	1st–6th c. AD
rim	100 in	fire rounded × folded in	×	transparent, colourless	1st–6th c. AD
rim	80 in	fire rounded × outsplayed	×	transparent, bluegreen	1st–6th c. AD
rim	92 in	fire rounded × outsplayed	×	transparent, bluegreen	1st–6th c. AD
rim	100 in	fire rounded × straight	×	transparent, bluegreen	1st–6th c. AD
rim	80 in	fire rounded × folded in	×	transparent, bluegreen	1st–6th c. AD
rim	100 in	fire rounded × straight	×	transparent, bluegreen	1st–6th c. AD

No.	SF #	SU	Trench / Polygon	Sect.	Group	Vessel form
29	SF16_I09_SW_01	survey	I09	SW	drinking vessels	beaker / bowl with middle d.
30	SF14_128	SU021	95E_105N	SE	drinking vessels	plate / bowl
31	SF16_039	SU078	100E_110N	SE	drinking vessels	plate / bowl
32	SF16_059	SU078	100E_110N	SE/NE	drinking vessels	plate / bowl
33	SF16_E12_SW_03	survey	E12	SW	drinking vessels	plate / bowl
34	SF16_E12_SW_07	survey	E12	SW	drinking vessels	plate / bowl
35	SF16_F13_SW_01	survey	F13	SW	drinking vessels	plate / bowl
36	SF16_G12_NW_01	survey	G12	NW	drinking vessels	plate / bowl
37	SF16_I12_SW_06	survey	I12	SW	drinking vessels	plate / bowl
38	SF16_H13_NW_02	survey	H13	NW	drinking vessels	plate / bowl
39	SF16_J13_SE_01	survey	J13	SE	drinking vessels	plate / bowl
40	SF16_G11_NE_01	survey	G11	NE	drinking vessels	bowl
41	SF16_D13_SE_04	survey	D13	SE	drinking vessels	conical beaker / lamp
42	SF16_H13_NE_15	survey	H13	NE	drinking vessels	conical beaker / lamp
43	SF16_I12_NE_02	survey	I12	NE	drinking vessels	conical beaker / lamp
44	SF14_113	SU020	105E_100N	NW	drinking vessels	conical beaker on a foot
45	SF15_175	SU001	95E_100N	×	drinking vessels	conical beaker on a foot
46	SF15_263	SU001	90E_100N	SE	drinking vessels	conical beaker on a foot
47	SF16_D13_SW_21	survey	D13	SW	drinking vessels	conical beaker on a foot
48	SF16_G12_NE_05	survey	G12	NE	drinking vessels	conical beaker on a foot
49	SF16_H13_SE_08	survey	H13	SE	drinking vessels	conical beaker on a foot / bowl
50	SF14_125	SU021	95E_100N	SE	drinking vessels	goblet
51	SF14_193	SU001	90E_100N	NE	drinking vessels	goblet
52	SF16_195	SU001	110E_115N	NW	drinking vessels	beaker / lamp
53	SF15_355	SU001	×	×	drinking vessels	beaker / bowl with tubular ridge
54	SF16_D13_N_01	survey	D13	N	drinking vessels	beaker / bowl with tubular ridge
55	SF16_D13_S_05	survey	D13	S	drinking vessels	beaker / bowl with tubular ridge
56	SF16_D13_S_10	survey	D13	S	drinking vessels	beaker / bowl with tubular ridge

Part	Rim d. (mm)	Rim shape	Decoration / Surface marks	Colour	Chronology
rim	90 in	fire rounded × folded in	×	transparent, bluegreen	1st–6th c. AD
rim	170 in	fire rounded × folded in	×	transparent, light yellow	1st–4th c. AD
rim	150 in	fire rounded × folded in	×	transparent, colourless	1st–4th c. AD
rim	170 in	fire rounded × outsplayed	×	transparent, bluegreen	1st–4th c. AD
rim	200 in	fire rounded × outsplayed	relief	transparent, colourless	1st–4th c. AD
rim	180 in	fire rounded × straight	×	transparent, colourless	1st–4th c. AD
rim	150 in	fire rounded × straight	×	transparent, amber	4th–6th c. AD (?)
rim	160 in	fire rounded × straight	×	transparent, bluegreen	1st–4th c. AD
rim	190 in	fire rounded × straight	×	transparent, bluegreen	1st–4th c. AD
rim	160 in	fire rounded × outsplayed	×	transparent, bluegreen	1st–4th c. AD
rim	200 in	fire rounded × outsplayed	×	transparent, colourless	1st–4th c. AD
rim	240 in	fire rounded × folded in	×	transparent, colourless	1st–4th c. AD
rim	80 in	fire rounded × straight	×	transparent, bluegreen	3rd–6th c. AD
rim	70 in	fire rounded × straight	×	transparent, colourless	3rd–6th c. AD
rim	60 in	fire rounded × folded in	×	transparent, light green	3rd–6th c. AD
base	50 in	base with tubular ring	×	transparent, colourless	2nd–4th c. AD
base	40 in	base with tubular ring	×	transparent, bluegreen	2nd–4th c. AD
base	40 in	base with tubular ring	×	transparent, bluegreen	2nd–4th c. AD
base	33 in	base with tubular ring	×	transparent, bluegreen	2nd–4th c. AD
base	36 in	base with tubular ring	×	transparent, bluegreen	2nd–4th c. AD
base	50 in	base with tubular ring	×	transparent, bluegreen	2nd–4th c. AD
base	40 in	base with smaller ring	×	transparent, bluegreen	4th–6th c. AD
base	40 in	base with smaller ring	×	transparent, bluegreen	4th–6th c. AD
rim	60 in	cut and polished × straight	engraved / lines	transparent, light green	3rd–5th c. AD
rim	100 in	fire rounded × outsplayed	tubular ridge	transparent, bluegreen	2nd–4th c. AD
rim	110 in	fire rounded × outsplayed	tubular ridge	transparent, bluegreen	2nd–4th c. AD
rim	90 in	fire rounded × outsplayed	tubular ridge	transparent, bluegreen	2nd–4th c. AD
rim	132 in	fire rounded × outsplayed	tubular ridge	transparent, bluegreen	2nd–4th c. AD

No.	SF #	SU	Trench / Polygon	Sect.	Group	Vessel form
57	SF15_029	SU015	100E_105N	NW	drinking vessels	ovoid beaker
58	SF15_345	SU001	×	×	drinking vessels	ovoid beaker
59	SF16_027	SU075	110E_100N	E	drinking vessels	ovoid beaker
60	SF16_120	SU088	100E_110N	SE	drinking vessels	ovoid beaker
61	SF16_K12_NE_01	survey	K12	NE	bottles / jugs	quadratic / cylindrical bottle
62	SF14_106	SU016	095E_105N	NW	bottles / jugs	bottle with straight rim
63	SF15_235	SU033	100E_105N	NE	bottles / jugs	bottle with straight rim
64	SF15_138	SU001	95E_100N	SW	bottles / jugs	cylindrical bottle (?)
65	SF16_F13_SE_01	survey	F13	SE	bottles / jugs	jug with funnel mouth
66	SF15_305	SU001	90E_100N	SW	bottles / jugs	jug with funnel mouth (?)
67	SF16_I09_NW_07	survey	I09	NW	bottles / jugs	jug with funnel mouth (?)
68	SF16_D13_S_ 09	survey	D13	S	bottles / jugs	jug (?)
69	SF14_102	SU016	095E_105N	NW	bottles / jugs	jug with trifoil mouth (?)
70	SF14_013	SU001	100E_100N	N	bottles / jugs	unguentarium
71	SF14_048	SU001	100E_100N	SE	bottles / jugs	unguentarium
72	SF16_D13_SW_05	survey	D13	SW	bottles / jugs	unguentarium
73	SF16_E12_NE_05	survey	E12	NE	bottles / jugs	unguentarium
74	SF14_159	SU023	95E_105N	SE	bottles / jugs	unguentarium
75	SF15_ 128	SU041	105E_105N	SW	bottles / jugs	unguentarium
76	SF15_281	SU059	100E_105N	NW	bottles / jugs	unguentarium
77	SF16_174	SU084	100E_110N	SE	bottles / jugs	unguentarium
78	SF16_I12_SW_02	survey	I12	SW	bottles / jugs	unguentarium
79	SF14_110	SU016	95E_105N	NW	bases	cup / bowl
80	SF14_162_a	SU023	100E_105N	NW	bases	cup / bowl
81	SF16_E12_SW_09	survey	E12	SW	bases	cup / bowl
82	SF16_F13_SE_03	survey	F13	SE	bases	cup / bowl
83	SF16_F13_SW_03	survey	F13	SW	bases	cup / bowl

Part	Rim d. (mm)	Rim shape	Decoration / Surface marks	Colour	Chronology
rim	40 in	fire rounded × outsplayed	×	transparent, bluegreen	2nd–3rd c. AD
rim	50 in	fire rounded × outsplayed	×	transparent, bluegreen	2nd–3rd c. AD
rim	50 in	fire rounded × outsplayed	×	transparent, bluegreen	2nd–3rd c. AD
rim	60 in	fire rounded × outsplayed	relief	transparent, bluegreen	2nd–3rd c. AD
rim	37 out	folded and outsplayed	×	transparent, bluegreen	end 1st–4th c. AD
rim	30 in	polished × straight	×	transparent, colourless	end 2nd–4th c. AD / 5th–6th c. AD (?)
rim	30 in	fire rounded × straight	×	transparent, light yellow	end 2nd–4th c. AD / 5th–6th c. AD (?)
base	70 in	slightly convex	×	transparent, light yellow	end 1st–6th c. AD
rim	38 in	cut and polished × straight	×	transparent, light yellow	3rd–5th c. AD
rim	40 out	folded and outsplayed	×	transparent, bluegreen	2nd–4th c. AD / 5th (?) c. AD
rim	35 out	folded and outsplayed	×	transparent, bluegreen	2nd–4th c. AD / 5th (?) c. AD
rim	×	×	relief	transparent, light yellow	2nd–4th c. AD
rim	×	fire rounded	×	transparent, bluegreen	2nd–4th c. AD
rim	25 in	fire rounded × outsplayed	×	transparent, colourless	?
rim	13 in	folded and outsplayed	×	transparent, colourless	2nd–4th c. AD (?)
rim	20 out	folded and outsplayed	×	impurities / bubbles, colourless	?
rim	20 out	folded and outsplayed	×	transparent, colourless	2nd–4th c. AD (?)
neck	×	×	×	transparent, light yellow	?
base	24 out	slightly convex	×	transparent, colourless	2nd–3rd c. AD
base	19 out	convex	×	transparent, colourless	2nd–3rd c. AD
base	18 out	slightly convex	×	transparent, colourless	2nd–3rd c. AD
base	26.5 out	slightly convex	×	impurities / bubbles, colourless	2nd–3rd c. AD
base	45 out	base with simple ring	pontil mark	transparent, light yellow	1st–6th c. AD
base	50 out	base with simple ring	×	transparent, colourless	1st–6th c. AD
base	50 out	base with simple ring	×	transparent, light yellow	1st–6th c. AD
base	60 out	base with simple ring	×	transparent, light yellow	1st–6th c. AD
base	60 out	base with simple ring	×	transparent, colourless	1st–6th c. AD

No.	SF #	SU	Trench / Polygon	Sect.	Group	Vessel form
84	SF16_H13_NW_01	survey	H13	NW	bases	cup / bowl
85	F16_I09_NW_04	survey	I09	NW	bases	cup / bowl
86	SF16_004	SU001	110E_100N	×	bases	bowl
87	SF14_095	SU016	95E_105N	NW	bases	bowl
88	SF15_154	SU052	100E_105N	NE	bases	spherical bottle (?)
89	SF16_006	SU001	110E_105N	W	bases	spherical bottle (?)
90	SF16_F11_SE_01	survey	F11	SE	bases	spherical bottle (?)
91	SF16_I09_NW_08	survey	I09	NW	bases	spherical bottle (?)
92	SF16_F13_NW_04	survey	F13	NW	decoration	?
93	SF16_H13_NE_06	survey	H13	NE	decoration	?
94	SF16_D13_SE_18	survey	D13	SE	decoration	beaker (?)
95	SF15_127	SU041	105E_100N	NW	decoration	?
96	SF16_I12_SW_03	survey	I12	SW	decoration	?
97	SF15_210	SU052	100E_105N	NE	decoration	bowl (?)
98	SF16_H13_NW_04	survey	H13	NW	decoration	?
99	SF16_J13_SE_01	survey	J13	SE	decoration	bowl
100	SF15_131	SU054	105E_105N	SW	decoration	bowl (?)
101	SF14_004	SU001	100E_100N	×	decoration	bowl
102	SF14_005	SU001	100E_100N	×	decoration	?
103	SF14_162	SU023	100E_105N	SW	decoration	?
104	SF14_211	SU023	100E_105N	SE	decoration	?
105	SF16_016	SU075	110E_100N	NE	decoration	bowl
106	SF16_034	SU001	×	×	decoration	?
107	SF16_190	SU001	110E_115N	W	decoration	?
108	SF16_D13_SW_06	survey	D13	SW	decoration	?
109	SF16_D13_SW_14	survey	D13	SW	decoration	?
110	SF16_D13_SW_15	survey	D13	SW	decoration	?
111	SF16_ D13_SW_30	survey	D13	SW	decoration	bowl
112	SF16_I12_SW_01	survey	I12	SW	decoration	bowl

Tab. 5: Catalog of the vessels found in Yurta-Stroyno (c.f. Figs. 1–7).

Part	Rim d. (mm)	Rim shape	Decoration / Surface marks	Colour	Chronology
base	64 out	base with simple ring	×	transparent, bluegreen	2nd–4th c. AD
base	45 out	base with simple ring	pontil mark	transparent, green	1st–6th c. AD
base	120 in	base with tubular ring	×	transparent, bluegreen	mid-1st–3rd c. AD
base	60 in	base with tubular ring	×	transparent, bluegreen	mid-1st–3rd c. AD
base	32 out	convex	pontil mark	transparent, colourless	3rd–6th c. AD (?)
base	30 out	convex	×	transparent, bluegreen	3rd–6th c. AD (?)
base	39 out	convex	pontil mark	transparent, colourless	3rd–6th c. AD (?)
base	48 out	convex	pontil mark	transparent, bluegreen	3rd–6th c. AD (?)
body	×	×	relief	transparent, bluegreen	?
body	×	×	mold blown	transparent, amber	4th–6th c. AD
body	×	×	mold blown	transparent, light yellow	4th–5th c. AD
handle	×	×	×	transparent, bluegreen	?
handle	×	×	×	transparent, bluegreen	?
base	30 out	base with simple ring	relief	transparent, bluegreen	3rd–6th c. AD (?)
body	×	×	relief (threads)	transparent, colourless	3rd–6th c. AD (?)
rim	180 in	fire rounded and outsplayed	relief	transparent, colourless	2nd–3rd c. AD
body	×	×	relief (threads)	transparent, colourless	3rd c. AD
rim	120 in	fire rounded × straight	engraved / facets and lines	transparent, colourless	2nd–3rd c. AD
body	×	×	engraved / facets	transparent, colourless	1st–4th c. AD (?)
body	×	×	engraved / facets	transparent, colourless	1st–4th c. AD (?)
body	×	×	engraved / facets and lines	transparent, colourless	1st–4th c. AD (?)
rim	110 in	fire rounded × outsplayed	engraved / lines	transparent, colourless	1st–4th c. AD (?)
body	×	×	engraved / facets	transparent, colourless	1st–4th c. AD (?)
body	×	×	engraved / facets	transparent, colourless	1st–4th c. AD (?)
body	×	×	engraved / lines	transparent, colourless	1st–4th c. AD (?)
body	×	×	engraved / lines	transparent, colourless	1st–4th c. AD (?)
body	×	×	engraved / lines	transparent, colourless	1st–4th c. AD (?)
body	×	×	engraved / facets and lines	transparent, colourless	2nd–3rd c. AD
rim	160 in	fire rounded	engraved / lines	transparent, colourless	1st–4th c. AD (?)

No.	SF #	SU	Trench	Sect.	Object
1	SF14_124	SU021	95E_100N	SE	bead
2	SF14_154	SU008	100E_100N	SW	bead
3	SF14_203	SU008	100E_100N	SW	bead
4	SF15_206	SU057	100E_105N	SE	bead
5	SF16_122	SU078	100E_110N	SE	bead
6	SF16_125	SU078	100E_110N	SE	bead
7	SF14_078	SU001	100E_100N	N	bead
8	SF14_177	SU008	100E_100N	SW	bead
9	SF16_155	SU084	100E_110N	SE_NW	bead
10	SF15_245	SU059	100E_105N	NE	bead
11	SF16_115	SU082	105E_105N	N	bead
12	SF16_165	SU001	105E_105N	NW	bead
13	SF15_236	SU054	105E_105N	SW	bead
14	SF15_311	SU033	100E_100N	NW	miscellaneous
15	SF16_196b	SU001	surface find	×	miscellaneous
16	SF16_E12_NW_03	survey	E12	NW	miscellaneous
17	SF16_F13_SW_05	survey	F13	SW	miscellaneous
18	SF16_I09_NW_06	survey	I09	NW	miscellaneous
19	SF15_328	survey	×	×	miscellaneous
20	SF14_123	SU013	105E_100N	NW	miscellaneous
21	SF16_163	SU084	110E_110N	E	miscellaneous
22	SF14_033	SU001	100E_100N	S	windowpane
23	SF15_067	SU020	105E_100N	SE	windowpane
24	SF15_023 (a)	SU001	90E_110N	SE	windowpane
24	SF15_023 (b)	SU001	90E_110N	SE	windowpane
25	SF15_290	SU001	RT soil	×	windowpane
26	SF15_060	SU036	100E_105N	N	windowpane
27	SF16_I09_SE_02	survey	I09	SE	windowpane

Tab. 6: Catalog of beads, ring, bracelets, windowpanes, and other miscellaneous objects found in Yurta-Stroyno (c.f. Pl. 7/1).

Type	Colour	Chronology
prismatic with hexagonal section	opaque blue	2nd–4th/mid-5th c. AD
prismatic with hexagonal section	opaque blue	2nd–4th/mid-5th c. AD
prismatic with hexagonal section	opaque blue	2nd–4th/mid-5th c. AD
prismatic with hexagonal section	opaque blue	2nd–4th/mid-5th c. AD
prismatic with hexagonal section	opaque blue	2nd–4th/mid-5th c. AD
prismatic with hexagonal section	opaque blue	2nd–4th/mid-5th c. AD
flat rounded	light opaque blue	2nd–4th/mid-5th c. AD
flat rounded	light opaque blue	2nd–4th/mid-5th c. AD
flat rounded	light opaque blue	2nd–4th/mid-5th c. AD
flat rounded	opaque white	2nd–4th/mid-5th c. AD
segmented	opaque white	2nd–4th/mid-5th c. AD
segmented	opaque white, gilded	mid-2nd–4th c. AD
rounded bead with dots	black opaque with colour dots	2nd–4th c. AD
glass ring	violette	2nd–4th c. AD
glass bracelet	opaque red	Early Medieval–Post Medieval (?)
glass bracelet	dark blue	Early Medieval–Post Medieval (?)
glass bracelet	dark blue	Early Medieval–Post Medieval (?)
tessera	opaque blue-green	Roman–Early Medieval
gaming counter	opaque white	Roman–Early Medieval
secondary worked glass frg.	translucent, blue-green	?
secondary worked glass frg.	translucent, blue-green	?
	translucent, blue-green	Roman (?)
	translucent, green	Roman (?)
	translucent, blue-green	Roman (?)
rounded edge	translucent, blue-green	Roman (?)
	translucent, blue-green	Roman (?)
rounded edge	translucent, blue-green	Roman (?)
rounded edge	translucent, colourless	Roman (?)

Plate	SF #	Colour	Vessel part	Na_2O	MgO	Al_2O_3	SiO_2	P_2O_5
Pl. 7/2:28	SF14_126	colourless	base	22.75	0.37	1.80	65.52	0.02
×	SF14_229	colourless	body	19.23	0.42	1.96	69.87	0.02
Pl. 7/2:29	SF14_230	colourless	base	20.23	0.49	2.11	68.54	0.02
Pl. 7/2:30	SF14_238	colourless	base	20.93	0.44	1.91	67.36	0.02
Pl. 7/2:31	SF14_240	colourless	body	20.13	0.41	2.01	69.02	0.02
Pl. 7/2:32	SF14_241	colourless	body	20.84	0.46	1.75	67.90	0.02
Pl. 7/2:33	SF14_243	colourless	body	21.64	0.50	1.72	65.97	0.01
Pl. 7/2:34	SF15_021	colourless	body	21.65	0.37	1.67	67.24	0.02
Pl. 7/2:35	SF15_022	colourless	body	18.59	0.40	1.86	70.83	0.01
Pl. 7/2:36	SF15_138	light yellow	body	21.17	0.50	1.73	65.84	0.02
Pl. 7/2:37	SF15_235	colourless	body	20.63	0.49	2.05	68.06	0.02
Pl. 7/2:38	SF15_269	colourless	body	18.12	0.36	1.87	71.14	0.02
Pl. 7/2:39	SF15_271	colourless	rim	21.08	0.34	1.76	68.41	0.02
Pl. 7/2:40	SF15_347	blue-green	base	20.94	0.51	2.07	68.34	0.02
Pl. 7/2:41–42	SF15_347a_b	blue-green	base	19.98	0.53	2.11	69.10	0.02
Pl. 7/2:43	SF15_074	colourless	rim	21.57	0.44	1.80	66.71	0.02
Pl. 7/2:44	SF16_080	colourless	body	15.23	0.28	1.90	75.41	0.02
Pl. 7/2:45	SF16_D13_S_09	light yellow	rim	21.88	0.52	1.70	66.19	0.02
Pl. 7/2:46–47	SF16_D13_SW_30	colourless	body	21.48	0.57	1.81	66.69	0.02

Tab. 7: Glass group 1 – *Antimony glass*.

Pl./Fig.	SF #	Colour	Vessel part / object	Na_2O	MgO	Al_2O_3	SiO_2	P_2O_5
Fig. 5:74	SF14_159	light yellow	neck	21.55	0.96	2.76	64.35	0.08
Pl. 7/2:48	SF15_001	colourless	base	21.86	0.61	2.56	62.51	0.04
Pl. 7/2:49	SF15_176	light yellow	body	21.17	1.03	3.06	61.79	0.06
Pl. 7/2:50	SF15_281	light yellow	base	18.97	0.63	2.39	69.02	0.03
Pl. 7/2:51	SF16_078	colourless	rim	21.21	0.62	2.18	66.55	0.02
Pl. 7/2:52	SF16_165	colourless	gilded bead	14.17	0.55	3.15	71.00	0.07
Pl. 7/2:53	SF16_H13_SE_07	yellow	body	20.42	0.89	2.51	65.99	0.04

Tab. 8: Glass group 2 – *Antimony glass II*.

SO_3	Cl	K_2O	CaO	TiO_2	MnO	Fe_2O_3	SrO	Sb_2O_3	BaO	PbO
0.27	1.30	0.30	6.55	0.07	0.012	0.30	0.06	0.444		
0.26	1.20	0.35	5.36	0.07	0.013	0.35	0.05	0.612	0.0128?	
0.25	1.17	0.38	5.61	0.07	0.016	0.37	0.05	0.449	0.01	0.0072?
0.22	1.30	0.33	5.97	0.09	0.017	0.42	0.05	0.702		
0.27	1.28	0.30	5.39	0.07	0.012	0.35	0.05	0.474		
0.26	1.26	0.33	5.91	0.06	0.014	0.32	0.05	0.580		
0.25	1.30	0.67	6.57	0.08	0.013	0.37	0.06	0.606		
0.26	1.23	0.30	6.18	0.06	0.012	0.29	0.05	0.439		
0.17	1.17	0.19	5.48	0.07	0.011	0.29	0.08	0.593		0.0139?
0.23	1.30	0.24	7.67	0.09	0.014	0.39	0.08	0.507		
0.20	1.20	0.36	5.74	0.07	0.023	0.37	0.05	0.480	0.0115?	
0.21	1.41	0.28	5.48	0.07	0.011	0.31	0.05	0.449		
0.21	1.27	0.26	5.46	0.06	0.015	0.32	0.06	0.528		
0.19	1.22	0.33	5.33	0.06	0.014	0.34	0.05	0.358		
0.19	1.20	0.36	5.46	0.07	0.010	0.35	0.05	0.370		
0.30	1.27	0.30	6.32	0.07	0.012	0.33	0.07	0.567		
0.22	1.04	0.21	4.44	0.05	0.010	0.21	0.07	0.700		
0.25	1.28	0.28	6.54	0.08	0.010	0.35	0.06	0.620		
0.24	1.22	0.30	6.35	0.08	0.020	0.40	0.07	0.540		

SO_3	Cl	K_2O	CaO	TiO_2	MnO	Fe_2O_3	SrO	Sb_2O_3	BaO	PbO	ZrO_2	ZnO
0.03	1.29	0.50	6.03	0.20	0.040	0.89	0.06	0.762	0.0138?		0.02	
0.32	1.27	0.56	7.61	0.11	0.033	0.67	0.08	1.520				
0.27	1.10	0.41	8.66	0.23	0.050	1.06	0.09	0.770		0.01	0.03	
0.19	1.04	0.41	5.89	0.10	0.022	0.57	0.05	0.456				
0.25	1.22	0.33	6.17	0.09	0.020	0.47	0.05	0.610				
0.27	0.98	0.23	6.63	0.15	0.040	0.99	0.19	0.670		0.69		0.02
0.24	1.00	0.47	6.42	0.13	0.070	0.69	0.07	0.820		0.01	0.013?	

