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Wolfgang Lobisser

The history of archaeological house models in the open air park of the MAMUZ in Asparn in Lower Austria from the beginnings up to our days

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With his conception for the archaeological open air park in Asparn an der Zaya in the 1960ies the founder Franz Hampl was surely one of the big pioneers in prehistoric culture dissemination. His plan was to present four ancient time levels with house models from the Neolithic Time, from the early Bronze Age, from early Iron Age and from the late Latène Period, which should be fit out with mobile, implements and tools according to the findings.

When the open air park was opened to the public in 1970 it included eleven architectural models of prehistoric houses built up partly on the basis of archaeological findings and partly as theoretic models without archaeological evidence. The successors of Franz Hampl left their traces in the park as well. Not just that some models were at the end of their function and had to be replaced, they also supplemented the ensemble with new archaeological models on the basis of actual prehistorical results. Thereby experimental methods and the use of authentic methods became more and more important. After a using time of up to 48 years in 2012 some of the reconstructed houses made from wood, clay and reed were at the end of their natural life period. The experimental working group of the VIAS, an interdisciplinary institution of the University of Vienna was invited to renovate the open air Park and to construct new houses following recent archaeological results. This presentation tells the story of the prehistoric house models of Asparn an der Zaya from the very beginnings up to our days.

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Helga Rösler-Mautendorfer, Bianca Mattl

The World Heritage Ladies Project - Reconstructions of Garments for the Oberösterreichische Landesmuseum

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For the rearrangement of the permanent exhibition of Archaeology in the Oberösterreichischen Landesmuseum in 2017 woman garments of three temporally different eras are reconstructed: a Neolithic (pile dwelling), a Hallstatt period and a Roman. The intent of the displayed garments is to impart the textile craft in Prehistory and Roman times and to broach the issue of the three archaeological World Heritage sites in Upper Austria.

The garments should be as far as possible made by prehistoric / roman methods, but it is not necessary that every single piece of clothing has to go through the complete prehistoric manufacturing process. For example, the yarn was not spun by hand for each garment. The garments are going to represent textile culture of the particular period. Therefore the reconstructed garments are based on analyses of original textiles. Since the preserved textile finds are often very small, the data of visually similar pieces were used to specify the fabric patterns and colours. In addition to the textile data

images of dresses, the positions of the jewellery in graves and the data from textile equipment for example of loom weights were integrated to get close image for the reconstruction.

A production of textiles with reconstructed tools and equipment does not always go smoothly. Tools and material have to fulfil the requirements of an exact reproduction of an original textile. The difficulties and errors in consequence of the equipment, lighting conditions in reconstructed buildings and the used material are in the focus of this report.

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Karina Grömer, Maikki Karisto

Different solutions for a simple design: New perspectives on tablet weave HallTex152 from the saltmine Hallstatt

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The Natural History Museum Vienna undertakes extensive research at the site Hallstatt, comprising not only interdisciplinary analysis of the finds and the contexts but also Experimental Archaeology. That methodology is applied for scientific research questions but also for didactics and dissemination activities. Experiments concerning textile topics help to understand details of certain textile techniques and thus are an important source for our understanding of Bronze and Iron Age textile production. Beside the scientific community, the textiles from Hallstatt – especially the checkered fabrics and the patterned tablet weaves - are also an inspiration for modern artist and designers.

Here we focus on a tablet woven band (HallTex 152), which seems to be a very simple design at the first glimpse. The pattern of the band – lozenges with cross-filling - is also present at other Hallstatt period artefacts such as pottery or bronze sheet objects. This band found its way via World Wide Web to re-enactment groups, Do-it-Yourself communities as well as modern artists. All of them have their different ways to recreate the pattern. We present seven of them. Detailed experiments were carried out with different threading concepts for the weaving tablets and different weaving mechanisms and turning sequences. The different solutions to create that design were discussed in comparison with the the original textile

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Rüdiger Schwarz

The origin of the plane – what part does the “adze-plane” play?

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The plane is surely one of the most developed hand tools of antiquity. Its basic design can already be found in the 1st century BC and is still common today. International treatises present different suggestions on the origin of the plane, but do generally not take the whole archaeological record in

account. The ancient literary sources provide us only with sparse information and practically no clues concerning the shape and construction of the tools in question.