Plate	SF #	Colour	Vessel part / object	Note	Na_2O	MgO	Al_2O_3	SiO_2
Pl. 7/3:54	SF15_175	blue-green	base		17.51	0.47	**2.79**	68.59
Pl. 7/3:55	SF16_195	yellow	rim		19.34	0.45	**2.91**	66.96
Pl. 7/3:56	SF15_188	yellow	body		21.81	0.49	2.68	63.98
Pl. 7/3:57	SF16_D13_SE_06	light yellow	body		18.62	0.51	**2.74**	67.90
Pl. 7/3:58	SF15_130	blue-green	body		18.30	0.44	2.68	68.35
Pl. 7/3:59	SF16_D13_SW_16	blue green	production indicators	waste	16.11	0.52	2.55	69.19
Pl. 7/3:60	SF16_D13_ SW_10_a	blue green	production indicators	waste	15.39	0.46	2.52	70.76
Pl. 7/3:61–62	SF16_E12_SE_02	yellow	body		19.09	0.48	2.63	66.32
Pl. 7/3:63	SF15_351_e	blue-green	production indicators	waste/moil	16.36	0.43	2.66	71.39
Pl. 7/3:64	SF16_D13_S_06	blue-green	production indicators	waste/moil	17.56	0.47	**2.70**	68.62
Pl. 7/3:65	SF16_D13_ SW_10_c	blue-green	production indicators	waste	16.98	0.44	**2.82**	70.90
Pl. 7/3:66	SF15_99	blue-green	rim		15.43	0.43	**2.77**	71.31
Pl. 7/3:67	SF16_D13_SW_20	blue-green	production indicators	waste	16.38	0.43	**2.99**	69.52
Pl. 7/3:68	SF16_D13_SW_08	blue-green	production indicators	waste	16.75	0.44	**3.04**	70.07
Pl. 7/3:69	SF16_D13_SW_31	blue-green	rim		18.56	0.45	**2.70**	68.47
Pl. 7/3:70	SF15_351_1	blue-green	production indicators	waste	18.24	0.46	2.67	68.07
Pl. 7/3:71	SF16_D13_S_02	blue-green	production indicators	raw glass	18.63	0.47	**2.70**	68.18
Pl. 7/3:72–73	SF15_290	blue-green	windowpane		17.95	0.55	**2.80**	67.91
Pl. 7/3:74–75	SF16_D13_SW_09	blue-green	production indicators	raw glass	18.62	0.46	**2.77**	68.42
Pl. 7/3:76	SF15_335	blue-green	production indicators	raw glass	18.45	0.46	2.68	68.07
Pl. 7/3:77	SF16_D13_SW_17	blue-green	production indicators	waste	16.90	0.51	**2.92**	67.15
Pl. 7/3:78	SF16_D13_N_01	colourless	rim		18.63	0.46	2.43	67.68
Pl. 7/3:79	SF15_351_2S	blue-green	production indicators	waste	17.67	0.49	**2.72**	67.67
Pl. 7/3:80	SF16_E12_SW_10	blue-green	production indicators	waste	17.85	0.50	**2.76**	67.51
Pl. 7/3:81	SF16_F13_NE_04	blue-green	body		19.08	0.54	2.68	65.98

P_2O_5	SO_3	Cl	K_2O	CaO	TiO_2	MnO	Fe_2O_3	SrO	Sb_2O_3	BaO	PbO	CuO	ZnO
0.09	0.18	1.00	0.48	8.13	0.06	0.03	0.38	0.06	0.00				
0.13	0.09	1.16	0.51	7.77	0.06	0.03	0.32	0.06	0.00				
0.11	0.24	1.19	0.55	8.21	0.06	0.04	0.35	0.06	0.00				
0.10	0.05	1.16	0.45	7.73	0.06	0.05	0.33	0.06	0.00	0.01			
0.11	0.15	1.04	0.44	7.64	0.06	0.19	0.31	0.06	0.00	0.02			
0.09	0.17	1.03	0.39	9.06	0.06	0.24	0.29	0.09	0.00				
0.08	0.19	0.99	0.41	8.30	0.06	0.25	0.25	0.10	0.00		0.03		
0.09	0.15	1.24	0.45	8.64	0.05	0.25	0.29	0.07	0.00			0.01	
0.09	0.14	1.04	0.42	6.60	0.06	0.26	0.27	0.09	0.00				
0.09	0.14	1.20	0.48	7.81	0.07	0.27	0.29	0.07	0.00	0.02			
0.08	0.13	1.04	0.46	6.27	0.06	0.28	0.25	0.07	0.00				
0.08	0.17	0.93	0.27	7.68	0.05	0.29	0.28	0.09	0.00		0.02		
0.09	0.13	1.04	0.60	6.79	0.06	0.29	1.38	0.07	0.00				
0.08	0.14	1.08	0.56	6.85	0.06	0.31	0.34	0.07	0.00				
0.09	0.11	1.11	0.49	7.04	0.06	0.32	0.31	0.06	0.00	0.02			
0.08	0.12	1.14	1.25	6.97	0.06	0.35	0.32	0.06	0.00	0.02			
0.08	0.11	1.18	0.43	7.16	0.06	0.39	0.32	0.06	0.00	0.02			
0.14	0.10	1.12	0.45	7.87	0.07	0.40	0.36	0.06	0.00				
0.08	0.10	1.13	0.42	6.89	0.06	0.44	0.31	0.06	0.00				
0.09	0.10	1.16	0.46	7.33	0.06	0.50	0.34	0.06	0.00	0.02			
0.12	0.12	1.02	1.79	8.17	0.07	0.50	0.36	0.07	0.06	0.02			
0.11	0.12	1.10	0.54	7.71	0.06	0.54	0.31	0.06	0.00	0.02			
0.15	0.10	1.11	0.70	8.05	0.07	0.55	0.40	0.06	0.03				
0.10	0.11	1.07	0.53	8.27	0.06	0.58	0.34	0.06	0.00	0.02			
0.14	0.16	0.98	0.60	8.19	0.07	0.74	0.43	0.07	0.08	0.02	0.02		

Plate	SF #	Colour	Vessel part / object	Note	Na_2O	MgO	Al_2O_3	SiO_2
Pl. 7/4:82	SF16_D13_N_02	blue-green	production indicators	waste	15.88	0.56	**2.72**	67.72
Pl. 7/4:83	SF16_D13_SW_37	blue-green	production indicators	raw glass	18.94	0.49	2.43	67.05
Pl. 7/4:84	SF16_D13_S_05	blue-green	rim		18.63	0.54	**2.77**	65.24
Pl. 7/4:85	SF16_E12_NE_05	colourless	rim		13.94	0.46	**3.68**	71.53
Pl. 7/4:86–87	SF16_H13_NW_01	blue-green	base		16.95	0.52	**3.03**	67.21
Pl. 7/4:88	SF16_H09_02	blue-green	base		18.13	0.58	**2.99**	65.71
Pl. 7/4:89	SF16_D13_SW_22	light yellow	production indicators	raw glass	18.31	0.51	2.62	66.13
Pl. 7/4:90	SF15_067	olive green	windowpane		15.84	0.66	**3.40**	66.56
Pl. 7/4:91	SF16_004	light yellow	base		16.66	0.47	**2.74**	68.60
Pl. 7/4:92	SF16_056	blue-green	rim		16.69	0.49	**2.97**	67.95
Pl. 7/4:93	SF14_201	olive green	base		16.77	0.66	**3.26**	65.47
Pl. 7/4:94	SF15_306	colourless	body		18.80	0.46	**3.05**	66.00
Pl. 7/4:95	SF16_070	violet grey	body		17.76	0.58	2.65	66.89
Pl. 7/4:96	SF14_228	olive green	neck		15.98	0.62	**3.07**	67.01
Pl. 7/4:97	SF15_352_a	violet grey	body		17.17	0.56	2.60	67.21
Pl. 7/4:98	SF16_054	light green	rim		16.58	0.57	**3.23**	66.93
Pl. 7/4:99	SF16_F13_SW_04	violet grey	body		19.31	0.53	2.40	65.04
Pl. 7/4:100	SF16_166	blue-green	base		18.17	0.61	**3.04**	65.21
Pl. 7/4:101	SF15_082	olive green	base		17.00	0.58	**2.99**	66.03
Pl. 7/4:102	SF14_242	colourless	body		19.63	0.61	**3.07**	63.92
Pl. 7/4:103–104	SF16_D13_NW_14	violet	body		17.70	0.63	2.47	65.74

Tab. 9: Glass group 3 – *Low-manganese / High-manganese glass*.

P_2O_5	SO_3	Cl	K_2O	CaO	TiO_2	MnO	Fe_2O_3	SrO	Sb_2O_3	BaO	PbO	CuO	ZnO
0.15	0.18	0.86	1.12	9.23	0.07	0.77	0.40	0.09	0.00	0.03			
0.11	0.12	1.07	0.60	7.71	0.06	0.78	0.32	0.07	0.00	0.03			
0.16	0.16	0.96	0.75	9.19	0.06	0.82	0.38	0.08	0.00	0.02			
0.08	0.16	0.94	0.26	6.89	0.06	1.11	0.42	0.16	0.00		0.08		0.02
0.09	0.10	1.14	0.55	8.27	0.07	1.29	0.42	0.07	0.00	0.05			
0.09	0.15	1.17	0.49	8.50	0.07	1.35	0.42	0.10	0.00	0.03			
0.11	0.11	1.19	0.41	8.46	0.05	1.41	0.32	0.09	0.00	0.04			
0.08	0.08	1.10	0.52	9.13	0.09	1.43	0.75	0.08	0.00	0.03			
0.11	0.11	0.96	0.40	7.75	0.07	1.43	0.37	0.07	0.00	0.04			
0.07	0.11	1.05	0.52	7.94	0.06	1.43	0.38	0.07	0.00	0.03			
0.09	0.08	1.14	0.41	9.74	0.07	1.46	0.46	0.08	0.00	0.05			
0.09	0.14	1.01	0.58	7.61	0.06	1.51	0.37	0.07	0.00	0.03			
0.12	0.14	1.03	0.45	8.05	0.06	1.53	0.37	0.09	0.03	0.02			
0.13	0.09	1.03	0.61	8.93	0.07	1.63	0.49	0.07	0.00	0.04			
0.11	0.15	1.01	0.40	8.34	0.06	1.65	0.37	0.09	0.00	0.03			
0.10	0.11	1.02	0.64	8.32	0.07	1.68	0.43	0.07	0.00	0.03			
0.09	0.23	1.06	0.38	8.54	0.06	1.69	0.35	0.07	0.00	0.03			
0.08	0.16	1.20	0.50	8.44	0.07	1.73	0.44	0.08	0.00	0.04			
0.08	0.06	1.12	0.44	8.91	0.07	1.87	0.47	0.08	0.00	0.05			
0.10	0.18	1.12	0.49	8.12	0.07	1.88	0.45	0.08	0.00	0.04			
0.11	0.14	0.99	0.33	8.93	0.06	2.14	0.37	0.11	0.00	0.05			

Plate	SF #	Colour	Vessel part / object	Note	Na_2O	MgO	Al_2O_3	SiO_2
Pl. 7/5:105	SF14_236	blue-green	base		20.14	0.47	2.63	66.87
Pl. 7/5:106	SF14_239	colourless	neck		17.96	0.43	2.62	70.09
×	SF15_046	blue-green	base		20.33	0.47	2.72	66.36
Pl. 7/5:107	SF15_128	colourless	body		19.79	0.53	2.86	66.39
Pl. 7/5:108	SF15_136	light yellow	base		20.95	0.50	2.44	65.84
Pl. 7/5:109	SF15_149	colourless	base		20.75	0.47	2.46	66.62
Pl. 7/5:110	SF15_154	colourless	base		21.29	0.48	2.35	66.19
Pl. 7/5:111	SF15_258	colourless	body		21.06	0.53	2.50	66.25
Pl. 7/5:112	SF15_262	blue-green	base		20.47	0.45	2.55	66.64
Pl. 7/5:113	SF15_263	blue-green	base		20.06	0.51	2.77	66.39
Pl. 7/5:114	SF15_351_4s	blue-green	production indicators	waste	19.03	0.47	2.79	65.32
×	SF15_351_f	blue-green	production indicators	waste	20.76	0.50	2.75	65.15
Pl. 7/5:115	SF15_356	colourless	body		20.32	0.48	2.66	66.13
Pl. 7/5:116	SF16_006	blue-green	base		20.01	0.74	2.64	65.60
Pl. 7/5:117–118	SF16_033	colourless	body		15.50	0.48	3.15	71.83
Pl. 7/5:119	SF16_041	light green	body		19.47	0.53	2.95	65.55
Pl. 7/5:120	SF16_055	colourless	rim		20.76	0.46	2.49	66.41
Pl. 7/5:121–122	SF16_101	colourless	rim		20.45	0.43	2.73	66.53
Pl. 7/5:123	SF16_133	colourless	rim		20.62	0.42	2.42	66.79
Pl. 7/5:124	SF16_174	colourless	base		20.15	0.45	2.82	66.21
Pl. 7/5:125	SF16_D13_NW_01	blue-green	production indicators	waste/moil	20.74	0.46	2.49	66.39
Pl. 7/5:126	SF16_D13_S_10	blue-green	body		19.34	0.47	2.69	68.18
Pl. 7/5:127	SF16_D13_SW_05	colourless	rim		18.76	0.51	2.77	69.62
Pl. 7/5:128	SF16_D13_SW_36	light yellow	production indicators	raw glass	20.51	0.47	2.64	66.30
Pl. 7/5:129	SF16_E12_NE_03	colourless	body		19.72	0.63	2.65	66.94
Pl. 7/5:130	SF16_F14_SW_01	colourless	body		20.06	0.49	2.33	67.27
Pl. 7/5:131	SF16_I12_SW_02	light green	base		20.37	0.47	2.66	65.77

Tab. 10: Glass group 4 – *Mixed antimony and manganese glass.*

P_2O_5	SO_3	Cl	K_2O	CaO	TiO_2	MnO	Fe_2O_3	SrO	Sb_2O_3	BaO	PbO	ZrO_2	CuO
0.06	0.23	1.13	0.46	6.34	0.07	0.138	0.71	0.05	0.627				
0.04	0.24	1.06	0.22	5.81	0.08	0.286	0.50	0.12	0.361		0.06		
0.09	0.18	1.10	0.51	7.00	0.07	0.350	0.45	0.06	0.267	0.02			
0.07	0.19	1.17	0.47	6.70	0.09	0.590	0.53	0.07	0.496	0.02		0.01	
0.05	0.22	1.16	0.43	6.96	0.07	0.432	0.43	0.07	0.417				
0.05	0.21	1.21	0.44	6.40	0.07	0.401	0.42	0.06	0.412				
0.05	0.23	1.19	0.43	6.38	0.07	0.328	0.42	0.06	0.468				
0.04	0.24	1.16	0.50	6.32	0.08	0.290	0.45	0.06	0.488		0.01		
0.07	0.21	1.06	0.48	6.74	0.08	0.320	0.42	0.06	0.390	0.02	0.02		
0.10	0.17	1.12	0.57	7.14	0.07	0.324	0.46	0.06	0.224				
0.12	0.19	1.12	0.52	7.58	0.08	0.377	2.03	0.06	0.266	0.02			
0.07	0.30	1.13	0.60	6.73	0.08	0.570	0.74	0.07	0.517	0.02	0.014?		
0.07	0.24	1.17	0.50	6.99	0.08	0.363	0.48	0.06	0.425				
0.15	0.21	1.11	0.64	7.12	0.09	0.650	0.57	0.06	0.340	0.02	0.02		
0.08	0.31	0.98	0.35	5.81	0.10	0.200	0.47	0.09	0.530		0.11		
0.07	0.18	1.13	0.61	7.54	0.07	1.060	0.52	0.07	0.212	0.02			
0.05	0.24	1.21	0.43	6.54	0.07	0.330	0.42	0.07	0.490		0.02		
0.06	0.21	1.20	0.49	6.46	0.08	0.420	0.45	0.05	0.410				
0.05	0.22	1.20	0.45	6.37	0.07	0.430	0.41	0.06	0.450	0.0116?			
0.06	0.23	1.13	0.51	6.84	0.07	0.710	0.39	0.06	0.340	0.02			
0.07	0.21	1.19	0.50	6.65	0.08	0.250	0.43	0.06	0.440		0.02		
0.09	0.17	1.00	0.57	6.20	0.08	0.240	0.41	0.06	0.390		0.10		0.01
0.07	0.26	1.07	0.28	5.40	0.08	0.190	0.47	0.08	0.400		0.05?		
0.07	0.22	1.17	0.50	6.73	0.08	0.220	0.49	0.06	0.490		0.02		
0.11	0.22	1.07	0.55	6.56	0.08	0.450	0.47	0.08	0.396	0.02	0.02		
0.04	0.25	1.12	0.37	6.74	0.08	0.280	0.41	0.07	0.441				
0.08	0.21	1.17	0.52	6.73	0.08	0.280	1.16	0.06	0.390	0.02	0.01		

Plate	SF #	Colour	Vessel part	Na_2O	MgO	Al_2O_3	SiO_2	P_2O_5
Pl. 7/5:132	SF15_045	light green	body	18.72	1.25	2.90	66.14	0.03

Tab. 11: Glass group 5 – *HIMT glass (high iron, manganese, and titanium).*

Plate	SF #	Colour	Object	Notes	Na_2O	MgO	Al_2O_3	SiO_2
Pl. 7/6:133	SF16_D13_SW_40	blue-green	production indicators	waste	18.77	2.11	2.17	63.06
Pl. 7/6:134	SF16_D13_S_07	blue-green	production indicators	waste	16.33	2.89	1.88	62.35
Pl. 7/6:135	SF16_D13_SW_18	blue-green	production indicators	waste	16.27	2.88	1.93	62.99
Pl. 7/6:136	SF15_351_c	blue-green	production indicators	waste	16.15	2	2.23	66.15
Pl. 7/6:137–138	SF15_351_3S	blue-green	production indicators	waste	18.14	2.17	2.14	62.54
Pl. 7/6:139–140	SF15_362	blue-green	production indicators	raw glass	16.58	2.89	1.85	62.31

Tab. 12: Glass group 6 – *Plant-ash glass.*

Plate	SF #	Colour	Vessel part / object	Notes	Na_2O	MgO	Al_2O_3	SiO_2	P_2O_5	SO_3
Pl. 7/6:141	SF16_H13_NE_06	orange-brown	body	3_Manganese	18.2	0.52	2.55	68.15	0.1	0.06
Pl. 7/6:142	SF16_H13_NE_16	orange-brown	body	3_Manganese	18.2	0.53	2.6	67.99	0.1	0.06
Pl. 7/6:143	SF16_F13_SW_01	orange-brown	rim	3_Manganese	17.89	0.51	2.61	68.22	0.13	0.05
Pl. 7/6:144	SF15_312	orange-brown	base	3_Manganese	18.26	0.556	2.73	66.87	0.168	0.076
Pl. 7/6:145	SF16_D13_NW_13	cobalt blue	body	3_Manganese	16.75	0.47	2.56	69.08	0.15	0.18
Pl. 7/6:146	SF16_E12_SE_04	cobalt blue	body	4_Mix	18.9	0.49	2.12	66.77	0.13	0.2
Pl. 7/6:147	SF16_122	blue	bead	4_Mix	18	0.53	2.48	68.4	0.07	0.4
Pl. 7/6:148; Pl. 7/1:7	SF14_078	blue	bead	4_Mix	17.19	0.47	2.43	68.63	0.074	0.344
Pl. 7/6:149	SF16_F13_SW_05	blue	bracelette	6_Plant ash	17.07	1.75	2.05	66.09	0.18	0.14
Pl. 7/1:15	SF16_196	red	bracelette	6_Plant ash	14.57	2.47	2.23	61.12	0.26	0.12

Tab. 13: Deliberately coloured samples.

SO_3	Cl	K_2O	CaO	TiO_2	MnO	Fe_2O_3	SrO	Sb_2O_3	BaO	PbO	ZrO_2
0.12	1.12	0.33	4.93	0.44	2.27	1.37	0.06	0.00	0.06		0.04

P_2O_5	SO_3	Cl	K_2O	CaO	TiO_2	MnO	Fe_2O_3	SrO	Sb_2O_3	BaO	PbO	ZrO_2
0.53	0.19	0.97	1.77	8.04	0.14	0.3	1.29	0.086	0.318	0.016	0.0221	0.0141
0.87	0.15	0.92	2.53	9.36	0.13	0.45	1.6	0.099	0.176	0.0234	0.0161	0.013?
0.86	0.13	0.89	2.39	9.1	0.13	0.42	1.5	0.103	0.15	0.0154	0.0168	0.0161
0.49	0.21	0.89	2.34	7.43	0.14	0.24	1.07	0.116	0.276		0.051	
0.547	0.2	0.987	2.95	7.99	0.142	0.288	1.25	0.084	0.292		0.0203	
0.887	0.146	0.92	2.52	9.21	0.129	0.443	1.58	0.089	0.169	0.0248	0.0135?	

Cl	K_2O	CaO	TiO_2	MnO	Fe_2O_3	SrO	Sb_2O_3	BaO	PbO	ZrO_2	CO_3O_4	CuO	ZnO	SnO_2
1.17	0.48	8.02	0.06	0.11	0.31	0.06	0							
1.16	0.48	8.11	0.06	0.11	0.31	0.06	0							
1.11	0.53	8.18	0.06	0.11	0.32	0.06	0							
1.01	0.694	7.96	0.064	0.849	0.424	0.071	0	0.0211						
0.88	0.42	7.52	0.07	0.22	0.91	0.074	0		0.097		0.119	0.29		
1.07	0.48	6.92	0.07	0.42	1.26	0.055	0.36	0.0127	0.012		0.199	0.284		
1.16	0.24	5.39	0.11	0.15	1.06	0.07	0.995		0.42		0.06	0.24		
1.01	0.361	5.6	0.098	0.593	0.628	0.09	1.32		0.41	0.0349	0.0372	0.411	0.0262	0.0311?
0.88	1.27	7.71	0.11	0.56	1.58	0.074	0	0.013?	0.072		0.063	0.13		
0.61	1.96	9.74	0.23	0.96	3.42	0.14	0	0.269	0.224	0.0167		1.58	0.015	0.065

ABBREVIATIONS

JASc = Journal of Archaeological Science
JGS = Journal of Glass Studies
SH = Studia Hercynia

BIBLIOGRAPHY

Aerts *et al.* 2003 = Aerts, A. – Velde, B. – Janssens, K – Dijkman, W. 2003: Change in silica sources in Roman and post-Roman glass. *Spectrochimica Acta Part B: Atomic Spectroscopy* 58, 659–667.

Alexeeva 1975 = Алексеева, Е.М. 1975: *Античные бусы Северного Причерноморья.* Археология СССР, Свод археологических источников, Выпуск Г1-12/1, Москва.

Antonaras, A.C. 2010: Glass-working activities in late Roman and early Christian Thessaloniki. In: Drauschke, J. – Keller, D. (eds.): *Glass in Byzantium, Production, Usage, Analyses.* Römisch-Germanischen Zentralmuseums – Tatungen 8, 93–105.

Arveiller-Dulong, V. – Arveiller, J. 1985: *Le verre d'époque romaine au Musée archéologique de Strasbourg*. Paris.

Barfod *et al.* 2018 = Barfod, G.H. – Freestone, I.C. – Lichtenberger, A. – Raja, R. – Schwarzer, H. 2018: Geochemistry of Byzantine and Early Islamic glass from Jerash, Jordan: Typology, recycling, and provenance. *Geoarchaeology* 33, 623–640.

Barfod *et al.* 2020 = Barfod, G.H. – Freestone, I.C. – Lesher, C.E. – Lichtenberger, A. – Raja, R. 2020: 'Alexandrian' glass confirmed by hafnium isotopes. *Sci Rep* 10, 11322. https://doi.org/10.1038/s41598-020-68089-w (visited 28/01/2022).

Barkóczi, L. 1988: *Pannonische Glasfunde in Ungarn*. Studia Archaeologica IX. Budapest.

Baydo, S. 2009: Late Antique/Early Byzantine Glass Vessels from Trench Q18 at Limyra: Excavation Season 2007–2009. In: Lafli ed. 2009, 189–198.

Benea, D. 1983: Die Glasswerkstätt von Tibiscum und der Perlenexport ins Barbaricum im 2. bis 4. JHs. *Apulum* 21, 115–120.

Benea, D. 2004: *Die römische Perlenwerkstätten aus Tibiscum*. Timişoara.

Boschetti *et al.* 2016 = Boschetti, C. – Henderson, J. – Evans, J. – Leonelli, C. 2016: Mosaic tesserae from Italy and the production of Mediterranean Colored Glass (4th century BCE – 4th century CE). Part I, chemical composition and technology. *JASc Reports* 7, 303–311.

Brems *et al.* 2012 = Brems, D. – Degryse, P. – Hasendoncks, P. – Gimeno, D. – Silvestri, A. – Vassilieva, E. – Luypaers, S. – Honings, J. 2012: Western Mediterranean sand deposits as a raw material for Roman glass production. *JASc* 39, 2897–2907.

Bucovală, M. 1968: *Vase antice de sticlă la Tomis*. Constanța.

Budzyńska, M. 2016: Glass vessels from the sector X-P (1st–7th centuries A.D.). In: Biernacki, A.B. – Klenina, E.Y. (eds.): *The Large Legionary Thermae in Novae (Moesia Inferior) (2nd–4th cent. A.D)*. Novae, Studies and Materials V. Poznań.

Burdajewicz, M. 2018: Glass finds from Beit Ras (ancient Capitolias) in Jordan. *Polish Archaeology in the Mediterranean* 26, 661–686.

Charleworth, D. 1966: Roman square bottles. *JGS 8*, 26–40.

Cholakov *et al.* 2016 = Чолаков, И.Д. – Александрова, С. – Русева, В. – Пеева, Н. 2016: *Могилен некропол от римската епоха край град Страланджа, Ямболско*. Българско е-Списание за Археология Suppl. 5. София.

Cholakova 2006 = Чолакова, А. 2006: Римски стъклени съдове от България I–III век. In: Иванов, Р. (ed.): *Археология на българските земи* 2. София, 209–242.

Cholakova, A. 2008 = Чолакова, А. 2008: Производство на стъкло и стъклене съдове през късната античност в Българските земи. In: Генчева, Е. – Димитрова-Милчева, А. (eds.): *Югоизточна Европа през античността VI в. пр. Хр. – началото на VII в. сл. Хр.: (Studia in honorem Aleksandrae Dimitrova-Milcheva)*. София, 471–478.

Cholakova, A. 2009: Part VI. Glass vessels from Gradishteto. In: Dinchev, V. – Kuzmanov, G. – Vladkova, P. – Cholakova, A. – Popova, Ts. (eds.): *Bulgarian-British archaeological excavations of Gradishteto near the village of Dichin, Veliko Tarnovo region, 1996–2003 (the results of the Bulgarian team)*. Разкопки и проучвания XXXIX. София, 257–307.

Cholakova, A. 2015: *Networks of distribution at the margins of the Empire: Late Antique glass vessels from the Lower Danube region*. Doctoral Thesis defended at University College London.

Cholakova, A. – Rehren, T. – Freestone, I.C. 2016: Compositional identification of 6th c. AD glass from the Lower Danube. *JASc Reports* 7, 625–632.

Clairmont, Ch.W. 1963: *The Glass Vessels*. The Excavations at Dura-Europos, Final Report IV, part V. Yale.

Conte *et al.* 2014 = Conte, S. – Chinni, T. – Arletti, R. – Vandini, M. 2014: Butrint (Albania) between eastern and western Mediterranean glass production: EMPA and LA-ICP-MS of late antique and early medieval finds. *JASc* 49, 6–20.

da Cruz, M. 2014: Campanulate bowls from Gallaecia: evidence for regional glass production in late antiquity. In: Keller, D. – Price, J. – Jackson, C. (eds.): *Neighbours and successors of Rome. Tradition of glass production and use in Europe and the Middle East in the later first millennium AD*. Oxford, 58–67.

Czurda-Ruth, B. 1989: Zu den römische Gläsern aus den Hanghäusern von Ephesus. *Kölner Jahrbuch für Vor- und Frühgeschichte* 22, 129–162.

Dankova, G. 1993: Kieliszki i unguentaria z Novae. Materiały do katalogu. *Novensia* 6, 77–129.

Degryse, P. – Shortland, A.J. 2020: Interpreting elements and isotopes in glass: a review. *Archaeometry* 62, 117–133.

Devái, K. 2016: Glass vessels from late Roman times found in Pannonia. *Acta Archaeologica Academiae Scientiarum Hungaricae* 67, 255–286.

Dimitrova – Popov 1978 = Димитрова, Д. – Попов, Ж. 1978: *Археологически паметници в Ямболски окръг*. София.

Doppelfeld, O. 1966: *Römisches und Fränkisches Glas in Köln*. Köln.

Dyczek, P. 1999: A glass atelier from sector IV in Novae. In: Conrad, S. – Vagalinski, L. (eds.): *Der Limes an der unteren Donau von Diokletian bis Heraklios*. Sofia, 99–104.

Fanderlik, I. 2009: *Barvení skla*. Valašské Meziříčí.

Foster, H.E. – Jackson, C.M. 2009: The composition of the 'naturally coloured' late Roman vessel glass from Britain and the implications for models of glass production and supply. *JASc* 36, 189–204.

Freestone, I.C. – Wolf, S. – Thirlwall, M. 2005: The production of HIMT glass: Elemental and isotopic evidence. In: *Annales du 16e Congrès de l'Association Internationale pour l'Histoire du Verre.* London, 153–157.

Freestone, I.C. 2015: The Recycling and Reuse of Roman Glass: Analytical Approaches. *JGS* 57, 29–40.

Freestone, I.C. – Stapleton, C.P. 2015: Composition, technology and production of coloured glass from Roman mosaic vessels. In: Bayley, J. – Freestone, I.C. – Jackson, C. (eds.): *Glass of the Roman World*. Oxford, 61–76.

Freestone *et al.* 2018 = Freestone, I.C. – Degryse, P. – Lankton, J. – Gratuze, B. – Schneider, J. 2018: HIMT, glass composition and commodity branding in the primary glass industry. In: Rosenow, D. – Phelps, M. – Meek, A. – Freestone, I.C. (eds.): *Things That Travelled: Glass in the First Millennium CE*. London, 159–190.

Freestone, I.C. 2021: Glass Production in the First Millennium CE: A Compositional Perspective. In: Klimscha, F. – Karlsen, H.J. – Hansen, S. – Renn, J. (eds.): *Vom Künstlichen Stein zum durchsichtigen Massenprodukt / From artificial stone to translucent mass-product*. Berlin Studies of the Ancient World 67. Berlin, 245–263.

Friedhoff, U. 1989: Beigaben aus Glas in Körpergräbern der späten 3. Und des 4. Jahrhundets: Ein Indis für den socialen Status des Bestattenten. *Kölner Jahrbuch für Vor- und Frühgeschichte* 22. Cologne, 37–48.

Fünfschilling, S. – Lafli, E. 2013: *Hadrianopolis II. Glasfunde des 6. Und 7. Jahrhunderts aus Hadrianopolis, Paphlagonien (Türkei)*. Internationale Archäologie 123. Rahden.

Fünfschilling, S. 2014: Glass from the Byzantine palace at Ephesus in Turkey. In: Keller, D. – Price, J. – Jackson, C. (eds.): *Neighbours and successors of Rome. Tradition of glass production and use in Europe and the Middle East in the later first millennium AD*. Oxford, 138–146.

Gliozzo, E. 2017: The composition of colourless glass: a review. *Archaeological and Anthropological Sciences* 9, 455–483.

Gomolka, G. 1979. Die späpantiken und frühmittelaterlichen Gläser aus Iatrus. In: Bülow, Von G. (ed.): *Iatrus – Krivina. Spätantike Befestigung und frühmittelalterlichen Siedlung an der unteren Donau I: Ergebnisse der Ausgrabung 1966–73,* Schriften zur Geschichte und Kultur der Antike 17. Berlin, 145–163.

Gomolka-Fuchs, G. 1991: Die Kleinfunde von 4. Bis 6. Jh. In: Böttger, B. (ed.): Iatrus – Krivina. *Spätantike Befestigung und frühmittelalterlichen Siedlung an der unteren Donau IV: Ergebnisse der Ausgrabung 1975–81*, Schriften zur Geschichte und Kultur der Antike 17. Berlin, 167–259.

Gomolka-Fuchs, G. 2007: Die Kleinfunde. In: Bottger, B. – von Bülow, G. – Conrad, S. (eds.): *Iatrus – Krivina. Spätantike Befestigung und frühmittelalterlichen Siedlung an der unteren Donau VI: Ergebnisse der Ausgrabung 1992–2000 (Limesforshungen 28*). Berlin, 265–304.

Golofast, L.A. 2009: Early Byzantine glass from the Tauric Chersonesos (Crimea). In: Lafli ed. 2009, 301–335.

Gopkalo 2008 = Гопкало, О.В. 2008: *Бусы и подвески черняховской культуры*. Киев.

Gorin-Rosen, Y. – Winter, T. 2010: Selected insights into byzantine glass in Holy Land. In: Drauschke, J. – Keller, D. (eds.): *Glass in Byzantium – production, usage, analyses*. Verlag des Römisch-Germanischen Zentralmuseums – Tagungen 8. Mainz, 165–181.

Gregl, Z. – Lazar, I. 2008: *Bakar: staklo iz rimske nekropole*. Musei Archaeologici Zagrabiensis catalogi et monographiae 5. Zagreb.

Gürler, B. – Lafli, E. 2010: Middle and Late Roman glass from the agora of Smyrna from the excavation season 1997 and 2002–2003. In: Drauschke, J. – Keller, D. (eds.): *Glass in Byzantium – production, usage, analyses*. Verlag des Römisch-Germanischen Zentralmuseums – Tagungen 8. Mainz, 121–144.

Hamel, H. – Greiff, S. 2014: Late Roman and Early Byzantine glass from Heliopolis/Baalbek. In: Keller, D. – Price, J. – Jackson, C. (eds.): *Neighbours and successors of Rome. Tradition of glass production and use in Europe and the Middle East in the later first millennium AD*. Oxford, 147–161.

Harden, D.B. 1936: *Roman Glass from Karanis.* Michigan.

Isings, C. 1957: *Roman Glass from Dated Finds*. Archaeologica traiectina 2. Groningen.

Israeli, Y. 2003: *Ancient Glass in the Israel Museum: The Eliahu Dobkin Collection and Other Gifts*. Jerusalem.

Jackson, C.M. – Foster, H. 2015: Provenance studies and Roman glass. In: Bayley, J. – Freestone, I. – Jackson, C. (eds.): *Glass of the Roman World*. Oxford, 44–56.

Jackson, C.M. – Paynter, S. 2016: A Great Big Melting Pot: Exploring Patterns of Glass Supply, Consumption and Recycling in Roman Coppergate, York. *Archaeometry* 58, 68–95.

Jennings, S. 2015: Flas glass from Butrint and its surrounding areas, Albania. In: Bayley, J. – Freestone, I. – Jackson, C. (eds.): *Glass of the Roman world*. Oxford, 153–164.

Kanyak, S. 2009: Late Roman/Early Byzantine Window Glass from the Marmaray Rescue Excavations at Sirkeci, Istanbul. In: Lafli ed. 2009, 25–47.

Keller, E. 1971: *Die Spatromischen Grabfunde in Sudbayern*. Münchener Beiträge zur Vor – und Frühgeschichte 14. München.

Knápek, R. – Šedo, O. 2017: Mocní a jejich hry: Hrací kostky v rukách příslušníků elitdoby římské. *Živá archeologie* 19, 25–34.

Koycheva 1990 = Койчева, К. 1990: Ранновизантийска стъкларна работилница. *Археология* 4, 36–46.

Lafli, E. (ed.): *Late Antique/Early byzantine glass in the eastern Mediterranean.* Acta Congressus Communis Omnium Gentium Smyrnae II. Izmir.

Lazar, I. 2003: *The Roman Glass of Slovenia*. Ljubljana.

Lesigyarski *et al.* 2013 = Lesigyarski, D. – Šmit, Ž. – Zlateva-Rangelova, B. – Koseva, K. – Kuleff, I. 2013: Characterization of the chemical composition of archaeological glass finds from South-Eastern Bulgaria using PIXE, PIGE and ICP-AES. *Journal of Radioanalytical & Nuclear Chemistry* 295, 1605–1619.

Maltoni *et al.* 2016 = Maltoni, S. – Silvestri, A. – Marcante, A. – Molin, G. 2016: The transition from Roman to Late Antique glass: new insights from the *Domus of Tito Macro* in Aquileia (Italy). *JASc* 73, 1–16.

Mazanek, D. 2014: Preliminary Typology of Glass Vessels from the so-Called Hellenistic House, Explored by the Polish Archaeological Mission in Nea Paphos (Cyprus). *Études et Travaux* XXVII, 279–321.

Minchev 1988 = Минчев, А. 1988: Антично стъкло от Западното Черноморие (I–VI в.) II. Чаши. *Известия на Народния музей – Варна* 24:39, 35–59.

Minchev 1989 = Минчев, А. 1989: Антично стъкло от Западното Черноморие (I–VI в.) III. Кани. *Известия на Народния музей – Варна* 25:40, 13–25.

Minchev 1990 = Минчев, А. 1990: Антично стъкло от Западното Черноморие (I–VI в.) IV. Бутылки. *Известия на Народния музей – Варна* 26:41, 56–78.

Olczak, J. 1995: Szkło rzymskie z terenu komendantury w Novae. *Novaensia* 8, 15–85.

Olczak, J. 1998: *Produkcija szkła w rzymskim I wczesnobizanyjskim Novae w świetle źródeł archeologicznych (Mezja Dolna)*. Toruń.

Price, J. 1976: Glass. In: Strong, D. – Brown, D. (eds.): *Roman Crafts*. London, 111–126.

Poulter, A.G. 2007: The Transition to Late Antiquity on the Lower Danube: The City, a Fort and the Countryside. In: Poulter, A.G. (ed.): *The Transition to Late Antiquity*. Oxford, 1–96.

Rehren, T. – Cholakova, A. 2010: The Early Byzantine HIMT glass from Dichin, Northern Bulgaria. *Interdisciplinary Studies* 22/23, 81–96.

Rehren, T. – Cholakova, A. 2014: Glass supply and consumption in the late Roman and early Byzantine site of Dichin, northern Bulgaria. In: Keller, D. – Price, J. – Jackson, C. (eds.): *Neighbours and successors of Rome Traditions of Glass Production and Use in Europe and the Middle East in the late 1st millennium*. Oxford, 83–94.

Riha, E. 1990: *Der römische Schmuck aus Augst und Kaiseraugst.* Forschungen in Augst 10. Augst.

Roberts, A. 2007: Beads and Glass, Jet and Shale Jewellery. In: Poulter, A.G. (ed.): *The Transition to Late Antiquity*. Oxford, 80–86.

Rütti, B.1991: *Die römischen Gäser aus Augst und Kaiseraugst*. Forschungen in Augst 13/2. Augst.

Schibille *et al.* 2017 = Schibille, N. – Sterrett-Krause, A. – Freestone, I.C. 2017: Glass groups, glass supply and recycling in late Roman Carthage. *Archaeological and Anthropological Sciences* 9, 1223–1241.

Schwarzer, H. 2009: Spätantike, byzantinische und islamische Glasfund aus Pergamon. In: Lafli ed. 2009, 85–109.

Shapova 1998 = Щапова, Ю.Л. 1998: *Византийское стекло. Очерки истории.* Москва.

Shepherd, J. 1999: The Glass. In: Poulter, A.G. (ed.): *Nicopolis ad Istrum: A Roman to early Byzantine city. The pottery and glass.* Reports of the Research Committee of the Society of Antiquaries of London 57. London, 299–377.

Shortland *et al.* 2006 = Shortland, A. – Schachner, L. – Freestone, I.C. – Tite, M. 2006: Natron as a flux in the early glass materials industry: sources, beginnings and reasons for decline. *JASc* 33, 521–530.

Silvestri *et al.* 2008 = Silvestri, A. – Molin, G. – Salviulo, G. 2008: The colourless glass of Iulia Felix. *JASc* 35, 331–341.

Smith, T. – Henderson, J. – Faber, E.W. 2016: Early Byzantine Glass Supply and Consumption: The Case of Dichin, Bulgaria. In: Gan, F. – Li, Q. – Henderson, J. (eds.): *Recent Advances in Scientific Research on Ancient Glass and Glaze*. Hackensack, 207–231.

Spaer, M. 2001: *Ancient glass in the Israel museum. Beads and other small objects.* Jerusalem.

Stawiarska, T. 2014: *Roman and early Byzantine glass from Romania and Northern Bulgaria*. Bibliotheca Antiqua 24. Warsaw.

Stern, E.M. 2001: *Roman, Byzantine and Early Medieval Glass, 10 B.C.E – 700 CE.* Ernesto Wolf Collection. Stuttgart.

Stojanović *et al.* 2015 = Stojanović, M.M. – Šmit, Ž. – Glumac, M. – Mutić, J. 2015: PIXE–PIGE investigation of Roman Imperial vessels and window glass from Mt. Kosmaj, Serbia (Moesia Superior). *JASc Reports* 1, 53–63.

Svobodová, H. 2017: *Ancient glass*. Editio Monographica Musei Nationalis Pragae 22. Prague.

Swift, E. 2000: *Regionality in Dress Accessories in the Late Roman West, Glass Beads*. Monographies Instrumentum 11. Montagnac, 89–116.

Tempelmann-Mączyńska, M. 1985: *Die Perlen der römischen Kaiserzeit und der frühen Phase der Völkerwanderungszeit im mitteleuropäischen Barbaricum.* Mainz.

Tommaso, G. 1989: Vetri incise dale collezioni del Museo Nazionale Romano di Roma. *Kölner Jahrbuch für Vor- und Frühgeschichte* 22. Cologne, 99–104.

Turno, A. 1989: Römische und Frühbyzantinische Gläser aus Novae in Bulgarien. *Kölner Jahrbuch für Vor- und Frühgeschichte* 22, 163–170.

Tušlová, P. – Weissová, B. – Bakardzhiev, S. 2022: The Final Excavation Report. In: Tušlová, P. – Weissová, B. – Bakardzhiev, S. (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. Studia Hercynia, Monographs 2. Praha, 24–52.

Uenze, S. 1992: *Die Spätantiken Befestigungen von Sadovec (Bulgarien): Ergebnisse der deutsch-bulgarisch--österreichischen Ausgrabungen, 1934–1937. Tafeln*. München.

Whitehouse, D. 1997: *Roman Glass in the Corning Museum of Glass* I. Corning

Whitehouse, D. 2002: *Roman Glass in the Corning Museum of Glass* II. Corning

Whitehouse, D. 2003: *Roman Glass in the Corning Museum of Glass* III. Corning.

Weissová, B. – Tušlová, P. – Bakardzhiev, S. 2022: Systematic Selective Survey of Yurta-Stroyno. A Methodological Approach to Sites Heavily Disturbed by Looters. In: Tušlová, P. – Weissová, B. – Bakardzhiev, S. (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. Studia Hercynia, Monographs 2. Praha, 53–69.

Viktoria Čisťakova
Department of Prehistory and Classical Antiquity
National Museum
Vinohradská 1, CZ-110 00, Prague 1
viktoria.cistakova@nm.cz

Zuzana Zlámalová Cílová
Department of Glass and Ceramics
University of Chemistry and Technology
Technická 5, CZ-16628, Prague 6
cilovaz@vscht.cz

Selected Small Finds

Adéla Minaříková

ABSTRACT
The article presents small finds from the excavation and surface survey of the Roman rural settlement of Yurta-Stroyno, located in the Yambol District, Bulgaria. It deals with less frequent groups of small finds such as worked bones and terracotta statuettes, as well as it includes one exceptional find of a head from a small marble statuette. The presented objects were mostly found in an unstratified context, consequently, their chronology is based on parallels either from Thrace, or from other Roman provinces. The small finds might be dated into the time span of the 2nd–4th century AD, illustrating the variability of materials and objects present on the Roman rural settlement on the middle stream of the Tundzha River during its peak period.

KEYWORDS
Bulgaria; Roman Thrace; *vicus*; small finds; worked bones; terracotta; statuette.

INTRODUCTION

Both terracotta figurines and worked bones belong to quite rare finds at the settlement of Yurta-Stroyno. Especially the terracotta were found in a very fragmented state of preservation, allowing only several of them to be more closely described. The worked bones are more frequent as well as variable, including a number of pins and their fragments, parts of distaff, spoons, and half of a dice (**Tab. 1**). All these objects are common on Roman period settlements and represent standard equipment of its inhabitants. Rare, in the context of the Yurta-Stroyno, is the head of a bearded man broken off from a statuette. It is executed in fine marble, and it represents the only depiction of freestanding human figure found on the site.

Classes of more abundant small finds were processed separately within this volume, including metals (Čisťakova – Kmošek 2022); coins (Heřmánková 2022b); terracotta lamps (Frecer 2022); votive terracotta plate with a Greek inscription (Heřmánková 2022a); and small glass items (Čisťakova – Zlámalová Cílová 2022). Among them we may find objects of similar function such as the glass gaming counter (Čisťakova – Zlámalová Cílová 2022, fig. 7:113, Pl. 7/1:19) which might well accompany our bone dice for a board game.

HEAD OF A BEARDED MAN

Among the most intriguing objects uncovered at the settlement of Yurta-Stroyno is certainly the head of a bearded man broken off from a small statuette **no. 1** (**Fig. 1**; **Pl. 8/1**). The 65 mm high piece was found in a fill of a ditch [SU008], located in the south-western corner of Room C (100E_100N SW). It is executed in fine grained white marble and bears a depiction of a bearded man. Surface corrosion has partially erased and camouflaged details of his depiction, however, we can still observe quite delicately worked features such as a rich asymmetrical beard, hairstyle with indicated headband, as well as skilfully captured details of the face. The hair and

No.	SF #	SU	Trench / Polygon	Sect.	SU specification	Material	Object	L./H.	W.	Th.	Chronology
1	SF14_153	SU008	100E_100N	SW	fill of a ditch	marble	statuette	65	41	50	Roman period
2	SF15_333	×	NE part of the settlement	×	survey	terracotta	figurine	36	29	30	2nd–4th c. AD
3	SF14_015	SU001	100E_100N	S	RT soil	terracotta	figurine	35	33	4–7	2nd–4th c. AD
4	SF15_252	SU054	105E_105N	SW	inner floor level	terracotta	figurine	48	31	15	2nd–4th c. AD
5	SF16_J09_NW_01	×	J09	NW	survey	terracotta	wheel	46	40	3–9	2nd–4th c. AD
6	SF15_042	SU001	95E_100N	NE	RT soil	terracotta	wing	67	41	17	2nd–4th c. AD
7	SF14_036	SU052	100E_100N	NE	levelling layer	bone	dice	13	11	9	2nd–4th c. AD
8	SF14_158	SU008	100E_100N	SW	fill of a ditch	bone	pin	129	3–5, 1	3–4, 1–3	1st–5th c. AD
9	SF16_150	SU084	100E_110N	SE	levelling layer	bone	pin	94	3–5	3–4.5	1st–3rd c. AD
10	SF15_129	SU041	105E_105N	SW	topsoil	bone	pin	24	3–4	3–4	Roman period
11	SF15_221	SU057	100E_105N	SE	fill of a ditch	bone	pin	16	3	3	Roman period
12	SF15_257	SU059	100E_105N	NE	levelling layer	bone	pin	38	4	4	Roman period
13	SF15_278	SU057	100E_105N	SE	fill of a ditch	bone	pin	39	4	2–3	Roman period
14	SF20_001	SU021	95E_100N	SE	fill of a ditch	bone	pin	25	1.5–2.5	×	Roman period
15	SF15_125	SU041	105E_105N	SW	topsoil	bone	pin	21	4–5	3–4	Roman period
16	SF15_133	SU052	100E_105N	NE	levelling layer	bone	pin?	24	7	5	Roman period
17	SF16_G12_NE_04	×	G12	NE	survey	bone	pin?	33	4.5–7	4–4.5	Roman period
18	SF15_100	SU041	105E_105N	SW	topsoil	bone	distaff	52	6–7	6–7	2nd c. AD
19	SF16_D13_SW_03	×	D13	SW	survey	bone	distaff	20	15	6–7	2nd c. AD
20	SF15_113	SU047	100E_105N	NE	levelling layer	bone	spoon	25	22	1.5, 3	2nd–3rd c. AD
21	SF16_G12_NE_01	×	G12	NE	survey	bone	spoon	24	21	1–5	2nd–3rd c. AD
22	SF15_380	SU057	100E_105N	SE	fill of a ditch	bone	flute?	23	6	4–5	Roman period?

Tab. 1: Overview of the presented small finds. All measurements in millimetres; L. = length, H. = height, W. = width; Th. = thickness.

beard were made by chisel, with individual curls finished by a drill. The drill marks are now smoothed by the surface erosion; however, they can still be noticed along the mouth, beard, hair, and the hairband. The eyes were outlined without the use of a drill.

At the centre of the neck of the statuette is a small conical hole, 5 mm deep. The purpose of this drilled hole is not entirely clear. If the statuette had been constructed from several individual parts, it could have served as a mortise (hole for the tenon) to attach the head to the

body. However, it may also represent the evidence of mending the head after it had broken off. Since the neck ending is irregular and rough, the second possibility seems more probable. If we accept the idea of this head being originally part of a standing statuette, then we may apply the classical *canon* of Polykleitos to suppose it would make one seventh of its entire body, resulting in a total height of approximately 455 mm.

Due to the eroded surface, it is difficult to stylistically class the statuette. In the excavation report of the first year of the Yurta-Stroyno Archaeological Project it was dated to the reign of Emperor Hadrian (AD 117–138) and Antoninus Pius (AD 138–161). This classification to the first half / middle of the 2nd c. AD was based on the eyes made without the use of a drill and the contrast between the smooth cheeks and relief of a beard and hair shaped without a drill (Tušlová – Weissová – Bakardzhiev 2014, 19). However, after more careful observation, the now heavily eroded drill marks were identified, and the more general chronology of the Roman period might be preferred.

The head of the statuette was found in material accumulation dug under the floor level inside of the excavated house, which does not give us context for its further interpretation. The depiction however seems to be generic, rather representing a type of a Greek philosopher or god, then a personal portrait.

Considering the smaller size of the statuette, we may expect its use in some private space or household context, although its exhibition in more sacred place such as sanctuary cannot be completely ruled out. Based on its physiognomy, a few representations of bearded deities come into consideration, including the god Asclepius (c.f. LIMC II/21984, Asklepios 233a and 345) and Heracles (c.f. LIMC IV/21988, Herakles 973 and 1198). If the statuette indeed represents one of these deities, the first possibility seems more likely, as cult of Asklepios was very popular in Thrace during the Roman imperial period (LIMC II/11984, 897).

Fig. 1: Drawing of the marble head of a bearded man (by D. Mildová).

TERRACOTTA

Among the small finds from the house excavation as well as from the surface survey several terracotta figurines parts had been uncovered (**nos. 2–6**).[1] The majority of the finds are very fragmented, not allowing any further specification. There are approximately 22 terracotta fragments, six from the surface survey and 16 from the excavation. Regarding the latter, a small accumulation of six small fragments comes from the levelling layer north of the house, including trenches 100E_105N NE and SE and 100E_110N; one fragment was found incorporated into the inner floor of Room D of the excavated house in layer [SU054]; the rest, however, comes from unstratified RT soil [SU001].

Only few terracotta fragments are sufficiently preserved to describe either their basic form, original shape, or possible representation and parallels. These include several parts of hollow figurines, one in a shape of a foot placed on a plinth (**Fig. 2:2**); a wheel (**Fig. 2:5**); and a wing of an eagle (**Fig. 2:6**). A specific terracotta find is also the votive terracotta plaque with Greek inscription which was however processed separately among the epigraphic finds (see Heřmánková 2022a, fig. 1).

Production of terracotta figurines was quite generic as well as widespread around the whole Roman Empire as illustrated by examples, e.g., from Zeugma in Turkey (Gingras – Aylward 2013, 202–208), or from Bulgaria (Hristov 2015, 87). Consequently, their chronological classification without context is difficult. Regarding the general chronology of the settlement and the available parallels, we may class them into the products of the 2nd–4th c. AD.

THREE FRAGMENTS OF FIGURINES (STATUETTES?)

Three fragments are from hollowed, three-dimensional figurines, representing part of a body or/and decoration. The best-preserved example is a surface find **no. 2** (**Fig. 2:2**) found accidently on the north-eastern part of the settlement prior to the systematic surface survey. It represents part of a plinth with a right foot of a likely seated person or god and lower part of the drapery. The inner side of the fragment bears traces of fingerprints as a result of pressing the clay into a mould. The colour of the sherd is red on the inner side and yellowish on the outer surface, which is likely caused by uneven firing; there is no surface slip.

Less conclusive are the representations of the other two terracotta. **No. 3** (**Fig. 2:3**) is of a semi-circular shape. The outer shell bears several subtly indicated vertical lines crossed with two parallel horizontal lines. The piece was made in a mould. The inner side of the fragment unfortunately does not provide any further information. The object seems to represent something static, and the quite linear rendering of the surface suggests it might have rather depicted an inanimate object than a figure. The clay is fine, orange, with no slip. **No. 4** (**Fig. 2:4**) is a hollowed object of similar rounded/ovoid shape. The outer surface bears a column-like depiction with beaded relief decoration which might have continued all around the object, unfortunately, now in this lower part unpreserved. Another breakage appears in the front part of the terracotta exactly next to the column-like depiction, where subtle creases of possible other decoration also seem to start.

1 This group of finds does not include terracotta lamps which were processed separately by R. Frecer (2022).

THE WHEEL

Fragment **no. 5** (**Fig. 2:5**) represents a partly preserved wheel made of brick red clay without any slip. It shows three spokes and a central axle hole, which are alongside the rim of the wheel executed in relief. The whole wheel, with an outer dimension of ca. 70 mm, would probably have had six or eight spokes altogether. These wheels are quite a common find in Roman Balkan provinces, where they are frequently accompanied by terracotta fragments of horses and horse riders' figurines. Production of these figurines was attested in Butovo, one of the major pottery workshops in Moesia Inferior (Sultov 1962; Ivanov 2021, 103, обр. 58). The complete terracotta represents horse with legs replaced by wheels, some of them with a rider on the back – either as a complete seated person or just the rider's head placed on horseback. These representations, as well as the separated wheels, are made in mould. It is generally expected these were toys for kids (Vladkova 2011, 106; Falkner 2007, 91), although we may also notice the strong link to the representation of the Thracian horse rider which was popular for votive monuments in Bulgaria especially during the 2nd–3rd c. AD (Kazarow 1938; Oppermann 2006).

The production centre at Butovo, where also moulds for these terracotta were found (Sultov 1962, 31), is commonly dated to the 2nd–4th c. AD (Sultov 1976; Vladkova 2011, 106; кат. nos. 12–16; Harizanov 2019). Most recently, more narrow chronology was proposed by Ivanov, dating its activity from the end of the 2nd / beginning of the 3rd c. AD till mid-3rd c. AD (Ivanov 2021, 102). Further, individual finds of these wheels come from Nicopolis ad Istrum, dated to the mid-3rd–4th c. AD (Sultov 1976, 95; with refined chronology in Falkner 2007, 91–94; fig. 6.4). Vladkova (2011, 106) also mentions other finding places either in Balkan peninsula or further apart: Viminacium, Romula, Singidunum, Chersonesos, Athenian Agora, and Toulon and Clermont-Ferrand in Gallia. All these examples are dated approximately to the 2nd–4th c. AD.

THE WING

The best-preserved terracotta fragment **no. 6** has a shape of a wing (**Fig. 2:6**). The roughly 70 mm high object consists of two pieces which were found in RT soil [SU001] in Room B, near each other. According to the high level of wear on the edge it appears to have been fractured some time ago. The wing has been constructed from two halves made in mould – front and back – with a visibly flattened joint. The wing itself is 20 mm thick with an uneven inner surface. The clay has a uniquely orange colour without any slip. The immediate interpretation of the object as a wing is based not only on the heart-like shape but, especially, on the outer treatment of the surface consisting of dips and scratches creating an illusion of feathers.

Statuettes of winged birds, especially eagles, seem to be relatively common among Roman period representations in Thrace. They appear to be made in terracotta as well as in stone (especially marble).[2] The size of the eagles might vary (usually up to several tens of centimetres) alongside with the pose of the eagle. The Yurta-Stroyno example shows no traces of the connection of the wing to the body but based on the parallels, the wing seems to be folded or half-spread (c.f. Bospatchieva 2004, 97:32, 98:43). Both spread and folded wings have been documented in Bulgaria (e.g. Ignatov 1999, 58–62; Bospatchieva 2004, 97:32, 98:43; Cholakov 2015, 138).

2 Regarding the settlement's immediate hinterland, there is one marble eagle statue exhibited in the Regional Historical Museum in Yambol, and another one at the Museum of the Archaeological Park of Thracian and Ancient City of Kabile.