A considerable approach is presented in the works of Wolfgang Gaitzsch and Hartmut Matthäus, who name a specific tool with two handles and a flat blade, depicted on several Roman monuments "Ascia-Hobel" ("adze-plane"). According to ancient depictions and original finds of blades this tool represents the Hellenistic-Roman tradition of craftsmanship and is possibly the link between adze and plane.

Neither a reconstruction of this tool based on the archaeological evidence nor practical tests or ethnographic analogies are known to the writer. Rebuilding the adze-plane could therefore be useful for examining its use and provide us with clues regarding the line of development of these woodworking tools.

The general construction of the adze-plane does not seem much elaborated but the practical approach confronts the craftsman with problems that do not arise in the same way within a merely theoretical consideration. The crucial points concern the construction of the wooden handle as well as the shape of the blades, the attachment of the components and the handling of the complete tool.

On basis of the archaeological, iconographic and epigraphic sources this contribution is meant to examine the construction and the possible applications of the adze-plane and thereby defining the tool's function within the Roman woodworker's tool-kit. Practical tests might even be helpful to check the hypothesis of the development from the adze via the adze-plane to the plane.

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Tobias Schubert, Michael Zülch

Virtual Reconstruction The validation of archeological clothing reconstruction by computer-based Simulation.

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Clothing defines people. Therefore it is of importance for social studies based on clothing to know how clothing works, and being able to decide if the garment can be worn only in a representative manner or it is also useful for everyday work.

The sources in pre- and early-historic times are limited, because the images are not accurate enough to show technical details. The problem multiplies with only find-based archaeological reconstructions.

The problem is not so virulent in the graphic presentation, but it is important for making a wearable and useable 1:1-modell. Therefore the use of virtual reconstruction and computer-based all-day-use simulation can help to validate reconstruction attempts. This will be shown on some examples.

Literature: not available.

Andreas Klumpp

Kinds of preparation and cooking methods in the medieval kitchen

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Cooking, roasting, baking. These terms can hide a wide variety of cooking and preparation methods. The presentation is meant to give an overview of kinds of preparation and methods of cooking in the medieval kitchen. In cooking with fluids the range comprises gentle simmering up to roaring boil. We can cook with steam or in the water bath. Different kinds of fluids can be used like water, broth, wine and others. Roasting, on the other hand is a dry kind of preparation that means no fluids are involved. Instead no cooking media or just oils and fats are used. The food is prepared using pans, grills or roasting spits. Baking in medieval times was not only done in ovens but also directly on the hearth in pans or special dishes. Not just the methods but the equipment needed for them will be demonstrated. This includes some methods that are basically unknown today like the use of „wooden roasting grills“

or how to cook food during travels without cooking equipment. What can you do, when you want to have cooked meat for lunch on Sundays but want to visit mass during cooking?

Literature

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Sayuri de Zilva, Josef Engelmann

Green stone to red metal – reduction process of malachite with blowpipes in open fire pits

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Several archaeometallurgical experiments have been undertaken in the past 20 years in order to smelt copper either from copper carbonates (malachite, azurite) or copper sulphide minerals. Research so far also took technological parameter known from ethno-archaeological context into account: for example using blowpipes and open fire for smelting copper sulphidores (Fasnacht 1999); working with bellows as recorded in traditional metallurgical practice from Western Nepal (Anfinset 2000; Anfinset 2011) and recently Laschimke and Burger (2015) reducing malachite using modern air supply under laboratory conditions.

Up to now there is no experimental approach described using minimal effort in time, material and manpower which lead to an amount of metallic copper enough for cold hammering of small scale artifacts (awls, hooks, rings etc.) without melting or casting in between.

Our archaeotechnical test series in reduction of malachite offers one possible practical solution on the level of available basic „early Neolithic“ metallurgical knowledge: Using lung power of 2 –3 persons for the work with blowpipes in an open fire pit, malachite placed in unfired clay receptacles we achieved a copper nugget of at least 20 grams.

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Hans Reschreiter

Experiments in the underground - the approach to prehistoric salt mines of Hallstatt with help of experimental archaeology

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The unique conditions of preservation in salt mines resulted that many items made from organic material are preserved in Hallstatt, which are unknown by any other site. To learn more about these unique bark ropes, wooden stairs, obtaining fur bags and pimples stalks, for decades the archaeological excavations are accompanied consistently with attempts and experiments to the mining finds.