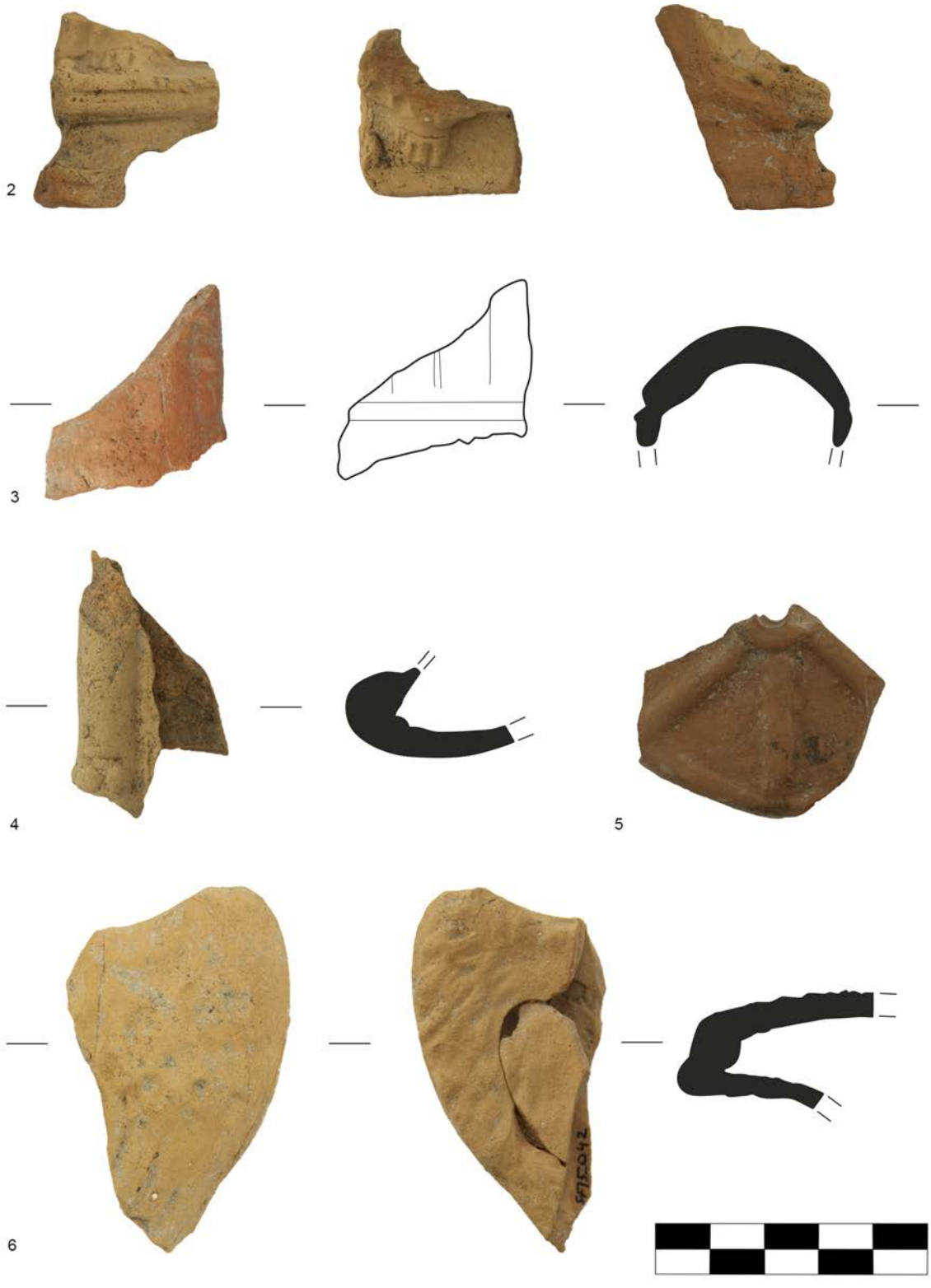


Fig. 2: The best-preserved terracotta fragments found at Yurta-Stroyno. By J. Tlustá and D. Mildová.

A pottery and terracotta workshop dated to the 3rd–early 4th c. AD was uncovered in Philippopolis (Plovdiv). Among its products terracotta eagles with folded as well as with half-spread wings were uncovered (Bospatchieva 2004, cat. no. 32–43). Motives of eagles in stone are also common in the area of Philippopolis, where several marble statues were found in its vicinity, e.g., in Diocletianopolis (Hisarya) and in the village of Tsalapitsa (Tsontchev 1959, figs. 66–67). Based on the concentration of representation of eagles either in stone or terracotta around Philippopolis Bospatchieva supposes their votive character connected to Zeus and/or Zeus-Sabazios (Bospatchieva 2004, 92). Depictions of eagles are however known from elsewhere, e.g., from Sostra (Hristov 2015, 86; fig. 7–8) where they were interpreted as eagle-shaped ceramic toys; or from Heraklea Sintica, where their local production in marble had been suggested (Cholakov 2015, 138; fig. 8:2).

WORKED BONES

Bone carving was a popular craft in the Roman Empire. Even though objects made of bones fall into a category of common finds uncovered both on the settlements and necropolises, they were not regionally specific. Identical objects can be found around the whole Roman Empire as they have been traditionally adapted and copied. Apart from artistic production (perhaps ivory diptychs, baskets or statuettes which were made in centres such as Rome, Constantinople, or Alexandria), the bone carving was usually produced locally in specified workshops using predominantly cattle or other animal's bones as butchery waste (Bíró 1994, 10).

At the settlement of Yurta-Stroyno 17 worked bones were identified including finds from the excavation and the surface survey. The majority of the bone objects have been uncovered during the excavation of the house and its immediate proximity. Five worked bone fragments were uncovered in the fills of the ditches – one in [SU008], another one in [SU021] and three in [SU057] – and a further six in the levelling layer (see **Tab. 1**). From the rest, several objects were uncovered either in the topsoil or during the surface survey. It is quite surprising that no worked bones were found in the soil excavated by looters (RT soil [SU001]), and it almost seems these objects might have been one of their main interests for collecting. Among the recovered finds are fragments of pins (10 pcs.), distaffs (2 pcs.), spoons (2 pcs.), dice (1 pc.) and one miscellaneous worked bone fragment.

Micrographs of the bones allowed us to study details of the tool marks left on the surface of the objects, including knife, file, drill, and a lathe (**Pl. 8/3**). Files and knives were the most commonly used tools for the items production. In some cases, especially in wholly preserved pins, the surface of the objects had been carefully polished leaving very few tool marks still visible on the surface. The only usage of the lathe had been detected on the inner sides of both spoon blades (**Pl. 8/3:21**); the drill had been used only on the animal head of the distaff.

Additionally, 14 *astragali* were collected over the investigated area. They come in approximately three sizes – around 20, 40 and 65 mm in length, some of them were damaged or just partially preserved. The animal ankle bones (*astragali*, knucklebones) have held a unique place in the societies in Europe and Asia since the Bronze Age (Choyke 2010, 201). Having four different sides on which they can land when thrown, they may have been used as an alternative to dice. Some of the Yurta-Stroyno *astragali* have horizontal cut marks on both sides of the frontal side, however, there are no traces of deliberate carving or alteration of any kind, thus, nothing further indicates a secondary use of these knucklebones as gaming counters.

DICE

There is only one half preserved dice (just over 10 mm large) in the collection (**Fig. 4:7**; **Pl. 8/2:7**). The surface of the dice is partially burnt but the surviving part suggests that this dice followed a standard layout with dots surrounded with circles carved with a fixed chisel compass (d. 3 mm). The fragment of the dice is not perfectly cubical in shape as one side is slightly concave and its surface has been polished leaving no tool marks visible (Barbier 2016, 124–125). It appears that the values were arranged so that opposite faces total seven, as was a common practice. The dice were used for playing games or as a part of a board game (Bíró 1994, 60–62; pl. LXXVII–LXXVIII).

Such bone dices were uniformed and represent common finds from settlements across the Roman Empire with myriad parallels to the Yurta-Stroyno, both from Thrace as well as from other Roman provinces (Deschler-Erb 1998 text und tafeln, 376, taf. 24, kat. 78–79, no. 872–878; Gostenčnik 2001, 391; St. Clair 2003, 113–114; Vladkova 2012, 236–239; Vass – Pánczél 2009; etc.).

PINS

Pins and their fragments constitute the biggest group of finds, in total ten objects (**Fig. 3:8–17**; **Pl. 8/2:8–17**). Pins in general are fairly common in Roman contexts but they can vary quite significantly, especially in terms of their head shape. There is one completely preserved example in the Yurta-Stroyno collection, **no. 8**, and nine fragments.

The fully preserved pin **no. 8** (**Fig. 3:8**; **Pl. 8/2:8**) is about 129 mm long sleek pin with a conical (pyramid) head and almost circular shaft, which has been recently broken near the tip into two parts. The surface bears very few toolmarks and has been polished into a still noticeable high shine. This type of pin has been associated with Type 1 according to a typology published in 1979 by Nina Crummy. The author estimates the lifespan of this type between ca. 70–200/250 AD (Crummy 1979, 157–159). However, according to Bíró this type of pin can be more broadly dated between the 1st and 5th century AD (Bíró 1994, 30–35).

Another almost completely preserved pin (only with a tip missing) in **no. 9** (**Fig. 3:9**; **Pl. 8/2:9**), which was uncovered in four pieces north from the house in the levelling layer (100E_110N SE). The 94 mm long pin has a circular shaft gradually broadening towards the head. The head is not emphasized in any way and consists only of the vertically cut shaft. The surface of this pin has been highly polished (**Pl. 8/3:9**). There are very few tool marks still visible, concentrated only around the head area of the pin. This is also relatively common type of a pin, which was widespread around the Roman provinces as we may give examples of such finds from Hungary (Bíró 1994, 150–152), Slovakia (Hrnčiarik 2016, 141–142) as well as from Bulgaria – Sostra (Hristov 2015, 85–86) and Novae (Vladkova 2012, 224–225). The dating of this pin usually falls into the 1st–3rd century AD.

Five fragments of pins, **nos. 10–14**, consist of body parts only (**Fig. 3:10–14**; **Pl. 8/2:10–14**), and they thus cannot be associated with any established types. However, they document subtle but surprising dissimilarity in shapes as well as in the surface treatment. Unlike the two almost wholly preserved pins which have been highly polished along the whole surface (**nos. 8–9**), the fragments reveal marks documenting how they have been made. We can see even with the naked eye parallel scratches from filing the pin (**Pl. 8/3:10**, **12**). On closer inspection, some fragments appear to be shaped into delicate facets rather than having a perfect oval or circular section.

No. 15 (**Fig. 3:15**; **Pl. 8/2:15**) represents a body fragment of a pin with both ends broken. Regardless of the state of preservation, there is an obvious narrowing and subsequent hint

of widening on one side of this fragment. This could suggest that this fragment might have come from a pin with a circular or an oval head – another popular type during the Roman period (c.f. Roberts 2007, 67; Vladkova 2012, 225; Charles 2013, 282; Hrnčiarik 2016, 141).

Another intriguing fragment **no. 16** (**Fig. 3:16**; **Pl. 8/2:16**), unfortunately broken on both sides, could have also represented a part of a head decoration, even though no exact parallels have been found. Similarly, an enigmatic worked bone fragment **no. 17** (**Fig. 3:17**; **Pl. 8/2:17**) with pin-like body and wider part decorated with an incised cross resembles writing equipment, a *stylus* (Bíró 1994, 52, 204), but otherwise its interpretation remains inconclusive.

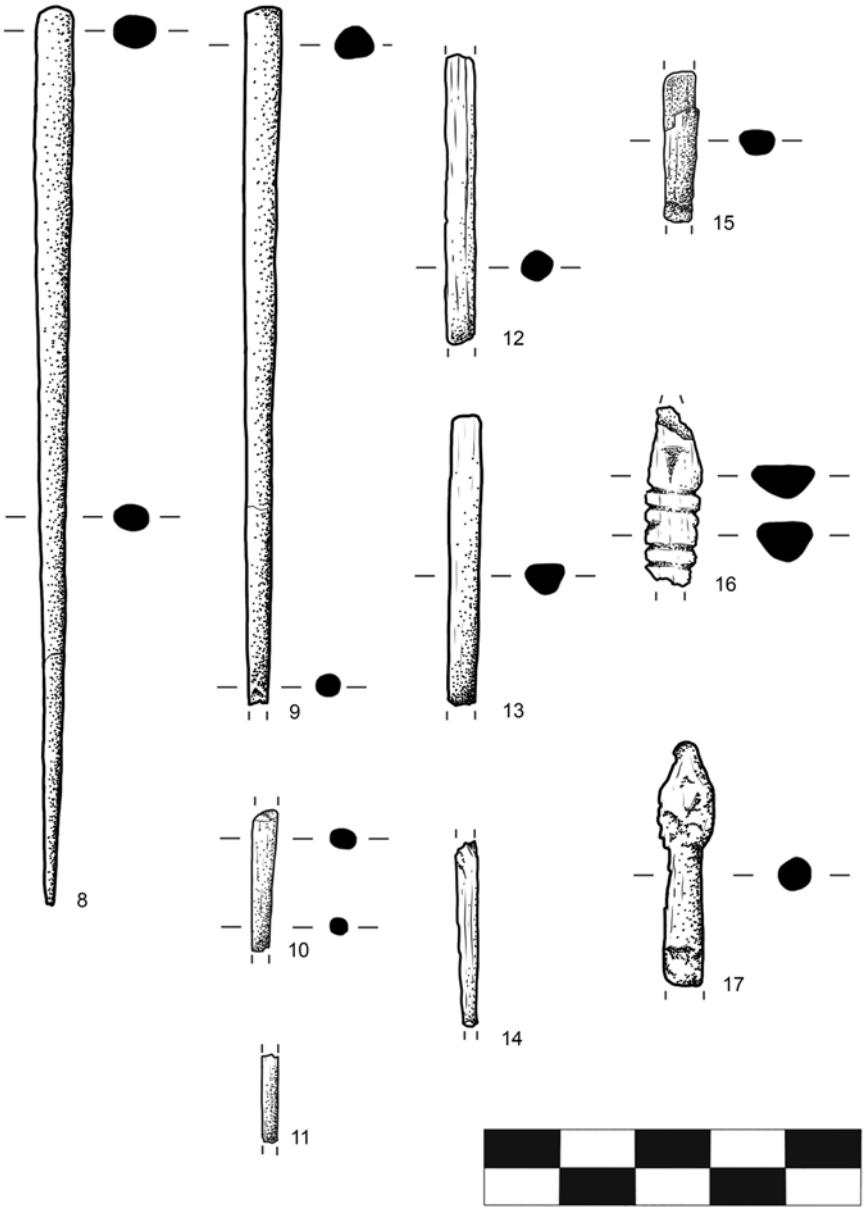


Fig. 3: Drawings of the bone pins. By D. Mildová.

DISTAFF

Two objects, first one, **no. 18**, found during the excavations inside Room D, and another one, **no. 19**, recovered during the archaeological survey, could have once been part of a distaff. **No. 18** (**Fig. 4:18**; **Pl. 8/2:18**) is a body part (ca. 50 mm long, broken on both sides), decorated near the broken ends by incised lines, and slightly narrowing towards one of the sides. The width persists almost the same throughout the whole fragment, which is unusual for pins, but characteristic for distaffs. The closest parallel to this body part might have been found in the burial mound excavated north-east of the village of Boyanovo,[3] in Elhovo municipality in Yambol District, dated to the end of the 1st and 2nd century AD. Several entirely preserved bone distaffs had been uncovered there, three of them composed of three such body segments the same as our piece (Agre 2013, 353). Due to the narrowing on one side with more profound decoration, the Yurta-Stroyno fragment could be reconstructed as the first segment of the distaff, nearest to the top.

The second object, **no. 19**, represents carving of an animal, a dog (ca. 20 mm high), standing on a rectangular platform (**Fig. 4:19**; **Pl. 8/2:19**). The break in a triangular shape just at the bottom of the platform suggests that the object had been broken off from a shaft. The animal representation is lively and bears relatively delicate details considering its size. The dog tail creates a small loop which might have been used to secure the distaff by a string against losing it. A skilled artisan used knife as well as a drill for its carving. For the parallel we may look again to the necropolis of Boyanovo and the distaffs uncovered there. One of them is crowned by a small animal standing on a rectangular platform. The size, the construction of the platform, as well as the animal-shaped decoration on its top is very similar to the one from Yurta-Stroyno (c.f. Agre 2013, 353).

SPOONS

There were also two examples of oval spoons found at Yurta-Stroyno, **no. 20** (**Fig. 4:20**; **Pl. 8/2:20**) and **no. 21** (**Fig. 4:21**; **Pl. 8/2:21**). Even though one has been uncovered at the excavation and the other one during the surface survey, they are very similar regarding the dimensions of the bowl (25×22 mm, 24×21 mm) and a shallow blade. They seem to be shaped into a very similar form, however, **no. 20** has a handle attached on the longer side of the bowl, while **no. 21** on the shorter side. Spoon bowl **no. 20** preserves the rest of a triangle-like relief reinforcement placed over the handle attachment which was (unsuccessfully) strengthening the connection. The handle of **no. 21** also broke off just above the spoon bowl, indicating the weakest point of this instrument.

These small, fragile, and rather delicate spoons might have been used in cosmetics, pharmacy, or medicine, as they are not suitable for dining (Bíró 1994, 44–45). Barely visible concentric marks in the inner sides of the bowls reveal the technology of its production, as, except for a file and a knife, the artisan must have employed a lathe to make the surface almost perfectly smooth (Barbier 2016, 114–115); see **Pl. 8/3:21**. This type of spoon is a common find in the Roman provinces (Riha – Stern 1982, 16), with parallels from different settlements and necropolises in Bulgaria, such as those from Heraclea Sintica in the Struma Valley (Cholakov 2015, 132–133), tumular necropolis near Straldzha in the Yambol District (Cholakov 2016, 161), or from Novae at the Danube River (Vladkova 2012, 230–231). Finds of these spoons from Straldzha and Novae have been dated to the 2nd and 3rd century AD.

3 The excavated burial mound is in fact halfway between villages Boyanovo and Stroyno, which are about 4 km apart each other.

MISCELLANEOUS

The last object, **no. 22**, could not have been conclusively classed among the worked bones, although it bears certain ambiguous traits for which it deserves to be incorporated into this collection. It looks like a fragment of a flute (hollowed bone) with only one fully preserved hole and another one partly damaged (placed ca. 15 mm apart from each other) (**Fig. 4:22**; **Pl. 8/2:22**). The bone itself is slightly bent which is not typical for Roman flutes, which tend to be straight and bigger in size. The holes have been pierced but apart from that, there are no tool marks visible. Examples of bone flutes with both drilled and pierced holes are relatively common during prehistorical, Roman but also Medieval periods (Bíró 1994, 60; Gál 2005, 327).

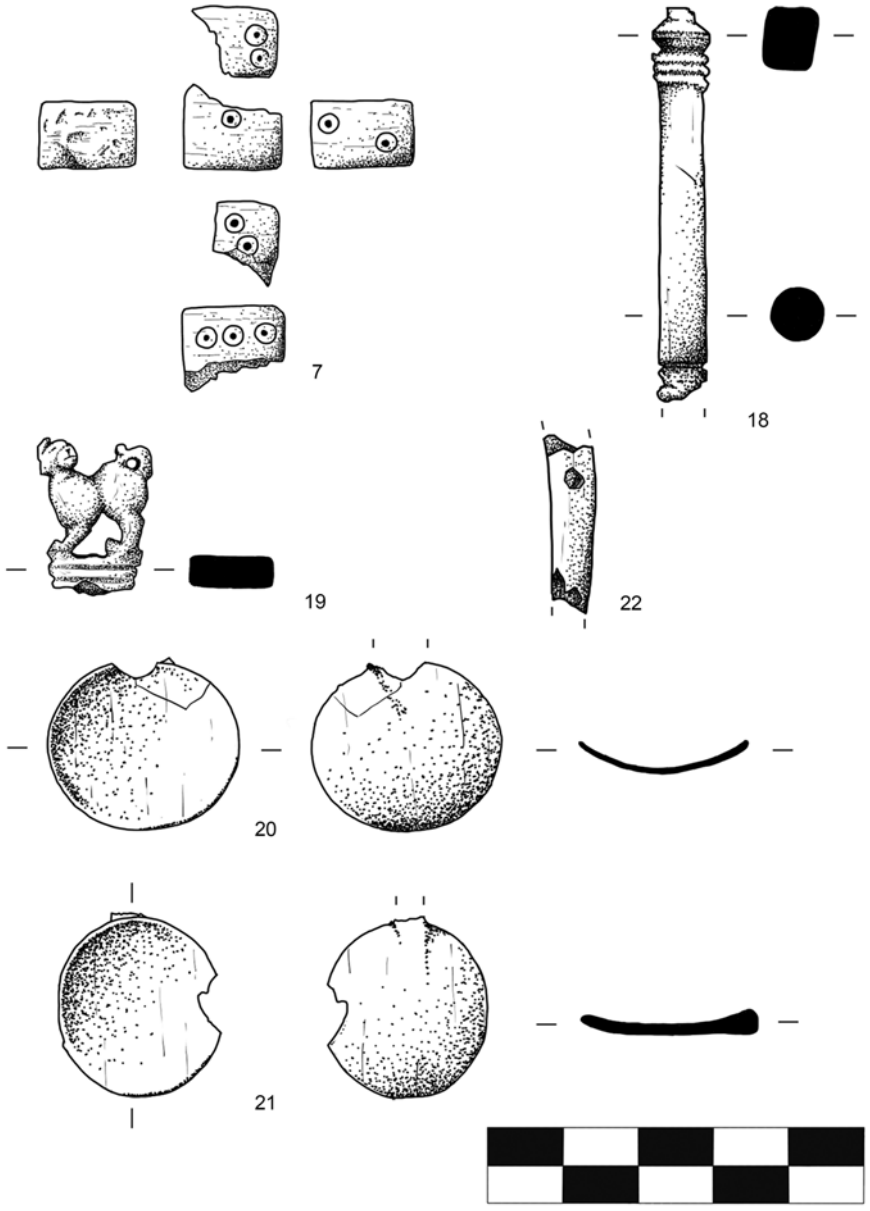


Fig. 4: Drawings of the bone items; 7: dice; 18–19: fragments of distaffs; 20–21: spoon bowls; 22: flute (?). By D. Mildová.

CONCLUSION

The terracotta figurines as well as the worked bones fall into the category of less frequent finds uncovered at the settlement of Yurta-Stroyno. It is difficult to confirm, that this might be a result of the looting activity, which seems to significantly modify the amount of information and items retrieved from the settlement. Worked bones are completely missing in the RT soil [SU001], excavated and carefully examined by the looters, while they are quite frequent in the levelling layer as well as in the fills of the ditches inside of the house. This comparison gives us an opportunity to reflect on proportions of objects located in the soil excavated by looters and the original contexts of the settlement.

Despite the small number of finds, the most common categories of variable object are still well represented at the settlement. They include anthropomorphic and zoomorphic terracotta figurines and toys, marble statuettes of small dimensions, and variable worked bones such as different types of pins, distaffs, small spoons used for cosmetics, pharmacy, or medicine, as well as items attesting to board games and gaming activities in general – the dice and probably some of the *astragali*. Both the terracotta products as well as the worked bones follow the same patterns and shapes widespread around the Roman Empire, which are usually not locally specific. However, the comparison with other such objects mostly from Balkan peninsula allowed us to date the finds into a time range of the 2nd–4th c. AD (see **Tab. 1**).

Several of the items are of high-quality execution including the representation of the dog figurine from a distaff, which, together with the other segment of a distaff, have direct parallels in the nearby rich grave of a burial mound in Boyanovo dated to the end of the 1st and 2nd century AD. We may also notice the similarity of the terracotta eagle wing with the products of the workshop in Philippopolis (Thrace) active in the 3rd c. – early 4th c. AD, and the wheel, connected to the horse rider figurine, with the attested production centre in Butovo (Moesia Inferior), newly dated to the end of the 2nd and mid-3rd c. AD. We do not have any proof besides the typological similarity these objects originate from the named workshops, however, these parallels help us to put the settlement of Yurta-Stroyno into the context of its hinterland and of the Roman province of Thrace in general.

The head of the bearded man, presumably a god Asclepius or Heracles, is done in finely grained white marble. The depiction of the man's face is well executed, although heavily eroded. The find is outstanding in the whole assemblage of Yurta-Stroyno, however mostly for its singularity, as it represents the only free-standing statuette uncovered on the settlement.

ABBREVIATIONS

AB = Archaeologia Bulgarica

LIMC II = Lexicon Iconographicum Mythologiae Classicae II: Aphrodisias – Athena. 1984, Zürich – München – Düsseldorf.

LIMC IV = Lexicon Iconographicum Mythologiae Classicae IV: Eros (in Etruria) – Herakles. 1988, Zürich – München – Düsseldorf.

SH = Studia Hercynia

BIBLIOGRAPHY

Agre 2013 = Агре, Д. 2013: Тракийска могила от римската епоха в землището на с. Бояново, Елховска община. In: *Сборник в памет на акад. Д.П. Димитров*. София, 346–358.

Barbier, M. 2016: *L'artisanat de l'os à l'Epoque Gallo-Romaine. De l'osteologie à l'archeologie expérimentale*. Archaeopress Roman Archaeology 16. Oxford.

Bíró, M. 1994: *The Bone Objects of the Roman Collection*. Budapest.

Bospatchieva, M. 2004: A Late Antiquity Pottery Workshop in Philippopolis (Plovdiv, Southern Bulgaria). *AB* VIII:2, 89–104.

Charles, B. 2013: Worked Bone and Ivory. In: W. Aylward (ed.): *Excavations at Zeugma. Conducted by Oxford Archaeology* III. California, 281–294. https://zeugma.packhum.org/ (visited 21/12/2021).

Cholakov, I.D. 2015: Handcraft Production in Heraclea Sintica (On Archaeological Data). In: E. Nankov – L. Vagalinski (eds.): *Heraclea Sintica: From Hellenistic Polis to Roman Civitas (4th c. BC–6th c. AD)*. Proceedings of a Conference at Petrich, Bulgaria, September 19–21, 2013. Papers of the American Research Center in Sofia 2. Plovdiv, 126–143.

Cholakov *et al.* 2016 = Чолаков, И.Д. – Александрова, С. – Русева, В. – Пеева, Н. 2016: *Могилен некропол от римската епоха край град Страланджа, Ямболско.* Българско е-Списание за Археология Suppl. 5. София.

Choyke, A. 2010: The Bone is the Beast: Animal Amulets and Ornaments in Power and Magic. In: D. Campana – P. Crabtree – S.D. de France – J. Lev-Tov – A. Choyke (eds.): *Anthropological Approaches to Zooarchaeology: Colonialism, Complexity, and Animal Transformations*. Oxford – Oakville, 197–209.

Crummy, N. 1981: Bone-working at Colchester. *Britannia* 12, 277–285.

Čisťakova, V. – Kmošek, J. 2022: Metal Finds and Traces of Metallurgical Activities at Yurta-Stroyno. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 155–183.

Čisťakova, V. – Zlámalová Cílová, Z. 2022: Archaeological and Archaeometric Study of the Roman and Late Antique Glass. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 184–244.

Deschler-Erb, S. 1998a: *Römische Beinartefakte aus Augusta Raurica. Rohmaterial, Technologie, Typologie und Chronologie. Text und Tafeln.* Augst.

Deschler-Erb. S. 1998b: *Römische Beinartefakte aus Augusta Raurica. Rohmaterial, Technologie, Typologie und Chronologie*. *Katalog*. Augst.

Falkner, R. 2007: Ceramic Objects. In: A.G. Poulter (ed.): *Nicopolis ad Istrum. A Late Roman and Early Byzantine City. The Finds and the Biological Remains.* Oxford, 88–103.

Frecer, R. 2022: The Terracotta Lamps. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 145–154.

Gál, E. 2005: New data on bird bone artefacts from Hungary and Romania. In: H. Luik – A.M. Choyke – C.E. Batey – L. Lõugas (eds.): *From Hooves to Horns, from Mollusc to Mammoth Manufacture and Use of Bone Artefacts from Prehistoric Times to the Present. Proceedings of the 4th Meeting of the ICAZ Worked Bone Research Group at Tallinn, 26th–31st of August 2003*. Tallinn, 325–338.

Gingras, J. – Aylward, W. 2013: Terracotta Figurines. In: W. Aylward (ed.): *Excavations at Zeugma. Conducted by Oxford Archaeology* III. California, 202–208. https://zeugma.packhum.org/ (visited 21/12/2021).

Gostenčnik, K. 2001: Pre- and Early Roman Bone and Antler Manufacturing in Kärnten, Austria. In: A. Choyke – L. Bartosiewicz (eds.): *Crafting Bone: Skeletal Technologies through Time and Space. Proceedings of the 2nd Meeting of the (ICAZ) Worked Bone Research Group, Budapest, 31 August – 5 September 1999*. BAR International Series 937. Oxford, 383–397.

Harizanov 2019 = Харизанов, А.К. 2019: *Пещи за керамика в днешните български земи през I–VI век.* Дисертации 15. София.

Heřmánková, P. 2022a: The Epigraphic Finds from Yurta-Stroyno in a Regional Context. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 118–132.

Heřmánková, P. 2022b: The Numismatic Finds. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 133–144.

Hristov, I. 2015: *The Preatorium of Sostra. A Study of the Roman Roadside Station of Sostra on Oescus – Philippopolis road (II–III century)*. Sofia.

Hrnčiarik, E. 2016: Roman Bone Artifacts from Iža. In: S. Vitezović (ed.): *Close to the bone: current studies in bone technologies*. Belgrade, 140–145.

Ignatov 1999 = Игнатов, В. 1999: Паметници на орли от Новозагорско. *Археология* 1999:1–2, 58–62.

Ivanov 2021 = Иванов, С.Д. 2021: *Типология и хронология на червенолаковата керамика от производствените комплекси между дунав и балкана (II–III в.). Archaeologia Bulgarica supplement 1A*. София.

Kazarow, G.I. 1938: *Die Denkmäler des thrakischen Reitergottes in Bulgarien*. Budapest.

Oppermann, M. 2006: *Der thrakische Reiter des Ostbalkanraumes im Spannungsfeld von Graecitas, Romanitas und lokalen Traditionen*. Langenweissbach.

Roberts, A. 2007: Worked Bone. In: A.G. Poulter (ed.): *Nicopolis ad Istrum. A Late Roman and Early Byzantine City. The Finds and the Biological Remains*. Oxford, 65–79.

Riha. E. – Stern, W.B. 1982: *Die römischen Löffel aus Augst und Kaiseraugst. Archäologische und metallanalytische Untersuchungen* 5. Augst.

Sultov 1962 = Султов, Б. 1962: Един занаятчийски център от Долна Мизия. *Археология* 1962:4, 30–34.

Sultov, B. 1976: *Ancient Pottery Centres in Moesia Inferior*. Sofia.

St. Clair, A. 2003: *Carving as Craft: Palatine East and the Greco-Roman Bone and Ivory Carving Tradition.* Baltimore.

Tsontchev, D. 1959: *Monuments de la sculpture romaine en Bulgarie méridionale*. Collection Latomus 39. Bruxelles.

Vass, L. – Pánczél, S.P. 2009: To Play or Not to Play? Roman dice from Porolissum in the Wesselényi-Teleki Collection. In: S. Bíró (ed.): *Ex officina…Studia in honorem Dénes Gabler*. Györ, 561–572.

Vladkova 2011 = Владкова, П. 2011: *Античен производствен център при Павликени (Долна Мизия): план на комплекса, периодизация и видове керамични изделия*. Велико Търново.

Vladkova, P. 2012: On the Working of Bone and Horn in Novae. In: L. Vagalinski – N. Sharankov – S. Torbatov (eds.): *The Lower Danube Roman Limes (1st– 6th c. AD)*. Sofia, 211–249.

Adéla Minaříková
Department of Art History
Faculty of Arts, Charles University
Celetná 20, CZ-11000, Prague 1
adel.minarikova@gmail.com

Analysis of the Osteological Material from Yurta-Stroyno

Miriam Nývltová Fišáková

ABSTRACT

The agricultural behaviour of the settlement of Yurta-Stroyno shows that cattle, sheep/goats and domestic pigs were important sources of meat and/or milk for the inhabitants. Most of the bone remains belong to cattle, followed by pigs and small ruminants. In addition to domestic animals, bones of a domestic dog and cat were identified. Birds were not found and from fish only a few vertebrae and unspecified fragments were recognized. The representatives of snails point to the proximity of fields and drier and warmer climate and indicate the aquatic environment of stagnant and muddy waters. Particularly important are findings of the aquatic snails which show that the area of the excavated house was covered by river sediments caused by floods.

Most of the osteological material from Yurta-Stroyno was retrieved from the so-called levelling layer laid north of the excavated house. This layer is a mixture of settlement waste which was accumulated there during the final stage of the house to elevate/drain the area. Exposition of the analysed bones on an open space is confirmed by the traces of dog gnawing on the bones.

The results from Yurta-Stroyno were compared with the osteological analysis from Nicopolis ad Istrum. In the comparison, the basic spectrum of domestic fauna is the same, while the osteological remains from Yurta-Stroyno provided less varied wild fauna. In both cases we can however spot that the cattle breeding and pastoralism was an important part of settlement life in the area of modern Bulgaria during the Roman period.

KEYWORDS

Bulgaria; Roman Thrace; rural settlement; zooarchaeology; animals; bones.

INTRODUCTION

The article deals with the osteological material found within the excavations of the Yurta-Stroyno Archaeological Project (SAP) taking place in 2014–2016 in Yambol District, Bulgaria. Altogether, material collected from ten deposits was evaluated, with seven of them creating a part of the so-called levelling layer[1] placed north of the house on its courtyard, and with three fills of ditches found inside of the house[2] located just below the soil excavated by the looters (see the excavation report: Tušlová – Weissová – Bakardzhiev 2022), here **Tab. 1**.

The levelling layer is up to 40 cm thick, located about 50 cm below the topsoil. It was spread at once in the area north of the house over different excavated trenches, elevating the area of the presumed courtyard of the house. It is characterized by a high amount of diverse and fragmented material compound of the settlement waste: pottery fragments, architectural ceramics, production waste, worked and unworked stones of different sizes and fragments of small finds of various materials. Besides that, it also contains a high amount of osteological material of different state of preservation. The levelling layer mixes material dated to the time span of the 2nd–5th/6th c. AD.

1 i.e. layers SU010; SU012; SU016; SU078; SU084; FA08 and levelling layer I.

2 Ditches SU008, SU021, SU057.

The osteological material from the area north of the house originates at different trenches and at several different stratigraphical units (SU). Nevertheless, all these are parts of one levelling layer. The levelling layer was divided within the excavation based on different squares and sub-units and, consequently, it has many SU numbers. What is important for us is the division into its upper and lower layers in some of the squares as the density of the finds, as well as their fragmentation, differs. Consequently, in the square 100E_110N SE the layer [SU078] was placed above the [SU084], in the square 95E_105N NW the layer [SU012] was placed above the layer [SU016].[3] In square 100E_105N NE the sub-units were put together and processed in bulk as one layer, further marked as Levelling I. The two remaining layers processed here are [SU010] and FA08, both corresponding to the lower levelling layer, i.e. parallel in height with [SU016] and [SU084] (see **Tab. 1**).

The three fills of ditches ([SU008], [SU021], [SU057]) located inside of the house represent the rest of the analysed material. They might have been created in antiquity, but also during material extraction, some time prior to the latest looting. They were all covered by the RT soil [SU001] excavated recently by the treasure hunters. In consequence, they represent the only places inside of the house, which were not affected by the recent looting activities. For a detailed description of the situation and each layer and fill see Tušlová, Weissová and Bakardzhiev 2022.

SU	Trench	Sect.	SU specification	SU position
SU010	90E_105N	NE	levelling layer	lower
SU012	95E_105N	NW	levelling layer	upper
SU016	95E_105N	NW	levelling layer	lower
SU078	100E_110N	SE	levelling layer	upper
SU084	100E_110N	SE	levelling layer	lower
Levelling I	100E_105N	NE	levelling layer	upper + lower
FA08	105E_105N	NW	levelling layer	lower
SU008	100E_100N	SW	ditch inside the house	
SU021	95E_105N	SE	ditch inside the house	
SU057	100E_105N	SE	ditch inside the house	

Tab. 1: Overview of the layers and ditches which were evaluated for the osteological material.

METHODS

The archaeozoological material was determined by commonly used anatomical atlases and manuals (Schmid 1972; Cohen – Serjeantson 1996; Červený – Komárek – Štěrba 1999; Bocheński – Tomek 2000; Komárek – Štěrba – Fejfar 2001) and by the comparison with the osteological collection deposited at the Institute of Physiology, Faculty of Medicine, Masaryk University, Brno. Bones of individual animals were distinguished and determined on the bases of the following works: the sheep and goats: W. Prummel – H. J. Frische (1986); S. Payne (1973); P. Haelstead – P. Collins (1995; 2002); and B. J. Adams – P. J. Crabtree (2008); the domestic and

3 While SU078 = SU012 and SU084 = SU016.

wild pigs: G. Payne – G. Bulla (1988); the cattle sex was identified and described according to P. Armitage (1982). Where the condition of skeletal remains survived, osteometric values were measured according to von Driesch (1976) methodology. The height at withers of the animal was calculated based on the instructions of M. Teichert (1969) and A. von den Driesch – J. Boessneck (1974).

To determine the age of the animals, current methods based on the development of epiphysis (Reitz – Wing 2008) and tooth eruption and abrasion (Payne 1973; Grant 1982) were used. The type of meat based on found bones was determined on the basis of the works of A. Trawiński (1948); M. Sobociński (1981; 1991); V. Páral – Z. Mechurová – M. Riedlová (1995); and L. Steinhauser *et al.* (2000). However, it should be borne in mind that these are modern criteria, their use for the Roman period conditions is only indicative. Basic quantification methods used in the article are based on standard methodologies, which are presented in the works of R. Kyselý (2004) and E. Reitz – E. Wing (2008). The complementary method of assessment based on the number of whole bone fragments is quantification of fragment mass analysis; bones were weighed on laboratory scales to two tenths of a gram.

The method of quantification of NISP (number of identified bone fragments) was calculated for individual fragments. In the case that it was clear that the failing epiphysis belongs to the diaphysis, then both fragments were counted as one bone (MNE – minimum number of elements). MNI values (minimum number of individuals) were determined based on the number of anatomical elements and their parts, taking into account the determination of the side in combination with fragmentation and age of each species. The zoological and anatomical terminology used in the work is based on current taxonomic nomenclature and recommendations (Gentry – Clutton-Brock – Groves 2004; *Nomina Anatomica Veterinaria* 2012).

THE OSTEOLOGICAL ANALYSIS

Below is a brief overview of identified fauna and the size categories from all contexts together. A more detailed breakdown is given in **Tab. 2**.

The list of the detected species
Mammals species
Bos taurus
Sus domestica
Ovis/Capra
Canis familiaris
Felis domestica
Large mammals (cattle or horse size)
Medium size mammals (pig size)
Small mammals (sheep or goat size)

Fishes
Pisces sp. Indet.

Gastropoda
Cepaea vindobonensis
Pomatia elegans
Cyraulus albus

Archaeological context				Determined animal species												
SU	Trench	Sect.	SU specification	Cattle	Pigs	Sheep/Goats	Cat	Dog	Pisces sp. Indet.	*Cepaea vindobonensis*	*Pomatia elegans*	*Cyraulus albus*	Large mammals	Medium size mammals	Small mammals	Unidentified	Total amount
SU078	100E_110N	SE	levelling layer	96	27	8							42	50	20	97	**340**
SU084	100E_110N	SE	levelling layer	14	5	12							22	8		63	**124**
Levelling I	100E_105N	NE	levelling layer	14	3	4							18	26	18	53	**136**
SU012	95E_105N	NW	levelling layer	4	2											8	**14**
SU016	95E_105N	NW	levelling layer	17	14	4							33	56		401	**525**
SU010	90E_105N	NE	levelling layer	14	23	3							83	31	11	574	**739**
FA08	105E_105N	NW	levelling layer	4	5	2							3	2		8	**24**
SU008	100E_100N	SW	fill, inside of the house	21	11	12	1		2	7						78	**132**
SU021	95E_105N	SE	fill, inside of the house	4		0	1	2								2	**9**
SU057	100E_105N	SE	fill, inside of the house	2	4				2		6	9	11			79	**113**
Total amount				**190**	**94**	**45**	**2**	**2**	**4**				**212**	**173**	**49**	**1363**	**2134**

Tab. 2: Detailed overview of the fauna found in each of the examined contexts with amount of the identified bones.

The total number of the bones and bone fragments collected within the ten contexts was 2156 pieces with a total weight of 8.7 kg (**Tab. 3**). Most of the material was very fragmented; the bone fragments range from 1.5 cm to 10 cm. The collection of osteological remains from Yurta-Stroyno provided a common range of mammalian domestic species. It was represented by the cattle (*Bos taurus*), the domestic pig (*Sus domestica*), the domestic sheep (*Ovis aries*), the domestic goat (*Capra hircus*), the domestic dog (*Canis familiaris*) the domestic cat (*Felis domestica*), and by size categories of a large mammal (cattle or horse size), a medium sized mammal (pig size), and a small mammal (sheep or goat size). Wildlife animals are represented by remains of unidentified fishes and species grastropods *Pomatia elegans, Cepaea vindobonensis* and fluvial gastropod *Cyraulus albus*. Most of the bone remains come from the cattle, followed by domestic pig and by size categories of medium-size and large mammals. A much lesser number of finds is of sheep/goats, medium-sized mammals, dogs and cats (**Tab. 2**). On the basis of NISP, MNI and MNE the most represented groups were cattle and large mammal categories, followed by pigs and medium size mammals with even lesser number of small ruminants (sheep/goats) and size categories of small mammals and snails; other species are in minority (**Tab. 3**). From the point of view of the weight categories of the bones, the most abundant is the cattle together with the large mammal size category corresponding to the size of the cattle or horse. The second abundant species is the pig and the size category of a medium-sized mammal

(the size of a pig). The third most abundant species is the sheep/goat in this respect, even in connection with the size category of a small mammal, which corresponds to the sheep/goat size. Many bones are in poor condition which likely relates to the post-deposition processes; ribs and vertebrates, as well as evidence of severely burned bones, are completely missing in the evaluated assemblage.

Species	NISP	MNI	MNE
Cattle	190	5	182
Domestic pig	94	4	74
Sheep/goats	45	4	32
Dog	2	1	2
Domestic cat	2	1	2
Pisces sp. Indet.	4	2	4
Pomatia elegans	6	6	6
Cepaea vindobonensis	7	7	7
Cyraulus albus	9	9	9
Large mammals	212		212
Medium size mammals	173		173
Small mammals	49		49
Totally determined	793		752
Undeterminable	1363		
Total (pcs.)	2156	39	1322
Weight (g.)	8700		

Tab. 3: The overview of the following values: number of identified bone fragments (NISP); minimum number of individuals (MNI); minimum number of elements (MNE).

THE LEVELLING LAYER

In the upper layer [SU078] in the square 100E_110N SE, and in the upper layer [SU012] in the square 95E_105N NW, we found the most abundant remains of an ox and the size category of the medium sized mammal (pig size), which are followed by domestic pigs and the size category of the large mammal (horse size); less represented is sheep/goats and the size category of a small mammal; majority of the material belongs to unidentified bone fragments. A similar situation was detected in the lower layer [SU084] in the square 100E_110N SE, and the lower layer [SU016] in the square 95E_105N NW. Both contain the most remnants of the large mammal and cattle size category, followed by sheep/goats, pigs, and the midsize mammal category. The unidentified bones are as well the most represented. The difference between the upper and the lower stratigraphically positioned layers is the higher fragmentation of the bones connected with the upper layers.

In addition to these, the thick levelling layer I, which was not divided into the upper and lower sub-units, is composed predominantly of undeterminable bones and of bones of all

size categories, with the best represented medium size mammals, and with bones of cattle, domestic sheep/goats and pigs in small amounts.

In general, the animal bones uncovered from the levelling layer feature low variability of the identified animals and high degree of fragmentation (fragments of about 1.5–3 cm); they are also represented mainly by the autopodia bones. According to these characteristics, the bones seem to originate from the kitchen waste compound of cattle (163 frgs.), pigs (79 frgs.), and sheep/goats (33 frgs.) (**Tab. 2**).

MATERIAL FROM THE EXCAVATED HOUSE

The three ditches inside of the house, [SU008] in square 100E_100N, [SU057] in square 100E_105N and [SU021] in square 95E_100N, yielded the richest variability of the bone finds. Together with the domestic mammals, including remains of a domestic cat and a domestic dog, also unspecified fish and water snails were found (**Tab. 2**). The ditch most abundant in bones, [SU008], combines remains of the size category of the medium, large, and small mammal, followed by cattle and sheep/goats and pigs. These characteristics make its bone composition very similar to the one in the levelling layer.

AGE STRUCTURE OF INDIVIDUAL ANIMAL SPECIES

Within the selected contexts, the adult animals (i.e. older than 3.5 years) predominate in all represented species. Only among the pig remains, one individual died at the age of 6–12 months. A small number of bones from young animals shows only occasional consumption of piglets. The domestic dog and the domestic cat also died in adulthood.

PATHOLOGY

The only detected pathological phenomenon (0.2% of the bone), which occur here is exostosis on the finger member (*phalanx* I and II) of domesticated ox, which is formed either on exertion stresses (carrying heavy loads) or during bad housing (Lasota – Moskalewska 1997, 32–36). A small proportion of pathologies might indicate that the animals were not used for work and were kept in suitable conditions (grazing).

OSTEOMETRY

If the conditions of bone maintenance allowed it, the height at the withers was measured and calculated. These conditions were however met only for one metatarsal bone of cattle. The detected height at the withers is 122.5 cm. This corresponds to a common size of cattle during the Roman period (Matolsci 1970; Bökönyi 1974; Clutton-Brock 1999; Beech 2007).

TAPHONOMY

Kitchen and butcher interventions were found on 3% of the analysed bone fragments, they were identified on tendon attachment and most of the meat parts of the bodies of animals. In

two cases, these were at the distal ends of the bones and in three cases on the finger cells. Dog gnawing was noticed on 11% of the bone fragments, indicating domestic dog presence and its access to the settlement waste. In nine cases the gnawing was located on the bones of cattle, in seven cases on pig bones, in fifteen cases on sheep/goats bones; another five affected bones were of the size category of large mammal and three of the size category of medium-sized mammal. The gnawing marks were mostly on parts of the tendon. Burned bones have not been identified in any context.

There are many primarily fragmented bones that can be categorized only into the size categories (small, medium size and large mammals) or are unidentifiable (67.6% of the total number). This means that the bones were fragmented during the meat processing or shortly after, as no traces of weathering have been found which would show on the bones if exposed on surface for a longer period.

Shells of the *Cyraulus albus* water snail were identified in the ditch [SU057], located inside of the house. This ditch is the only one excavated which is associated with destruction material, including a high amount of charcoal. The presence of the snail shells in the soil indicates the material in the ditch was flooded by the waters of the Dereorman River and confirms the assumption the river represented a threat for the house inhabitants, possibly causing flooding.

As for the size of the bones related to their distribution within the individual contexts, most fragmentary bones (fragment size 1.5–10 cm) occurred in the ditches [SU057] and [SU008], and in the layer [SU078], which is the upper sub-unit of the levelling layer. Regarding the last layer, this size analysis well confirms what was already noted during the excavation, i.e. that the more bulky material, including bigger fragments of bones, are concentrated at the bottom of the levelling layer.

REPRESENTED PARTS OF THE SKELETON

The majority of the bones found at the site corresponds to the kitchen waste (e.g. jaws, teeth, fragments of the skull and the apical part of the limbs), which are bones with so-called low-grade meat of type B (Uerpmann 1973, 310–311; Páral – Měchurová – Riedlová 1995, 418–419). The bones with quality A type meat (i.e. the highest quality such as the proximal ends of the femur and humerus, blades, vertebrae and proximal parts of the ribs) are missing, as well as the bones with lower grade AB meat as the distal end of femur and thigh bone and middle of the ribs. In the size categories, there are more represented parts with the highest quality meat (type A).

The cattle were represented by teeth, pelvis fragments, metacarpus and finger cells; sheep/goats were represented by teeth, jaw fragments, long bones and finger cells; pigs by internal teeth fragments, fragments of spindle bones and pelvis fragments. The dog was identified by teeth fragments and by a distal part of the tibia the domestic cat was also represented by teeth and fractures of the femur. Only shells were found from molluscs.

COMPARISON

To compare the osteological material from Yurta-Stroyno with another Roman period settlement in Bulgaria, the material was consulted with the one published assemblage from Nicopolis ad Istrum, a Roman to Late Antique town in Moesia Inferior, located about 60 km south from the Danube River. The extended chronological span of the settlement of Nicopolis

ad Istrum is similar to Yurta-Stroyno, covering period from the beginning of the 2nd c. till 6th c. AD (Poulter 2007).

The osteological material from Nicopolis ad Istrum shows different trends than Yurta-Stroyno as it is much more variable and comes from prime contexts (c.f. Beech 2007; Boev – Beech 2007; Beech – Irving 2007). Most remains of domestic animal species and the number of individuals come from domestic pigs followed by sheep/goats and the cattle. This trend was dominated by the whole Roman period with the amount of cattle decreasing from the early to late periods (Clutton-Brock 1999).

In addition to these common species, the remains of a domestic dog (*Canis familiaris*), domestic cats (*Felis domestica*), a donkey (*Equus asinus*) and a camel (*Camelus* sp.) were also found there. There is also wild fauna, red-deer (*Cervus elaphus*), brown bear (*Ursus arctos*), wild boar (*Sus scrofa*), badger (*Meles meles*), red fox (*Vulpes vulpes*), beaver (*Castor fiber*), mustelids (*Mustelidae* sp. indet.), hare (*Lepus europaeus*) and tortoise (*Testudo greaca*).

In Nicopolis ad Istrum was also found large number of fish remains, both freshwater and saltwater fish (carp, pike, salmon, sturgeon, flounder, mackerel, etc.), in total 21 fish species have been identified (Beech – Irving 2007). Further, 42 bird species have been identified from bones. Most of the remains belong to domestic species (hen, goose, and duck). Eleven orders of the modern Bulgarian avifauna were present as *Anseriforrnes, Columbiformes, Cuptimulgiformes, Charadriiforrnes, Falconiforrne, Galliformes, Gruiformes, Passeriformes, Podicipediformes, Pelecaniformes* and *Strigiforrnes* (Boev – Beech 2007). Regarding malacofauna, representatives of terrestrial, freshwater and sea snails were found. Terrestrial snails point to a dry and warm climate and are commonly found today. Aquatic species came to the site probably with sand used for mortar in the construction of houses. Marine gastropods apparently came with imported goods from the Black Sea coast (Beech 2007).

There is also a rich representation of various types of bone pathologies such as fractures, infections, developmental abnormalities, and malnutrition traits. In terms of osteometry and height at the withers of all the described animals, there is a clear trend towards increasing height at the withers towards Roman times (Beech 2007).

DISCUSSION AND CONCLUSION

The amount of osteological material found at the settlement of Yurta-Stroyno is very fragmented which results in the majority of the bones either not being identified or being attributed only to the size categories of large, medium size and small mammals (**Tab. 2**). From the identified bones, the most represented domestic animals were cattle, pigs and sheep/goats, which seems to create the basis of the meat-based cuisine of the settlement inhabitants. The composition of the processed material, including mostly bones with so-called low-grade meat of type B (e.g. jaws, teeth, fragments of the skull and the apical part of the limbs), points to its origin in the kitchen waste. The bones were very fragmented already after the primary processing, shortly exposed on the surface as dog gnawing was marked on some of the analysed samples, however, the bones were not weathered, so they must have been buried/covered in short period of time. The small proportion of pathologies of the most represented animals might suggest these animals were not used for hard work and might rather be kept for grazing – for milk and for meat. However, for confirmation of such a statement, more bones of better preservation would be necessary.

It was possible to calculate the withering height of 122.5 cm only for one individual cattle, the dimensions correspond to the height of the cattle during the Roman period (Bökönyi 1974;

Clutton-Brock 1999; Spassov *et al.* 2018). As far as butcher interventions are concerned, only sloping interventions have been recorded at the locations of the proximal epiphyses of long bones and blades that are located at the butcher's cutting sides. The long bones and metapodials have short horizontal cuts corresponding to the tendon. The bones lack interventions that would mean the division of the bodies of slaughtered animals.

The fragmented state of the bones seems to be related to their secondary use for elevation or drainage of the area north of the house, where they were placed over the courtyard together with another anthropogenic material and soil. The same preference might be seen there as for the rest of the material – bigger bones were creating the lower base of the levelling layer, while smaller/more fragmented pieces were placed on its upper part.

Only a small part of the settlement of Yurta-Stroyno was excavated, consequently all the analysed material origins in one area of the house which seems to have a specific history related to its proximity of the Dereorman River. The river intervention to the investigated area was hinted by the presence of the water gastropods in the ditch [SU057] located inside of the excavated house, confirming part of the area along the river[4] was mixed with flood sediments.

Extending the excavated area inland could bring more variable osteological material, as the wild fauna is almost missing in the material as it is represented only by a snail.

In addition to the domestic animals for meat and/or milk, also domestic dogs and cats were found, appreciated for centuries for killing rodents. Birds were not identified at all, and from fish only a few vertebrae and undetermined fragments were noted. The already mentioned representatives of gastropods point to the proximity of fields and a drier and warmer climate; the water representative points to the aquatic environment of stagnant and muddy water. The shells might have reached the settlement along with the sand used for cement – as in the case of Nicopolis ad Istrum –, although the use of cement in Yurta-Stroyno seems to be limited and we may rather connect them with the nearby river.

Comparing the material to the one from Nicopolis ad Istrum, the basic spectrum of domestic fauna is the same, composed of cattle, pigs, and sheep/goats. However, at Nicopolis ad Istrum there could be found a much wider representation of species, including exotic ones. The reasons for that might be various. Nicopolis ad Istrum was a much bigger city with a large number of inhabitants (compared to Yurta-Stroyno), which demanded a greater supply of more variable foodstuffs. Also, it is better connected with the other Roman Provinces *via* the nearby Danube River, also rich in fish. No less important are the prime contexts composed of kitchen and butcher waste which were excavated there, as well as the long-term investigation covering more variable areas of the city.

Despite of its limited variability, the composition of the identified fauna from Yurta-Stroyno does not otherwise deviate from the spectrum of fauna found at other archaeological sites of the Roman period in the area of Roman Thrace (Bökönyi 1974; Clutton-Brock 1999; Spassov *et al.* 2018).

4 or at least the soil inside of the ditch.

ABBREVIATIONS

BAR = British Archaeological Reports
JASc = Journal of Archaeological Science
SH = Studia Hercynia

BIBLIOGRAPHY

Adams, B.J. – Crabtree, P. J. 2008: *Comparative Skeletal Anatomy. A Photographic Atlas for Medical Examiners, Coroners, Forensic Anthropologists, and Archaeologists*. Totowa.