Mathias Mehofer, Ruslan Stoychev, Hristo Popov, Zdravko Tsintsov

Ada Tepe – Experimental reconstruction of Late Bronze Age gold melting

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The exploration of late bronze age gold mining at Ada Tepe, southeastern Bulgaria, is complemented by archaeometallurgical and experimental archaeological research for several years. The first attempts were focused on the mining and the extraction of the gold (Popov 2014), the processing of gold in the foreground came in recent years. But initial experiments could not satisfactorily reconstruct the process chain (Stoychev 2014). In continuation of the series of experiments of the last few years, more melting experiments with a modified experimental design were carried in June 2016. These were based on contemporaneous Egyptian representations or Central European archaeological findings and now brought satisfactory results. These results will be presented and complemented by archaeological findings in the context of the planned lecture.

Literature

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Maren Siegmann

Interiors. Glass beads from the hole here considered

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Glass is a fascinating material, but also a material with a very own problems. As archaeologist bead maker has to deal with these problems repeatedly: if for some unknown reason a just wrapped pearl can't be separated from the bead mandrel. And that although these beads maker cheats and for separating the "Celtic", "bronze age" or "medieval" beads of the beads thorn chooses a modern high performance release agents...

It will deal with the wound glass bead holes. The bead mandrel used. And anti-sticking agent.

Literature: not available.

Hannes Lehar

***Puls* meets Fast Food Generation**

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In movies and historical novels there are often depicted amazing feasts of the upper ten thousand in Ancient Rome, during which exotic meals and drinks are offered. But was this the reality in the Roman Empire? What did normal Romans eat during everyday life, what did the legionnaires eat during their military expeditions?

Their main food up until the Augustin time was grain pulp – called *puls* – with varying ingredients. Then instead bread became the staple food for the majority of the population. For soldiers there was the *panis militaris*, but *puls* stayed in use beside it. For gladiators their special *puls* obviously stayed in use as a staple food still.

At the first the author was merely curious how such a *puls* – a pretty simple aliment – tastes. Together with three dedicated doctoral candidates first cooking experiments got started. Following this the students engaged closely with the topic. Which passed down recipes are there, which ingredients were used, what's the best way of preparation etc.? The result of their research and repeated cooking experiments were surprisingly tasty pulps.

To enable a broader judgement the reaction of the public to various *puls* types was tested and their views recorded during the „Lange Nacht der Forschung“ of the university Innsbruck.

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SATURDAY, October 1st 2016

Frank Wiesenberg

Making Roman Ribbed Bowls

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Although many finds are known, the manufacturing techniques of Roman ribbed bowls are still being discussed today. The lecture will present this type of vessel (Isings 3, “pillar-moulded bowl”) with its characteristic and often easily-noticed tool marks.

The technique of making ribbed bowls by pinching and slumping as suggested by Mark Taylor and David Hill is shown as an example of researching ancient crafts techniques. For mosaic ribbed bowls, a disk of glass mosaic pieces is fused together. For monochrome ribbed bowls, a simple glass disk is shaped. The ribs are pinched into this flat disk by either a special pair of pincers, or two pointing trowels. Within the furnace, the disk is slumped upside down over a hemispherical mould. After being removed from the cooling oven (lehr), the inner surface and the outer area below the rim are ground and polished to remove traces of the slumping form material, and reduce visible tool marks.

This manufacturing technique was demonstrated during the “Borg Furnace Project 2015” by Mark Taylor, David Hill, François Arnaud, Torsten Röttsch and Frank Wiesenberg, using the reconstructed Roman glass workshop at the Archaeological Park Roman Villa Borg (Perl-Borg, Germany). The tool marks caused by this method of making are identical to the tool marks evident on the Roman ribbed bowls.

Literature/information

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Matthias Bruestle

About the relationship of the coin image and the engraving tools

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In the year 2008 my cat Kitty died. To remember her I wanted to create a medal in Roman style with the tools the Romans would have used. There are no schoolbooks about Roman die engraving and I had no schoolbooks about "modern" engraving (i.e. from around 1900/1950). So my teachers were the Roman coins. I have examined many Roman denars in my hand or on photos, mostly well preserved, but also coins which had a die or minting peculiarity. From what I saw I tried to reproduce by trial and error the techniques which allowed me to reproduce the style as closely as possible.