Armitage, P. 1982: A System for Ageing and Sexing the Horn Cores of Cattle from British Post-medieval sites (17th to early l8th century) with Special Reference to Unimproved British Longhorn Cattle. In: B. Wilson – C. Grigson – S. Payne (eds.): *Ageing and Sexing Animal Bones from Archaeological Sites.* BAR British Series 109. Oxford, 37–54.

Beech, J.M. 2007: The Large Mammal and Reptile Bones. In: Poulter ed. 2007, 154–197.

Beech, J.M. – Irving, B. 2007: The Fish Remains. In: Poulter ed. 2007, 224–241.

Bocheński, Z.M. – Tomek, T. 2000: Identification of Bones of Galliform Hybrids. *JASc* 27, 691–698.

Boev, Z. – Beech, J.M. 2007: The Bird Bones. In: Poulter ed. 2007, 242–253.

Bökönyi, S. 1974: *History of Domestic Mammals in Central and Eastern Europe*. Budapest.

Clutton-Brock, J. 1999: *A Natural History of Domesticated Mammals*.[2] Cambridge.

von den Driesch, A. – Boessneck, J. 1974: *Kritische Anmerkungen zur Widerristhohenberechnung aus Langenmaen vor- und frühgeschichtlicher Tierknochen*. *Säugetierkundliche Mitteilungen* 4. Stuttgart, 325–348.

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

Cohen, A. – Serjeantson, D. 1996: *Bird Bones from Archaeological Sites*. London.

Červený, Č. – Komárek, V. – Štěrba, O. 1999: *Koldův atlas veterinární anatomie*. Praha.

Grant, A. 1982: The Use of Tooth Wear as a Guide to the Age of Domestic Ungulates. In: B. Wilson – C. Grigson – S. Payne (eds.): *Ageing and Sexing Animal Bones from Archaeological Sites.* BAR British Series 109. Oxford, 91–108.

Gentry, A. – Clutton-Brock, J. – Groves, C.P. 2004: The Naming of Wild Animal Species and their Domestic Derivatives. *JASc* 31, 645–651.

Haelstead, P. – Collins, P. 1995: *Sheffield Animal Bone Tutorial: Taxonomic Identification of the Principal Limb Bones of Common European Farmyard Animals and Deer: a Multimedia Tutorial.* Glasgow.

Haelstead, P. – Collins, P. 2002: Sorting the Sheep from Goats: Morphological Distinctions between the Mandibles and Mandibular Teeth of Adult Ovis and Capra. *JASc* 29, 545–553.

Komárek, V. – Štěrba, O. – Fejfar, 0. 2001: *Anatomie a embryologie volně žijících přežvýkavců*. Praha.

Kyselý, R. 2004: Kvantifikační metody v archeozoologii. *Archeologické rozhledy* LVI, 279–296.

Lasota-Moskalewska, A. 1997: *Podstawy archeozoologii. Szczątki ssaków*. Poznań.

Matolsci, J. 1970: Historische Erforschung del Korpergrosse des Rindes auf Grund von ungarischem Knochenmaterial. *Zeitschrift für Tierzüchtung und Züchtungsbiologie* 87:2, 89–137.

Nomina Anatomica Veterinaria 2012: Prepared by the International Committee on Veterinary Gross Anatomical Nomenclature (I.C.V.G.A.N.).[5] Knoxville – Hannover – Columbia – MO – Ghent – Sapporo.

Páral, V. – Měchurová, Z. – Riedlová, M. 1995: Zvířecí kosti ze zaniklé středověké vsi Konůvky (okr. Vyškov). *Archaeologia historica* 20, 417–425.

Payne, S. 1973: Kill-off Patterns in Sheep and Goats: The Mandibles from Aşvan Kale. *Anatolian Studies* 23, 281–303.

Payne, S. – Bulla, G. 1988: Components of Variation in Measurements of Pig Bones and Teeth, and the Use of Measurements to Distinguish Wild from Domestic Pig Remains. *Archeozoologica* 2, 27–65.

Poulter, A.G. (ed.) 2007: *Nicopolis ad Istrum. A Late Roman and Early Byzantine City. The Finds and the Biological Remains*. Oxford.

Poulter, A.G. 2007: Introduction. In: Poulter ed. 2007, 1–14.

Prummel, W. – Frisch, H.J. 1986: A Guide for the Distinction of Species, Sex and Body Side in Bones of Sheep and Goat. *JASc* 13, 567–577.

Reitz, E. – Wing, E. 2008: *Zooarchaeology*. Cambridge.

Schmid, E. 1972: *Tierknochenatlas (Atlas of Animal Bones)*. Amsterdam – London – New York, 1972.

Sobociński, M. 1981: Pożywienie mięsne mieszkańców osady otwartej kultury łużyckiej i wczesnośredniowiecznej oraz grodu wcześnośredniowiecznego w miejscowości Węgry, woj. gdańskie. Roczniki Akademii Rolniczej w Poznaniu 131. *Archeozoologia* 7, 95–103.

Sobociński, M. 1991: Pożywienie mięsne mieszkańców klasztoru Benedyktynów w Lubinie, woj. leszczyńskie. Roczniki Akademii Rolniczej w Poznaniu 221. *Archeozoologia* 15, 67–72.

Spassov *et al.* 2018 = Spassov, N. – Geraads, D. – Hristova, L. – Markov, G. 2018: The Late Miocene Mammal Faunas of the Republic of Macedonia (FYROM). *Palaeontographica A Band* 311: 1–6, 1–85.

Steinhauser, L. *et al.* 2000: Produkce masa. Tišnov.

Teichert, M. 1969: Osteometrische Untersuchungen zur Berechnung der Widerristhöhe bei vor- und frühgeschichtlichen Schweinen. *Kühn-Archiv Halle* 83, 237–292.

Trawiński, A. 1948: *Mięsoznawstwo.* Warszawa.

Tušlová, P. – Weissová, B. – Bakardzhiev, S. 2022: The Final Excavation Report. In: P. Tušlová – B. Weissová – S. Bakardzhiev (eds.): *The Yurta-Stroyno Archaeological Project. Studies on the Roman Rural Settlement in Thrace*. SH Monographs 2. Praha, 24–52.

Uerpmann, H.P. 1973: Animal Bones Finds and Economic Archaeology: A Critical Study of "Osteoarchaeological Method". *World Archaeology* 4:3, 307–322.

Miriam Nývltová Fišáková
Department of Physiology
Faculty of Medicine, Masaryk University
Kamenice 753/5, CZ-62500, Brno
miriam.nyvltova@med.muni.cz

Concluding Remarks on the Results of the Yurta-Stroyno Archaeological Project

One of the biggest concerns of the Yurta-Stroyno Archaeological Project was setting up the foundation date and chronology of the settlement to contribute to the discussion on the habitation of the area during the Roman period. Due to the state of the settlement preservation, we could not base our conclusions on well stratified contexts from the settlement itself, and we had to search for parallels at other archaeological sites in the Balkan peninsula or even further afield.

All the material studies including architectural components, pottery, glass, metals, terracotta, worked bones, coins and other numismatic and epigraphic finds suggest the main peak of the habitation dating to the 2nd–3rd and/or 4th c. AD. There are several single finds which are, or which could be, dated to the 1st c. BC – 1st c. AD such as the coin of Augustus minted in 27–23 BC. The number of these finds is however very small, and they do not attest to the existence of a settlement in the area of Yurta at that time.

Better attested is the material dated to the Late Antiquity (4th/5th–6th c. AD) including several pottery fragments and glass and metal objects of daily use, which are regularly scattered along the whole investigated area. It is necessary to say, these are present in the dozens of finds as opposed to thousands of varying objects from an earlier date. It seems the settlement was somehow used during this period but for a short time and/or with much smaller intensity.

Even fewer finds are dated to the Medieval period (ca. 11th–13th c. AD). It might be of interest that these objects are for personal decoration such as fragments of several glass bracelets or a bronze pendant which normally belong to accidental losses, dropped by their owners. Perhaps these finds relate to the vicinity of a road, such as the one cut on the slope of Bakadzhik Hill on the south of the settlement.

The settlement itself seems to have a rural-industrial character. The attested fauna includes mainly cattle, sheep/goats and pigs used for meat and/or milk; hunted wild animals were not identified at all. The milling equipment preserved in broken pieces was used for the processing of different cereals. Based on the palaeoecological data, the area along the middle stream of the Tundzha River was by the Roman period dedicated to grain cultivation and stock breeding, with few woodlands. With no or little forest, the hunting possibilities would have been limited or out of the question for the inhabitants, which seems to be reflected in the composition of the osteological finds.

Regarding the industrial part, two workshops were identified towards the middle-upper part of the settlement's nucleus. One of them is a glass workshop using blowpipes for vessel production, working with raw glass but perhaps also remelting broken glass fragments (cullet) for the production of new items. The second workshop is an iron working area, attested by fragments of a smelting furnace(s), as well as pieces of smelting and forging slags pointing not only to primary iron ore processing, but also to the finishing of individual products made on the spot.

The character of the inhabitants is difficult to specify any closer. The few inscriptions which were found are in the Greek alphabet. Some seem to be made on the settlement, others might have travelled with the pottery or the object on which they are attested. Consequently, we may only confirm that Greek was not alien to the inhabitants, as it was however common elsewhere in Roman Thrace. Alongside Roman style pottery, the inhabitants still used the handmade pottery of the Thracian tradition and forms made locally, which might suggest a local origin of at least some of them. Additionally, there are few items, especially among the

bronze adornments, which might be connected with a military environment. It is interesting that these are dated quite precisely from the mid-2nd till mid-3rd c. AD; few might be also connected to cavalry. It cannot be proven if they relate to the veterans of the auxiliary unit cohort II Lucensium (equitata) stationed in Kabyle since 135/136 AD. However, besides the military diploma and inscriptions attesting to the Roman family name *Avilius* found both in Kabyle and Yurta-Stroyno, these finds build up the evidence related to a military / ex-military material culture present at the settlement and to a possible relation with the military camp at Kabyle.

The pottery studies (volume II) bring more information about the economic connections of the settlement. Regarding the studies in the current volume, we need to mention the discus fragment with a bust of Athena and the vine and ray decoration on terracotta lamp shoulders both of the type Broneer XXVII which seem to be produced in Greek workshops at the turn of the 3rd c. / 4th c. AD; in the case of the discus with Athena it likely originated directly in Athens. Several glass fragments are likely of eastern provenance. These include the rim and body fragments of beaker/bowl with tubular ridge (Near East?), the body fragments with a fine leaf ornament, with a honeycomb decoration (Near East?) and with the facet decoration. The latter might be produced on the norther Black Sea coast or at the Near East in Dura Europos. There is also a bronze object which is very untypical for the Roman environment. It is the pendant in the shape of an axe head which is typically connected with the Goths and their cultural milieu, in our area likely connected to accidental loss in a period of the Gothic rides.

Regarding the hinterland of Yurta-Stroyno, in order to give us a much closer context, we may compare stylistically some finds from the settlement with the burial mound near Boyanovo. The two bone distaffs found in Yurta-Stroyno seem to be from the same type (and production centre?) as the distaffs found in grave 8 of the Boyanovo mound dated to the end of the 1st and 2nd c. AD. Further in the region, the terracotta wing of an eagle might find parallels in the pottery workshop in Philippopolis (Thrace) active in the 3rd c. – early 4th c. AD, and the terracotta wheel of a horse rider figurine, as well as some of the terracotta lamps, at the pottery workshop in Butovo (Moesia Inferior), recently redated to the end of the 2nd and mid-3rd c. AD. Besides a stylistic comparison, some of the stones found at the settlement were analysed and compared with the ancient Kamenets Quarry situated about 8 km north-east of Yurta-Stroyno. The analysis suggests that the quarry might have been the source of the foundations of the houses at the settlement as well as of some of the architectural components (capitals).

The architecture of the settlement could be investigated through the excavated house, but as well through the walls found *in situ* uncovered by the treasure hunters. The foundations made of the local stones were oriented almost in an east-west – north-south direction with about 10° inclination of the walls. The rest of the settlement seems to follow the same pattern and as such created a regular grid. The upper structure was made of a half-timbered adobe construction covered by a gabled roof of Laconian rooftiles. Based on the excavated house's outer dimensions (ca. 6×24–25 m), it probably had only one floor and an attic. The upper construction was very likely covered by a white-red plaster, protecting the walls made of the organic material. In its disposition, the house resembles the so-called long-/strip-houses combining living quarters at the rear part of the house and industrial/commercial areas facing the street.

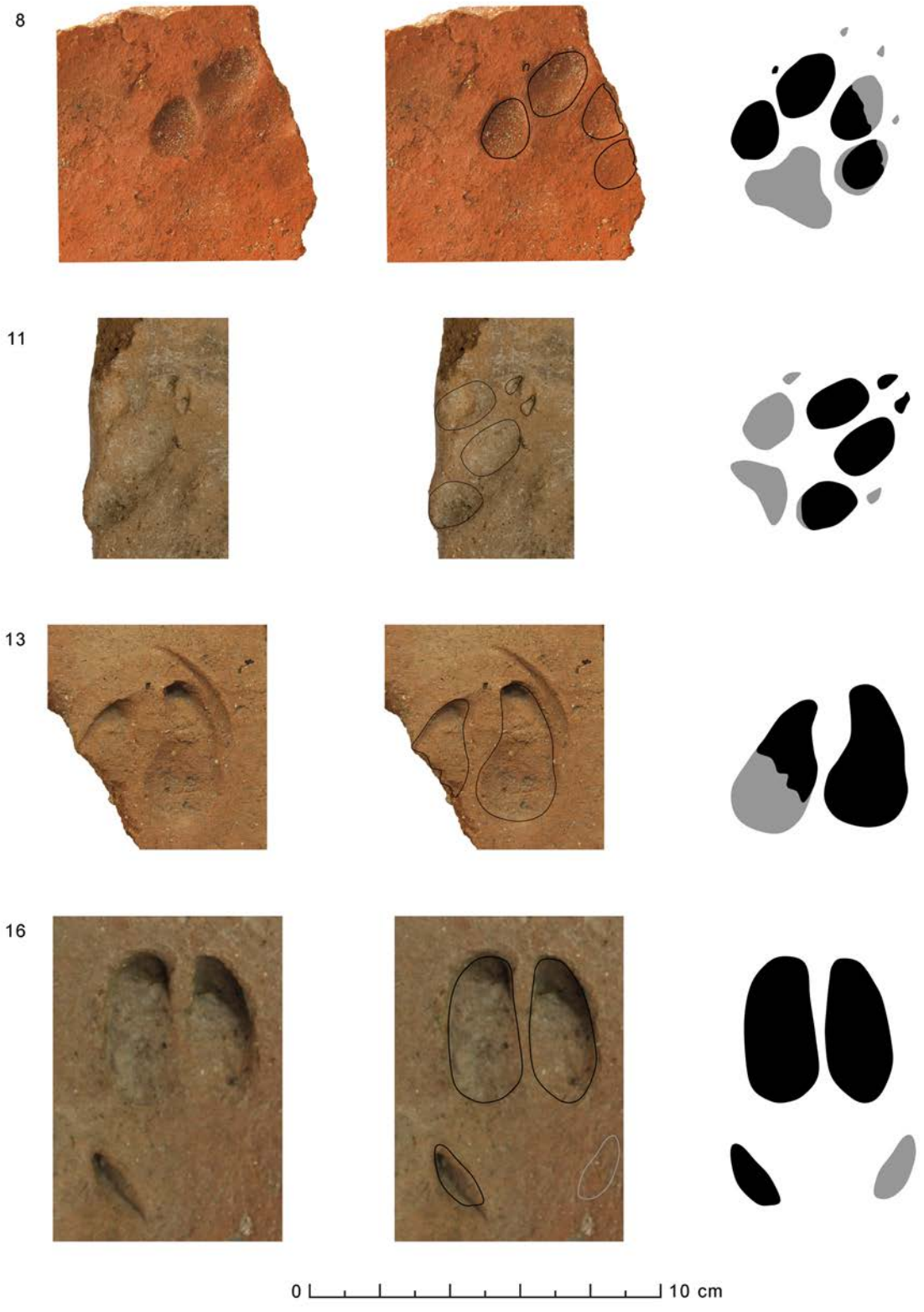
The surface survey facilitated by the work of the looters provided a comparison from the other areas of the settlement's nucleus, which seems to be built using the same architectural components. This leaves us wondering how many construction phases the settlement might have had, as the excavated house was built using material (milling stones, reliefs, clay with pottery for binding) from an earlier Roman habitation, however, of similar chronology as the final house.

The material culture gives us an insight into the lives of the Yurta-Stroyno inhabitants, which, despite their dedication to agriculture, cattle breeding, and crafts possessed also luxurious items imported from further afield (e.g. the few glass vessels and terracotta lamps) or perhaps produced locally, but not available to everyone (e.g. the bronze leaf-shaped vessel attachment from a bucket or cauldron). We may also speculate that there might have been smaller-sized *thermae* somewhere at the settlement as attested by the architectural components of *hypocastum* and perhaps also some communal baking facilities as suggested by the fragment of a segmented mill.

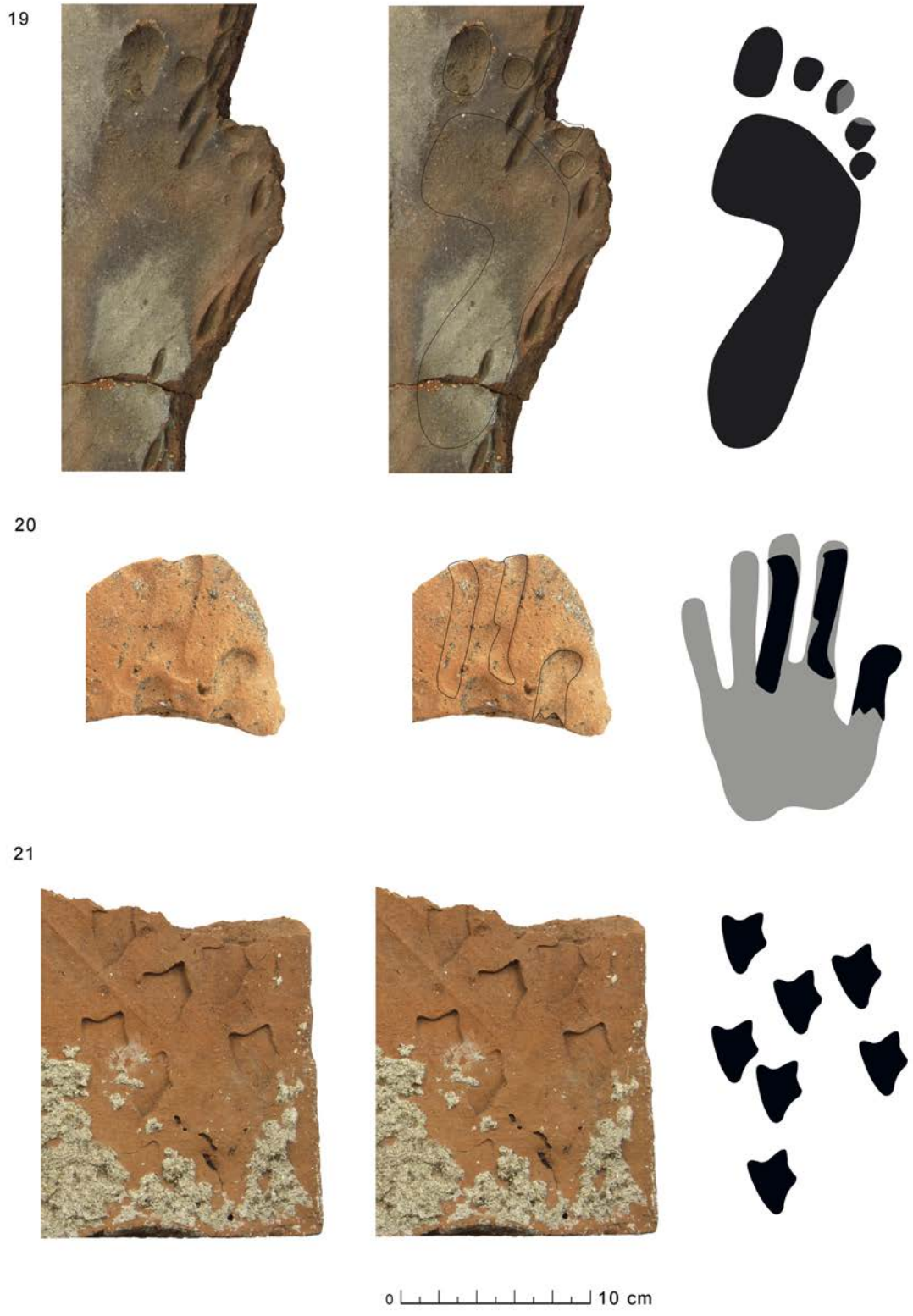
In this final paragraph of the book, we would like to add a short note on the investigation of a settlement disturbed by treasure hunters. In some ways fortunately, the interests of treasure hunters and of archaeologists differ and while the looters aim to find the shiniest objects, presuming they are worth most on the black market, archaeologists read between the lines and prize much more objects of daily life of the common settlement inhabitants which might look uninteresting at the first sight. In the case of Yurta-Stroyno, among the most precious finds in terms of importance, but not value, are the identification of the glass workshop and of the iron smelting and smithing facilities. The remains of these production activities are by no means interesting for the treasure hunters, while archaeologists immediately see the potential of further studies and analyses, which provide abundant information on the provenance of the raw materials, technologies used, or the final products, which thus enable a deeper analysis of the settlement, its inhabitants, and their economic and cultural ties. This realisation gives us hope that each archaeological site, even a heavily disturbed one, has the potential for investigation and may significantly contribute to regional and supra-regional studies.

The editors
Petra Tušlová, Barbora Weissová & Stefan Bakardzhiev

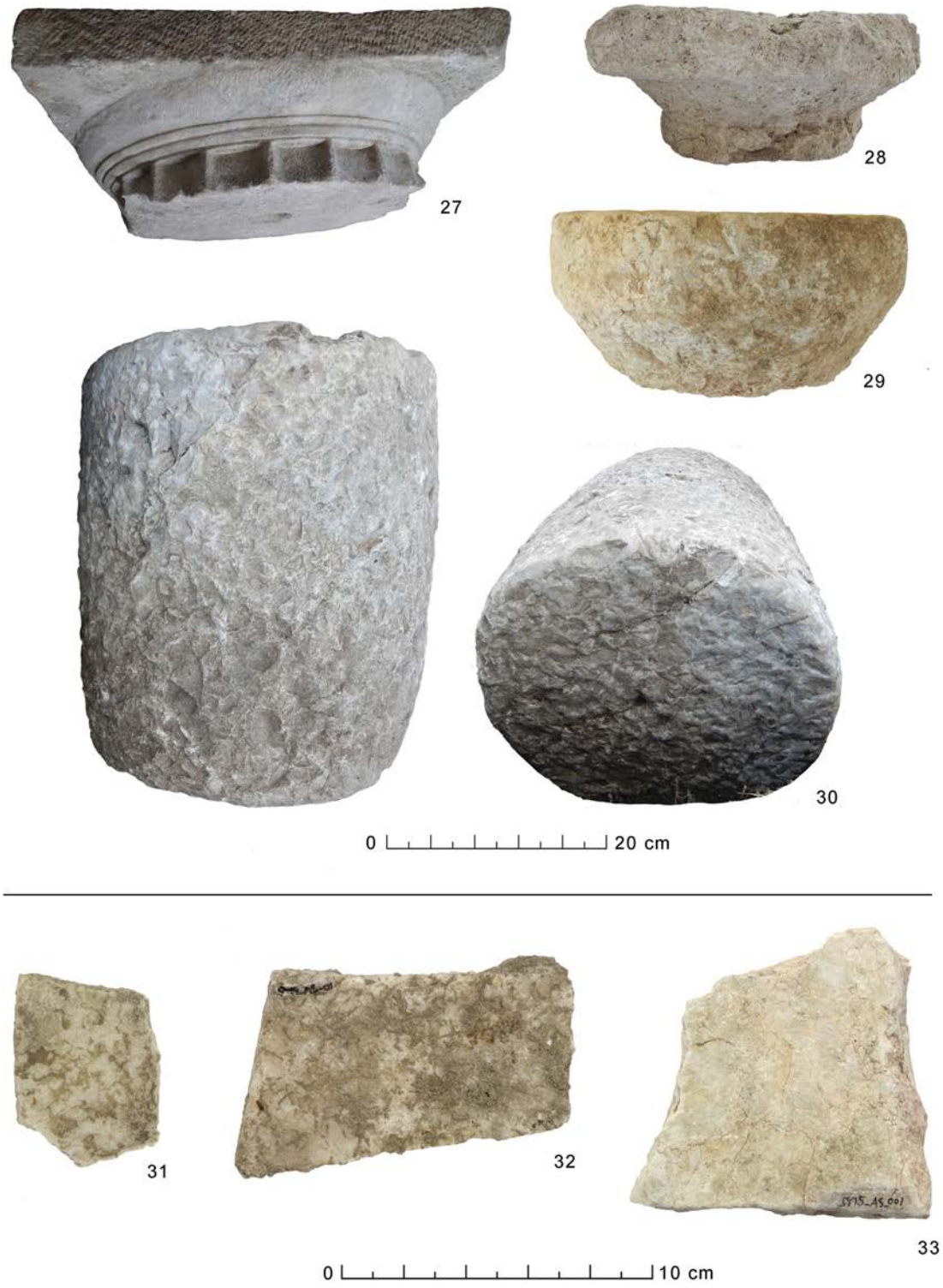
PLATES



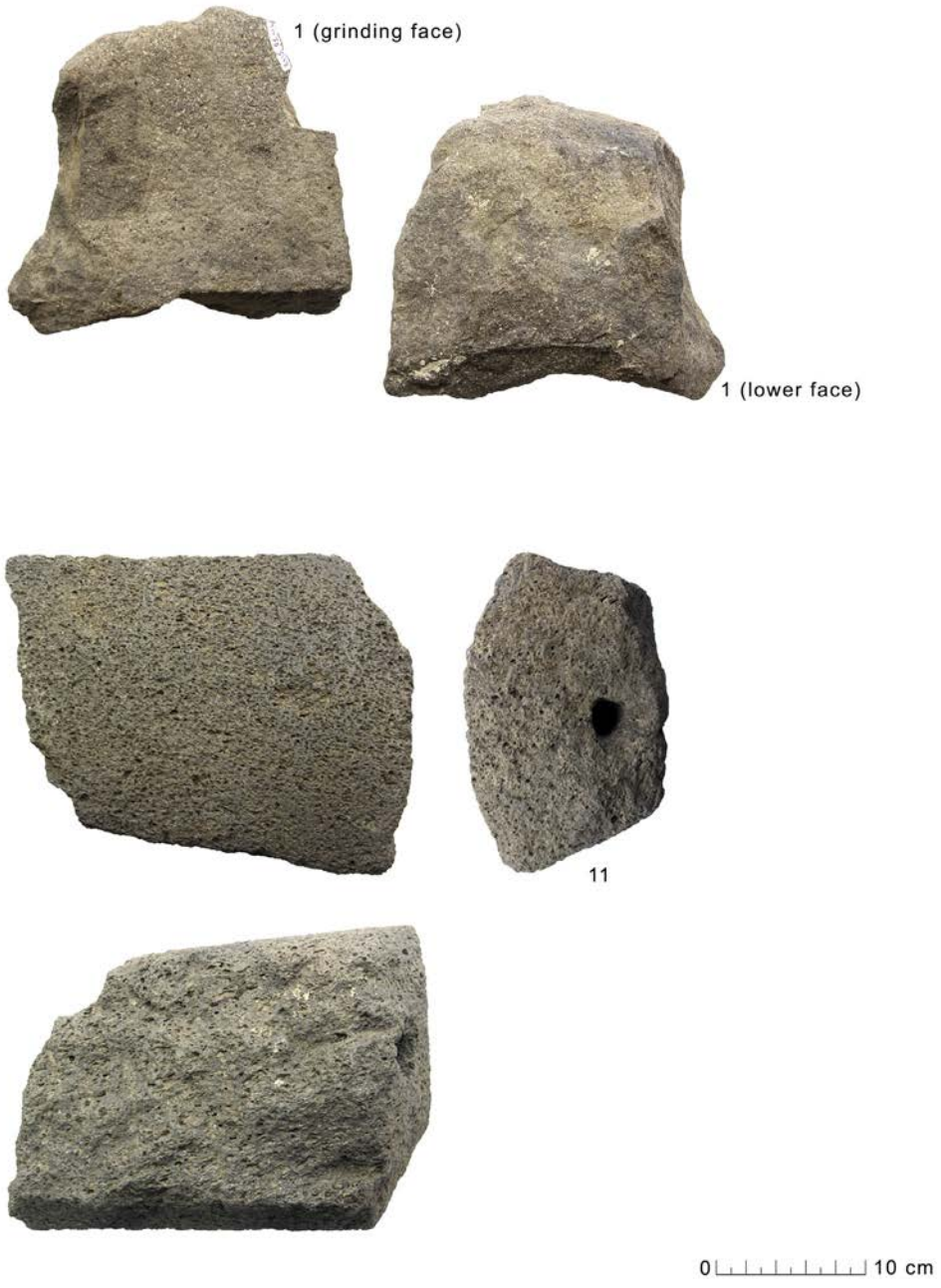
Pl. 1/1: Imprints on *tegulae*; 8: dog's paw; 11: fox's paw; 13: hoof of a sheep/goat; 16: hoof of a pig (Photos by A. Minaříková, drawings by M. Minařík and B. Weissová).



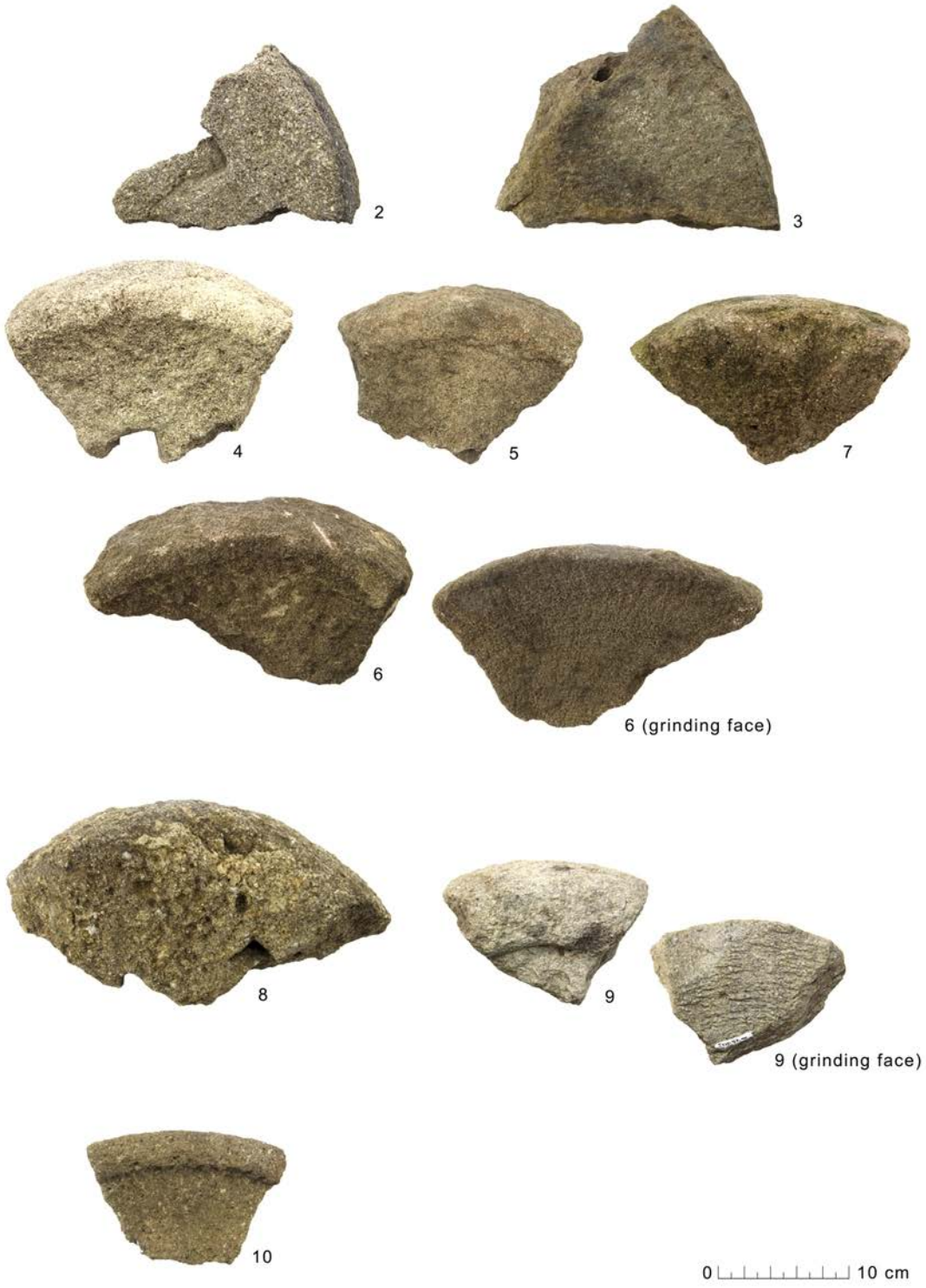
Pl. 1/2: Imprints on bricks; 19: human foot; 20: human hand; 21: waterfowl-like foot stamps (Photos by A. Minaříková, drawings by M. Minařík and B. Weissová).



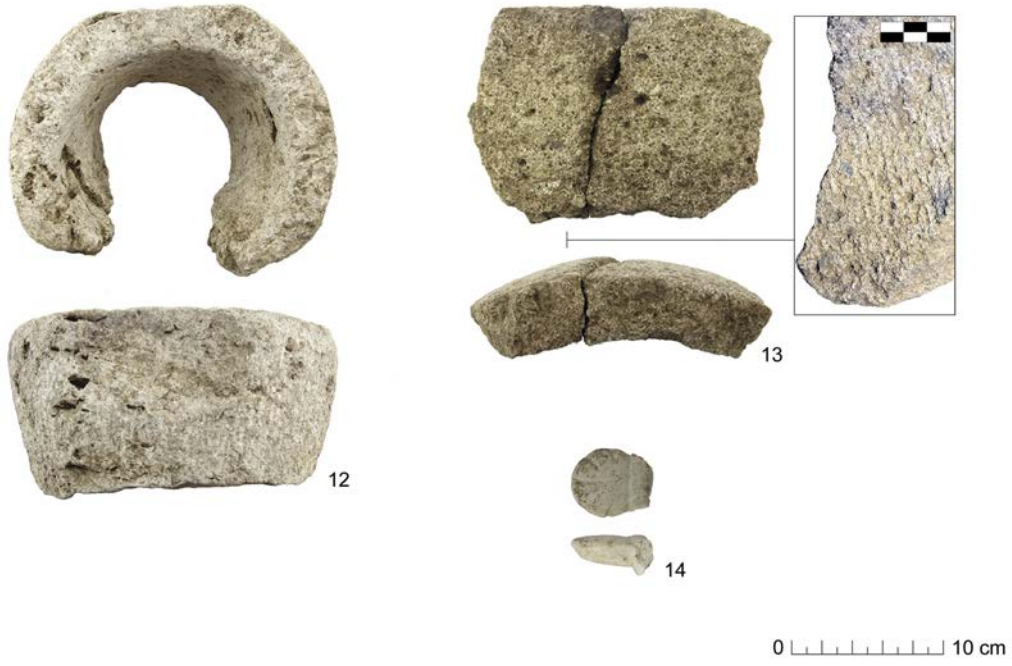
Pl. 1/3: 27: Roman-Doric capital Type 1; 28: simplified version of Roman-Doric capital Type 1; 29: capital or base; 30: cylindrical stone; 31–33: marblelike stone plates (Photos by A. Minaříková and B. Weissová).



Pl. 2/1: Saddle quern and segmented mill; no. 1 - *metate* Type 1 (after Peacock 2013a); no. 11: inner stone represented by a tapered slab (Photos by J. Tlustá).

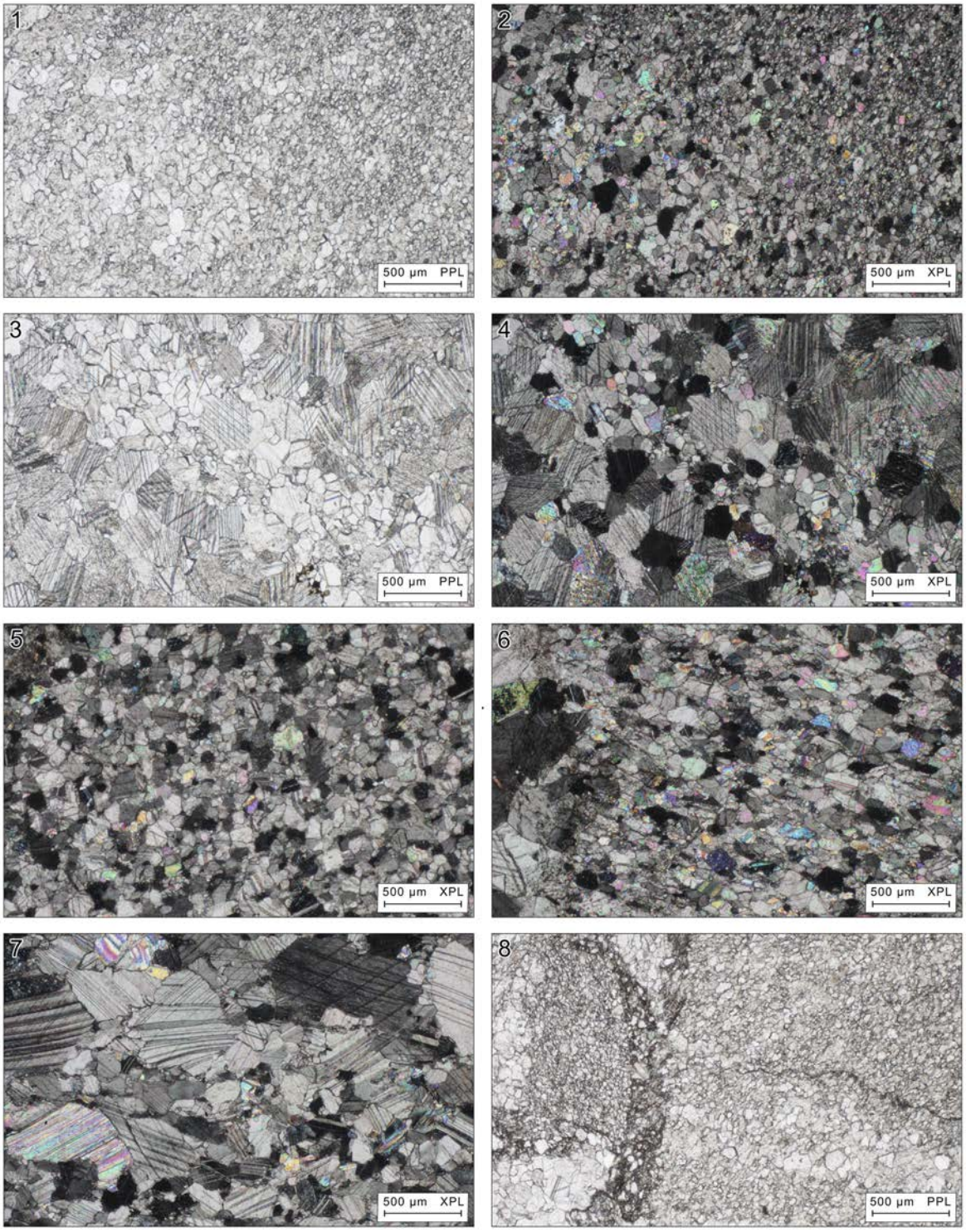


Pl. 2/2: Rotary querns; nos. 1–2: Conical *catilli* without rim; nos. 3–6: Conical *catilli* with sloping rim; no. 5: additionally depicting the worn lower surface; no. 7: Hemispherical *catillus* without rim; no. 8: Hemispherical *catillus* with flat rim and worn lower surface; no. 9: Cylindrical *catillus* with rim (Photos by J. Tlustá and A. Minaříková).



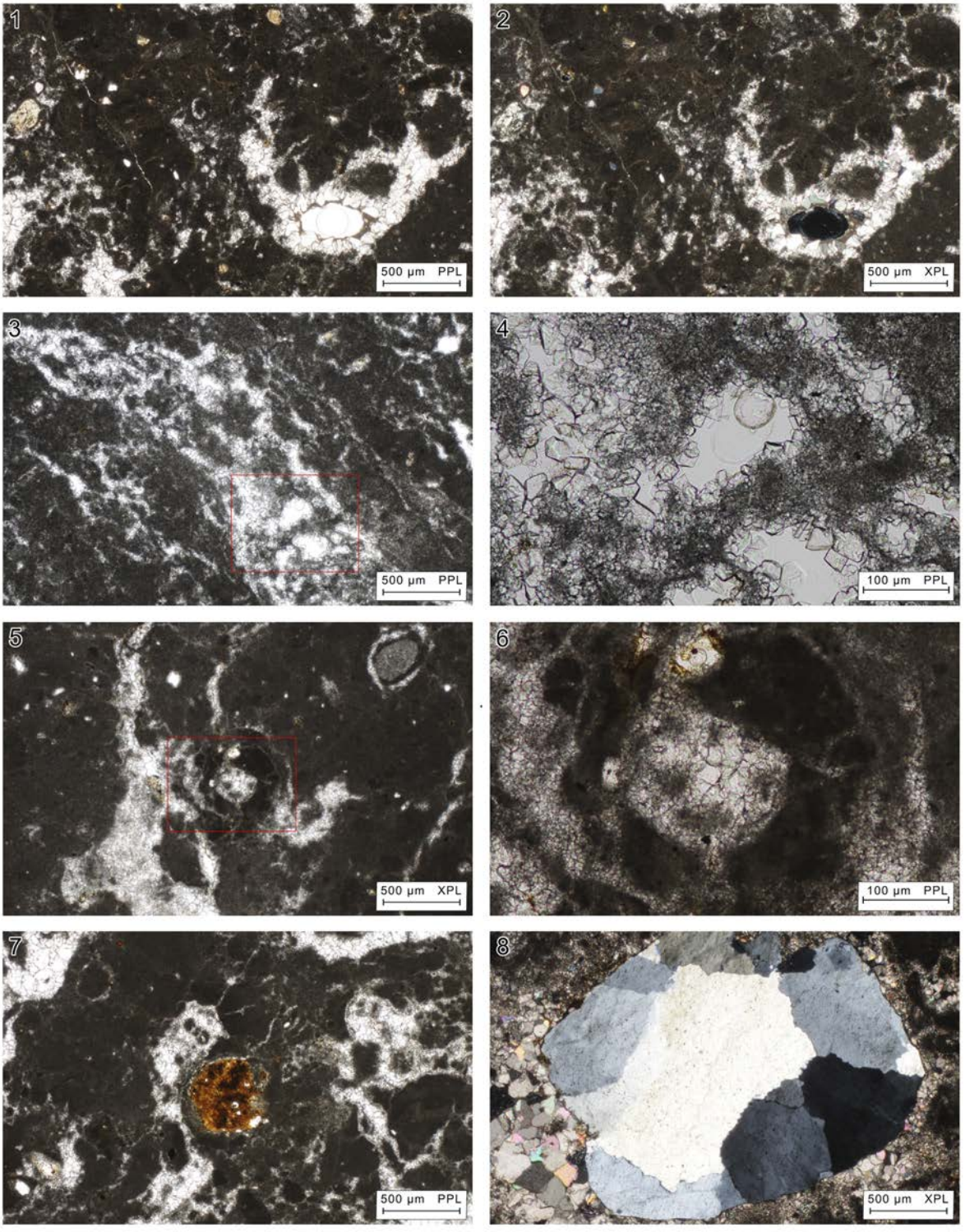
Pl. 2/3: mortaria; no. 12: conical mortarium; no. 13: open form mortarium with detail of furrows inside; no. 14: horizontal handle of an open form mortarium (Photos by J. Tlustá, A. Minaříková and B. Weissová).

Pl. 3/1: The sampled marble artefacts (nos. 1, 3, 4, 8 and 9) found in Yurta-Stroyno. As the artefacts correspond to various sizes their depictions are accompanied by a 10 cm scale. The details of the raw material are all scaled equivalent to a 3 cm width.

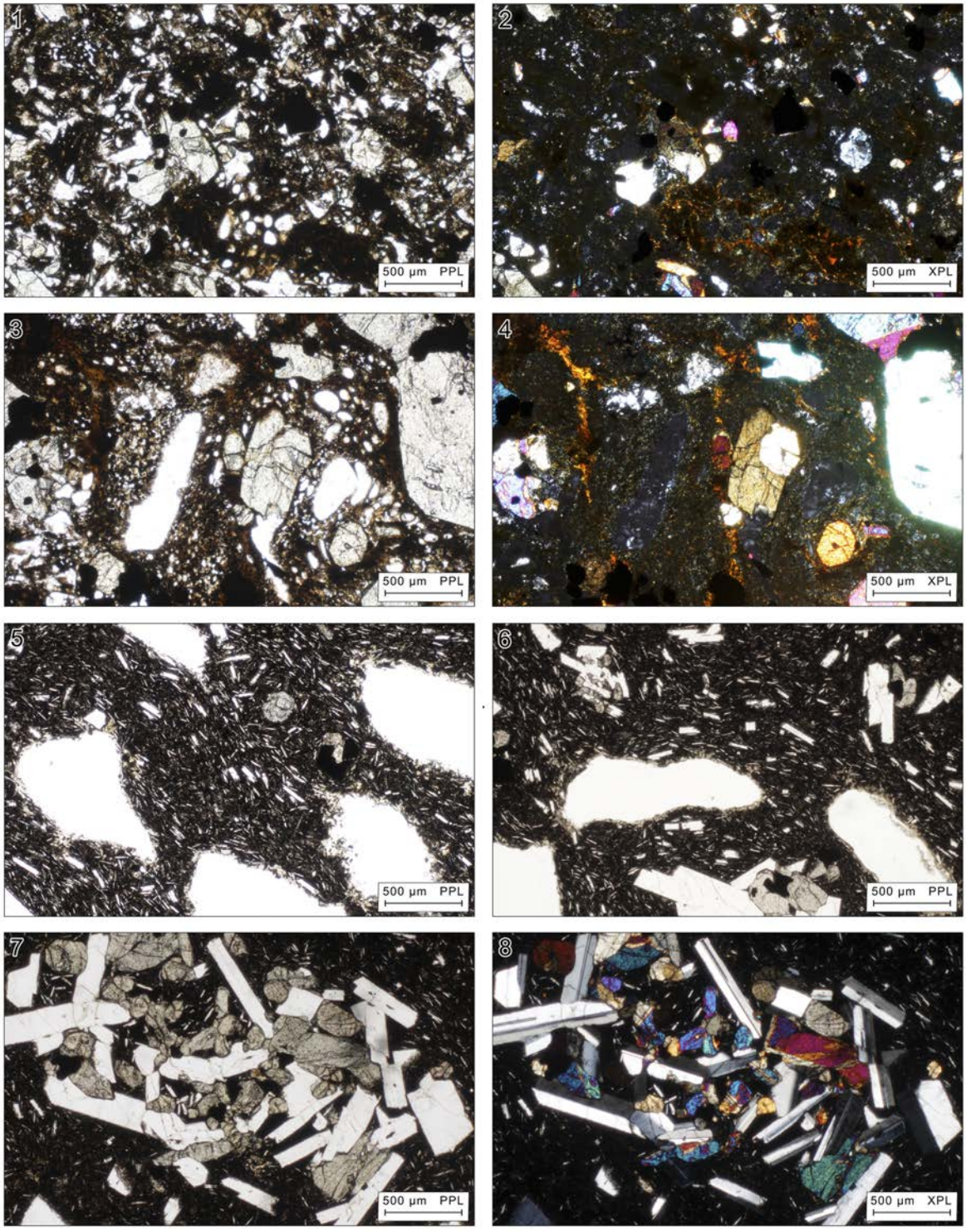


Pl. 3/2: Marbles; all magnified by 2.5×. 1–2: *mgs* of the rubble stone no. 4; 3–4: *mgs* of the worked stone no. 9; 5–6: crystal structures of the cylindrical worked stone no. 3; 7: grain-size range and MGS of the worked stone no. 8; 8: iron hydroxide-stylolites in the sample no. 1 (capital). Abbreviations: *mgs* – mean grain-size; MGS – maximum grain-size; *PPL* – plain polarized light; *XPL* – crossed polarized light.

Pl. 3/3: The sampled micritic (nos. 2, 5 and 6) and volcanic artefacts (nos. 7 and 10). As the artefacts correspond to various sizes their depictions are accompanied by a 10 cm scale. The details of the raw material are all scaled equivalent to a 3 cm width.



Pl. 3/4: Micrites; 4 and 6 represent details of the mark-ups in 3 and 5 and are magnified by 10×; the others by 2.5×. 1–2: sample no. 2 (capital) in PPL and XPL; 3: porous and cracked matrix of sample no. 6 (mortar); 4: precipitated carbonate crystals in sample no. 6 (mortar); 5–8: sample no. 5 (large worked stone); 5-6: remains of fossils; 7: allochemical components; 8: quartzite grain. Abbreviations: *PPL* – plain polarized light; *XPL* – crossed polarized light.



Pl. 3/5: Volcanic Rocks; all magnified by 2.5×. 1–4: pyroclastic worked stone (no. 10); 5–8: inner stone of a segmented mill (no. 7), SiO_2-rich basaltic rock; 5: elongated vesicles; 6: fluidal structure; 7–8: aggregate of phenocrysts (plagioclase feldspars and pyroxene crystals). Abbreviations: *PPL* – plain polarized light; *XPL* – crossed polarized light.

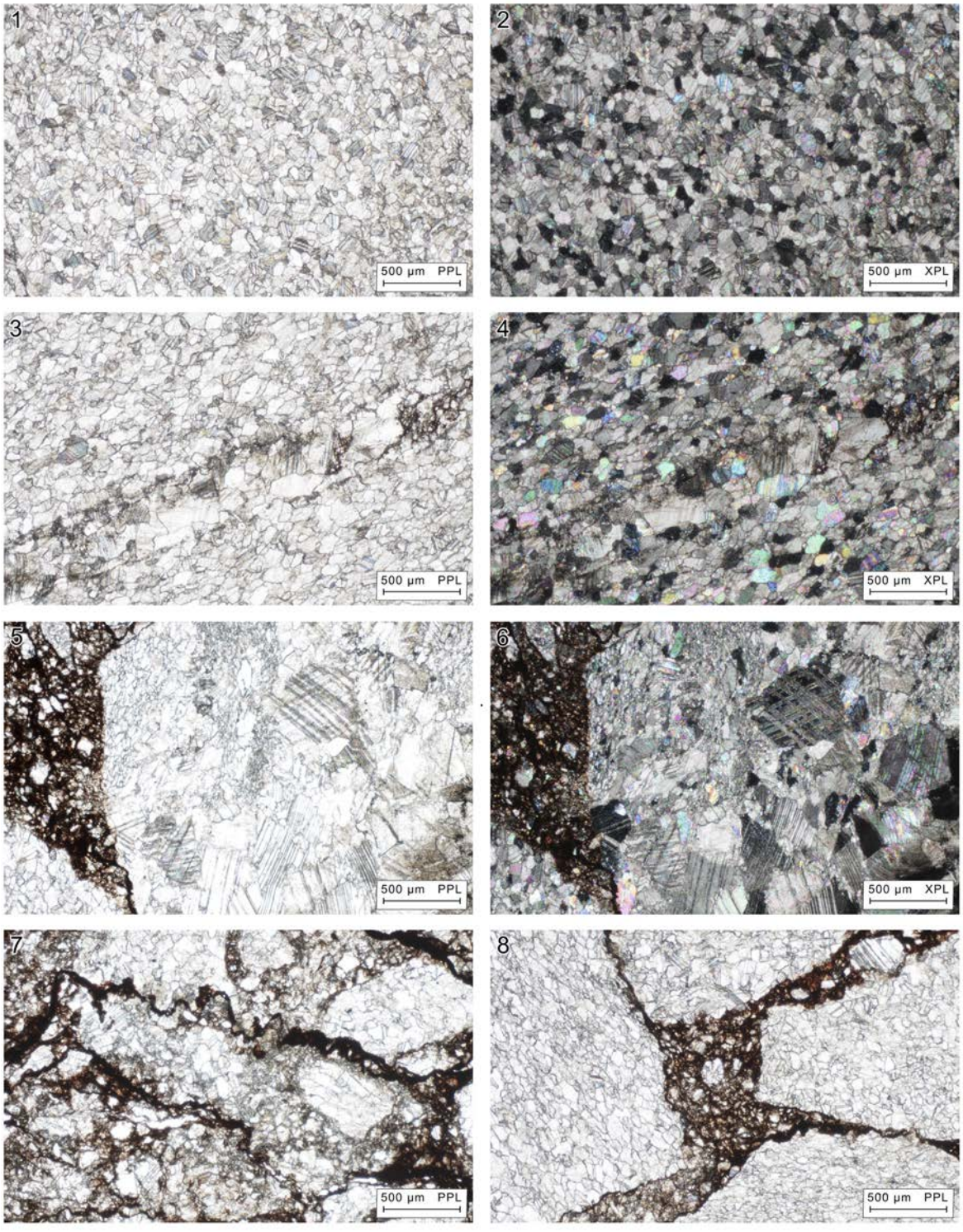
11

12

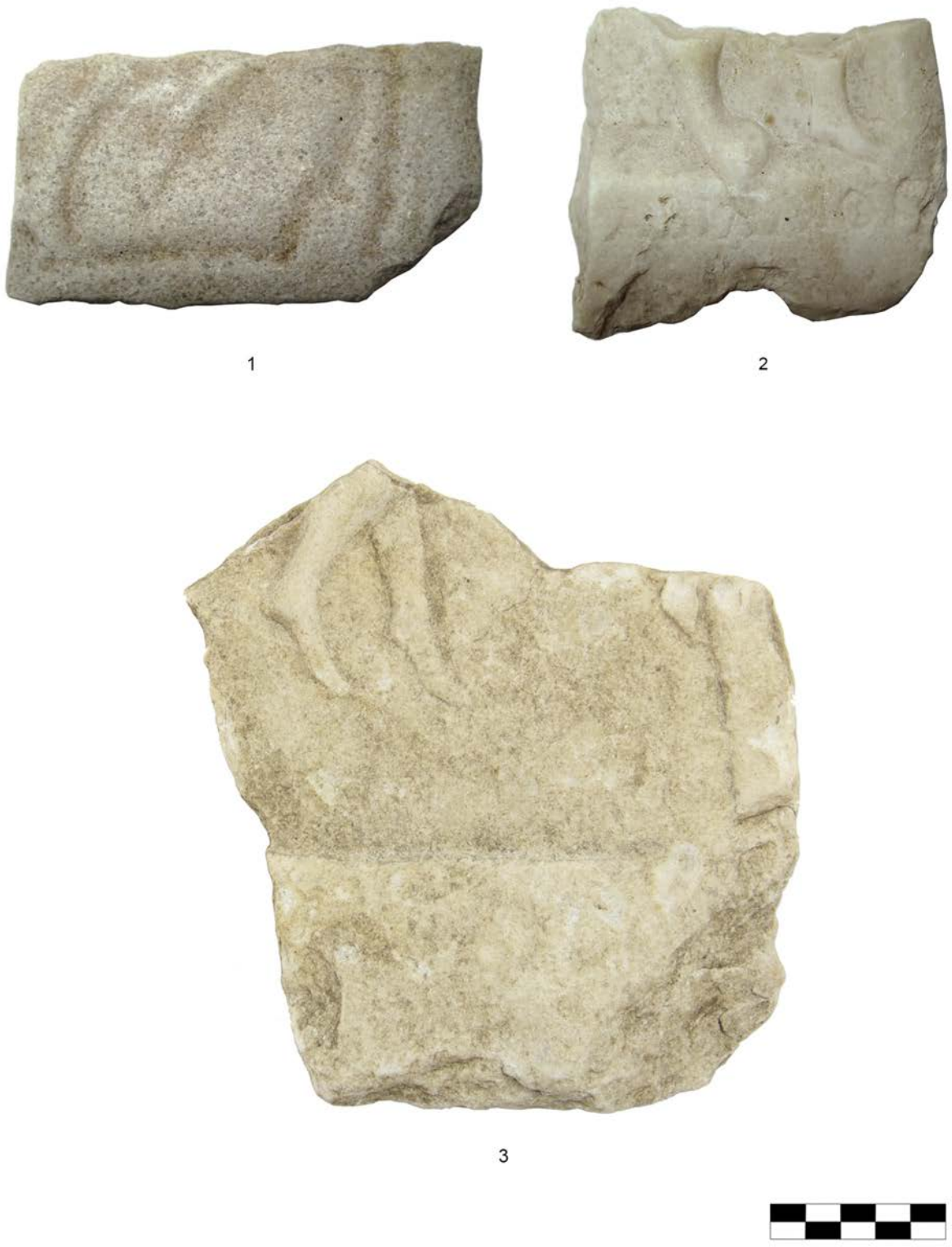
13

14

Pl. 3/6: Macroscopic pictures of the Kamenets Quarry specimens (nos. 11–14); all pictures are scaled equivalent to a 3 cm width.



Pl. 3/7: Kamenets Quarry specimens; all magnified by 2.5×. 1–2: *mgs* and granoblastic structure of specimen no. 11; 3–4: *mgs* and preferred elongation direction of the smaller crystals constituting specimen no. 12; 5–6: MGS of specimen no. 13; 7: iron hydroxide-stylolites (specimen no. 14); 8: brecciated appearance (specimen no. 13). Abbreviations: *mgs* – mean grain-size; MGS – maximum grain-size; *PPL* – plain polarized light; *XPL* – crossed polarized light.



Pl. 4/1: Decorated stone plates; 1: fragment of a horse rider plate; 2: fragment of a plate mentioning Roman family name Avilius; 3: fragment of a horse rider plate. Photos by J. Tlustá and P. Tušlová.

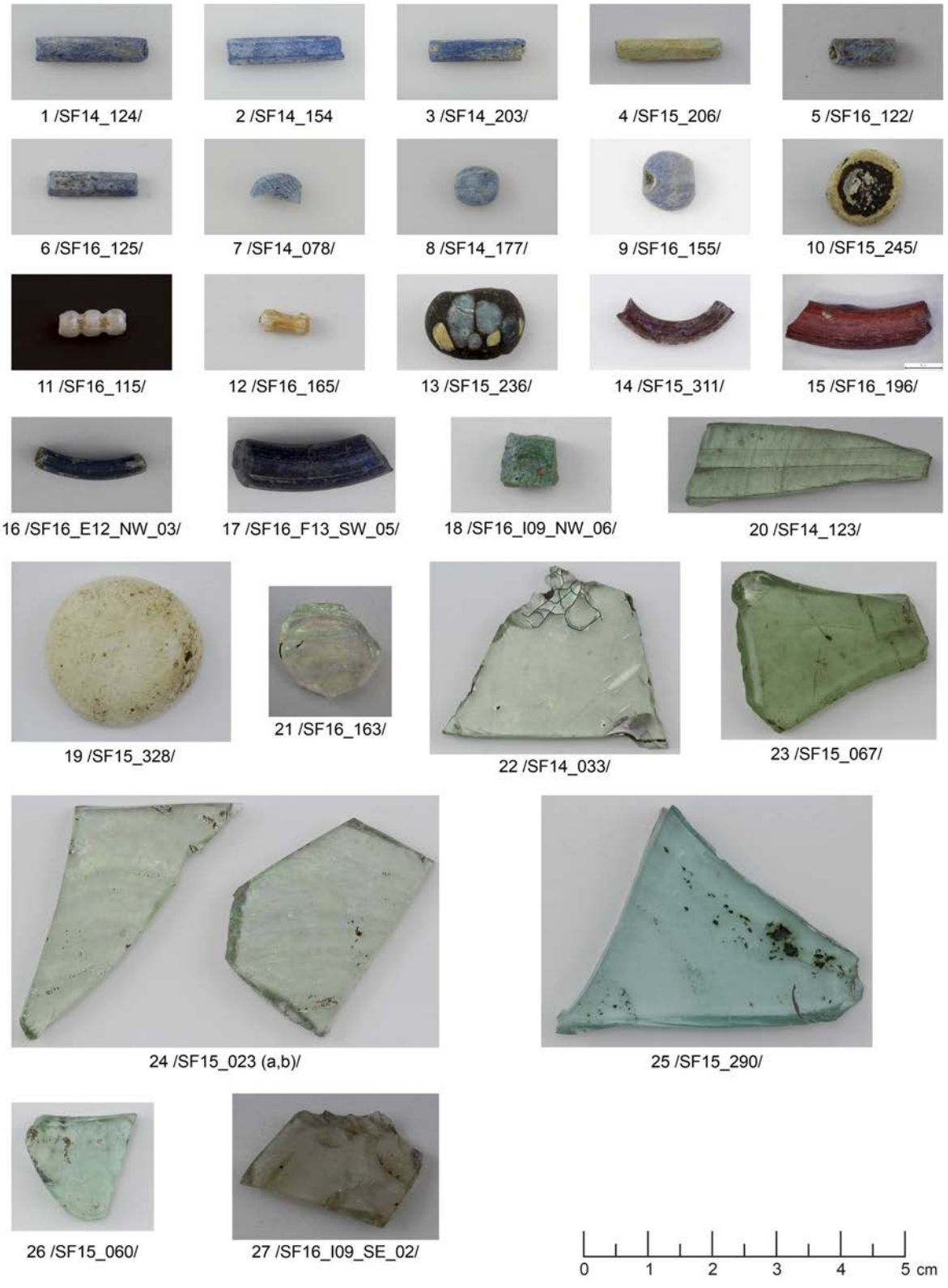
Pl. 4/2: An inscribed Roman brick, with a dedication in Greek to a young female (deity?). Hand-made inscription in detail (bottom). Photo by B. Weissová.

Pl. 5/1: Bronze coins found by SAP. 1: coin of Philipp II, ca. 350–300 BC; 2: coin of Augustus, 27–23 BC; 3: coin of Trajan, AD 98–117; 4: coin of the Flavian dynasty? Domitian?; 5: coin of an unknown Emperor (Marcus Aurelius?); 6: coin of Ioulia Domna, AD 193–217; 7: coin of Caracalla, AD 211–217; 8: coin of Diadoumenian, AD 217–218; 9: coin of Tranquilina, AD 241–244.

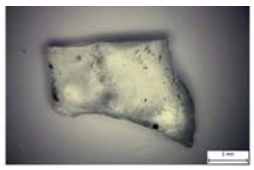
Pl. 6/1: Terracotta lamps; 1–5: type Broneer XXVII; 6–8: type Loeschcke IV/V imitation (?); 9–10: type Iconomu type XXX / Broneer type XXIX.

Pl. 6/2: Terracotta lamps; 11–17: type Iconomu type XXX / Broneer type XXIX; 18–25: type Loeschcke VIII.

Pl. 6/3: 26–28: Bildlampen (Loeschcke types I–IV) (?); 29, 33–35: unidentified; 30: lampstand (?); 31–32: Bildlampen (Loeschcke type I–V) (?); 36–37: Firmalampen (?).



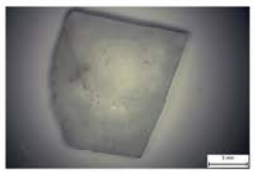
Pl. 7/1:1–13: glass beads; 14: glass ring; 15–17: glass bracelets; 18: *tessera*; 19: gaming counter; 20–21: secondary worked glass fragments; 22–27: windowpanes.


28 /SF14_126/

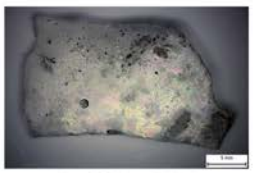

29 /SF14_230/


30 /SF14_238/

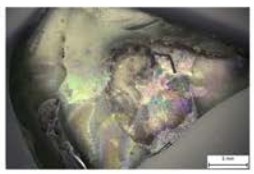

31 /SF14_240/


32 /SF14_241/


33 /SF14_243/


34 /SF15_021/


35 /SF15_022/


36 /SF15_138/

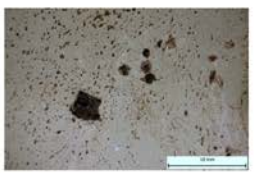

37 /SF15_235/


38 /SF15_269/


39 /SF15_271/


40 /SF15_347/


41 /SF15_347a/

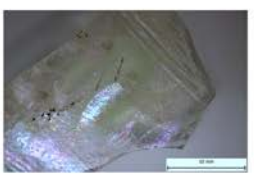

42 /SF15_347b/


43 /SF15_074/


44 /SF16_080/


45 /SF16_D13_S_09/


46 /SF16_D13_SW_30/


47 /SF16_D13_SW_30a/


48 /SF15_001/


49 /SF15_176/

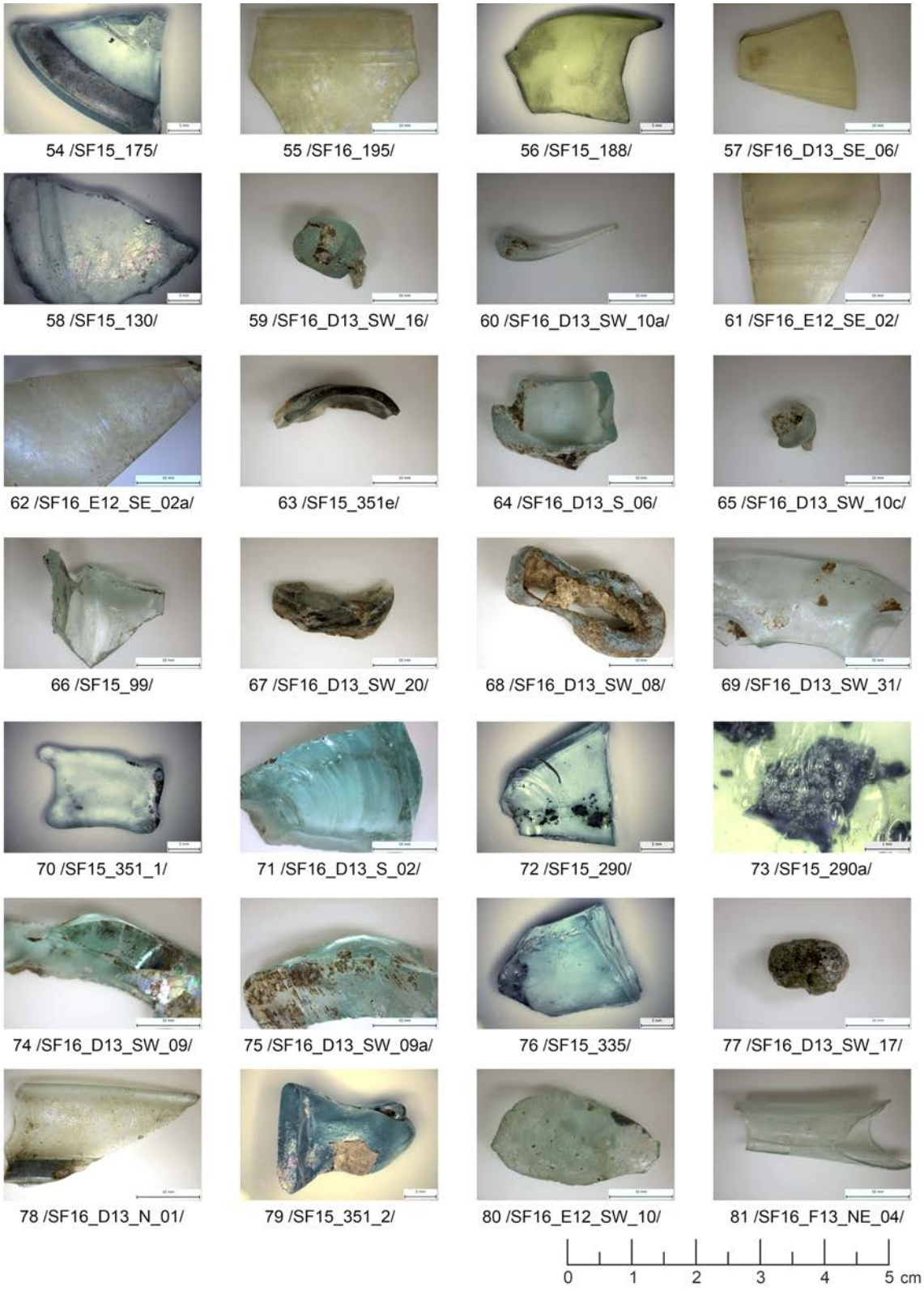

50 /SF15_281/


51 /SF16_078/

52 /SF16_165/

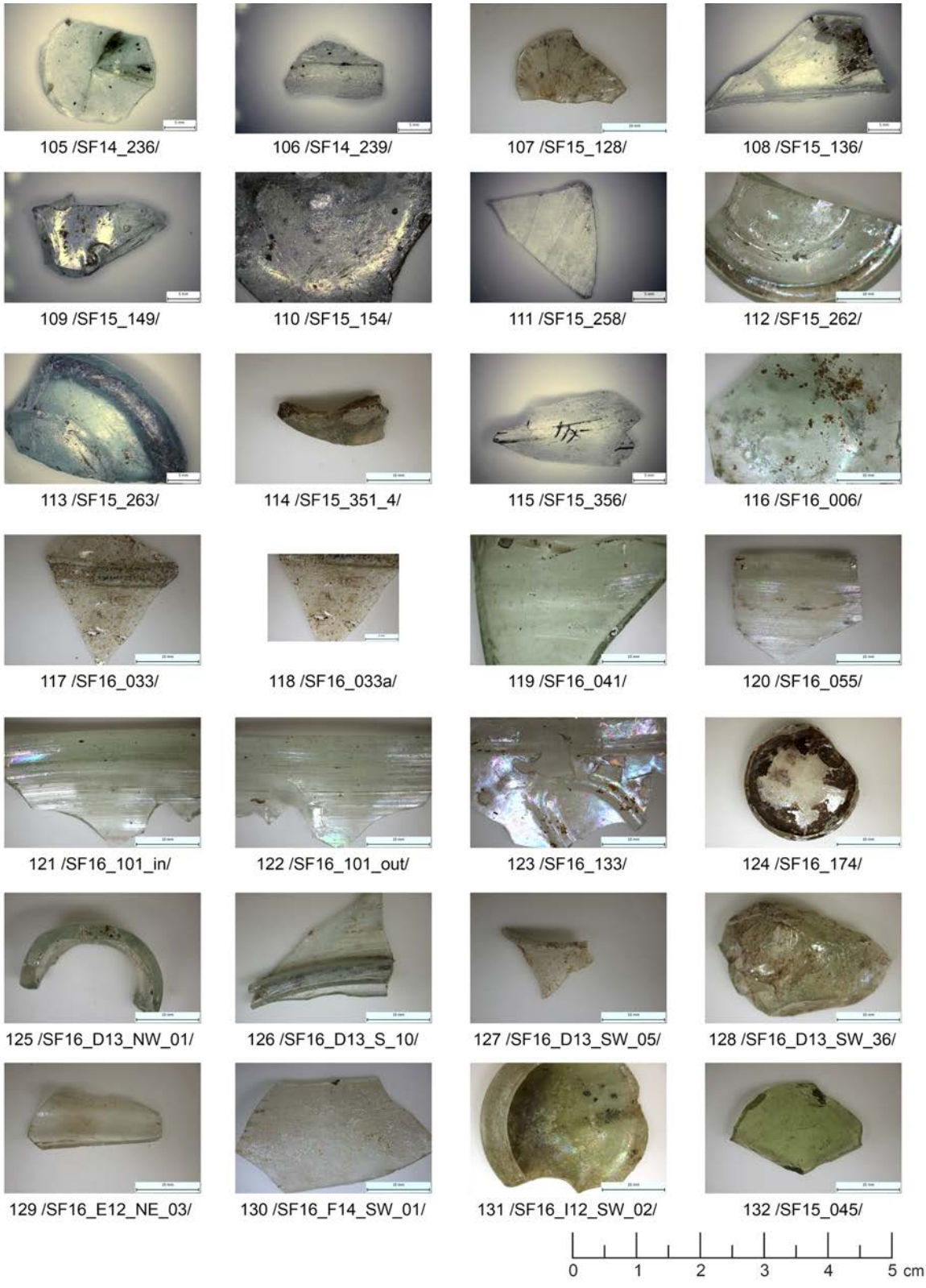

53 /SF16_H13_SE_07/

Pl. 7/2: macro photos; 28–47: *Antimony glass*; 48–53: *Antimony glass II*.

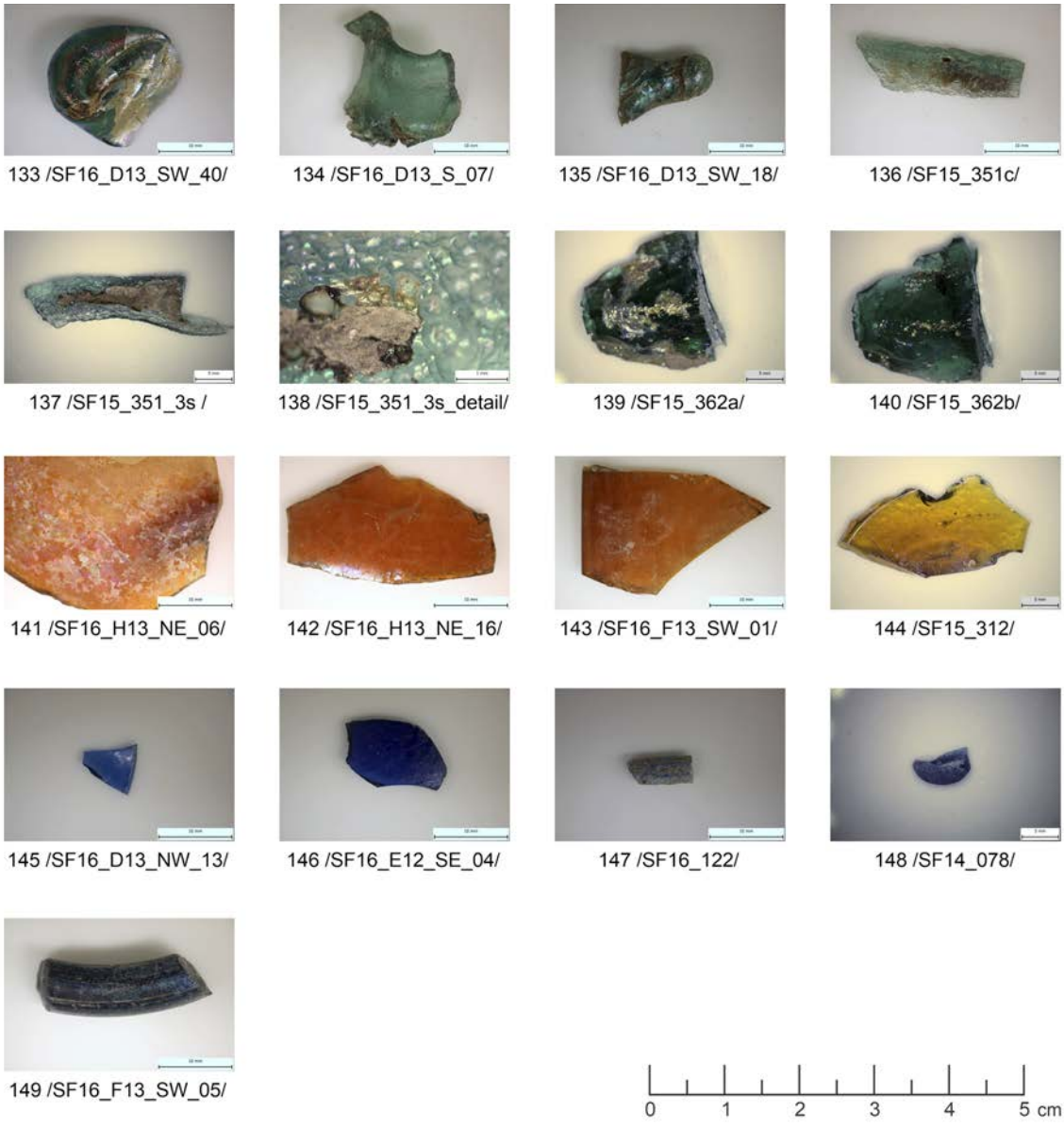


Pl. 7/3: macro photos; 54–81: *Low-manganese / High-manganese glass*.

Pl. 7/4: macro photos; 82–104: *Low-manganese / High-manganese glass.*



Pl. 7/5: macro photos; 105–131: *Mixed antimony and manganese glass*; 132: *HIMT glass*.



Pl. 7/6: macro photos; 133–140: *Plant ash glass*; 141–149: glass of different colours.

150 /SF15_351/

151 /SF15_351f/

152 /SF15_351e/

153 /SF16_D13_SW_42/

154 /SF16_D13_NW_01/

155 /SF16_D13_SW_10/

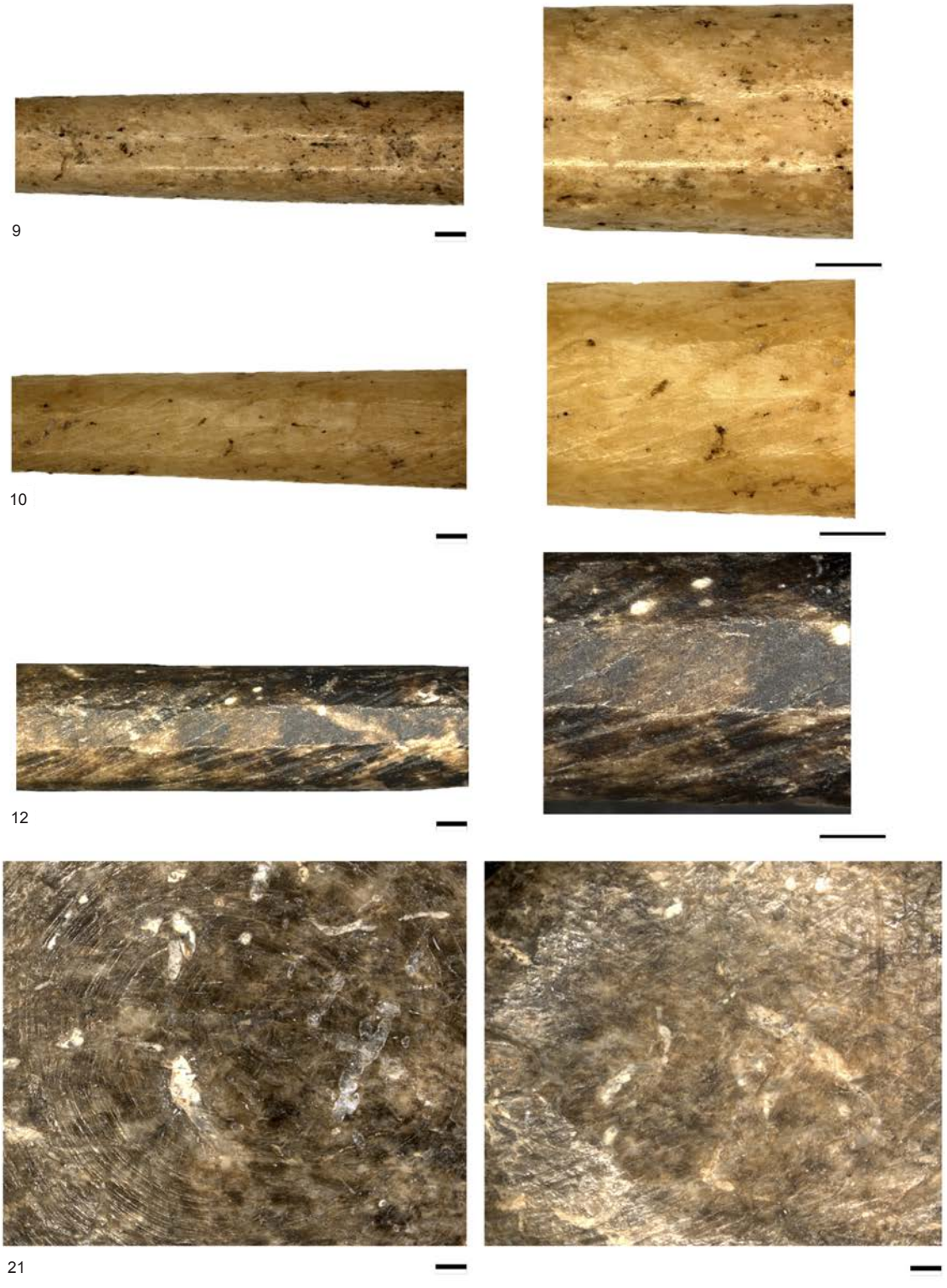
156 /SF16_D13_SE_08/

157 /SF16_D13_SW_35/

Pl. 7/7: Fragments of raw glass and production waste; 150: threads and melted glass; 151, 152, 154: glass moils; 153, 157: raw glass; 155: glass drops; 156: cullet.

Pl. 8/1: Photo of the head of a bearded man. By J. Tlustá, D. Mildová.

Pl. 8/2: Photos of the bone finds. By J. Tlustá, D. Mildová.



Pl. 8/3: Photos of the bones with worked marks; overview on the left, detail of the same item on the right. Nos. 9–10, 12: pins with different degrees of smoothed surface, no. 9: very smoothed, nos. 10, 12: with tool marks; no. 21: spoon bowl with marks of a lathe. By M. Minařík, D. Mildová.

Petra Tušlová An assistant professor at the Institute of Classical Archaeology at Charles University in Prague. She has been working on different archaeological projects in the Balkan peninsula since 2008 including Bulgaria, North Macedonia, and Romania. Her main interests lie in the Roman and Late Antique Thrace, with special focus on the pottery; as well as in the technology of pottery making and ceramic petrography.

Barbora Weissová An assistant professor at the Institute of Archaeological Studies at the Ruhr University in Bochum, Germany. She has been working on excavations and surveys since 2006, taking part in projects in Bulgaria, North Macedonia, Turkey and Italy. Her main interests include digital archaeology with a focus on the applications of geographic information systems (GIS), methods of spatial analyses and quantifications as well as designs of archaeological surveys.

Stefan Bakardzhiev The director of the Regional Historical Museum in Yambol, and chief assistant professor at the University of Library Studies and Information Technologies in Sofia. His main interest is the regional archaeology of south-eastern Bulgaria with a special focus on the Roman to Middle Age periods. He is a director of long-term archaeological excavations in Kabyle (Roman period) and Voden (Middle Ages).

ISBN 978-80-7471-048-9