Since then I expanded my field of interest to coins from the beginning up to about 1700 and I always like to try new technological methods. The basic working techniques of die engraving are cutting (e.g. with a chisel) and displacing with a punch. These tool types have their properties and create characteristic marks on the die and hence the coin. These properties lead to specific styles. To illustrate this with an example: Black lines on white can be easier drawn with ink on paper than with white chalk on a blackboard (although it is also possible to do it clumsily by the second way). When engraving dies it is similar. The choice of tools is determined by the targeted result. But also the result is determined by the available tools.

In this presentation I want to show the characteristics of the different tools and their influence on the coin image. These findings could also be transferred to other areas of metalworking and may therefore be of interest for attendees not interested in coins.

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Helga Rösel-Mautendorfer, Ines Bogensperger

Pliny and the Painting of Textiles. The Role of Experimental Archaeology for Understanding Ancient Texts

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In the study of ancient history craftsmanship attracts more and more interest. On one hand the archaeological objects themselves contain important evidence on their production and use, on the other hand ancient authors give a special insight into the ancient knowledge. However, only in rare cases, these various scientific disciplines are working together, with the result that some information is misunderstood and even lost.

The Roman author Caius Plinius Secundus Maior (23./24.-79. AD), also known as Pliny the Elder, describes in his work *Naturalis historia* an unusual way to paint textiles in Egypt (Plin. nat. 35, 42: *Pingunt et vestes in Aegypto, inter pauca mirabili genere [...]*). The special feature of the described technique is that fabrics were coated with different *medicamenta*, that is to say they were treated with mordents to produce a different coloured pattern in a dye bath. Even for current scholarship, the described technique is not fully understood; thus this passage needs to be critically examined in an interdisciplinary approach and collaboration.

After analysis of the text with philological methods, the content should be evaluated using the methods of experimental archaeology. The basic requirement is the accurate knowledge of preserved textiles from ancient and late antiquity, which provides information about the expertise of the dye-technique. During the experiments, the operations described are to be closely monitored and recorded. Furthermore, the results in the use of various mordants and dyes are going to be compared.

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Stefan Stadler

From zinc ore (calamine) to brass in the early medieval Eastern Alps

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In Europe, zinc was only discovered as independent metal in the modern era and its unique chemical-physical characteristics are a melting point of 419°C and a boiling point of 907°C under normal conditions. As such a low boiling point lies far below the melting point of copper (1085°C), it poses the questions whether and how zinc could have been extracted from ore, and how an alloy of these two materials could have been produced. During modern times, condensation techniques with special stoves that were used for the extraction of zinc are well-known and profoundly researched. However, it is evident that in ancient times and in the Middle Ages there must have been different methods for the same purpose. Various scientific analyses prove that zinc was used for brass alloys. For example, it has been shown that in Europe brass was widely used under Roman rule for the first time. Afterwards, the zinc content in alloys is systematically reduced until the fifth century. More recent studies from the Eastern Alps demonstrate that between the eighth and the ninth century tin bronzes decrease dramatically, whereas brass alloys show a strong increase. On average, these contain a zinc content of 15% and a lead content of 5%. These observations lead to the assumption that the cementation processes was used for the production of these alloys. During these procedures ground zinc oxide (calamite) is fused in a crucible with coal dust and copper. The carbon is supposed to reduce the zinc oxide to zinc, which is then absorbed by the copper and consequently forms brass. This procedure has been experimentally and archeologically reproduced in the course of numerous experiments with smithsonite and pure zinc oxide. The present paper aims to document the processes as well as the results of the mentioned experiments, followed by a discussion about the previously introduced cultural and technological aspects within their historical context.

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Stephan Patscher, Sayuri de Zilva

The byzantine treatise „About the esteemed and famous goldsmith’s art” – New Edition, German translation and multidisciplinary commentary: The idea of the project and first results of the experimental evaluation.

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The medieval anonymous Greek treatise contains 69 goldsmith’s recipe and is bequeathed as a transcript by Theodoros Pelecanos from 1478 in the French National Library (Paris, Bibliothèque Nationale, Par. Gr. 2327). The treatise is not only significant for Byzantine studies, but also for the history of goldsmith’s art in general und therefore for the experimental archeology, because it is the only known treatise from Byzantium, which predates the often-cited opus of Theophilus Presbyter from

the 12. Century und presents several procedures first, f.e. enameling and niello, which both play an important role in the goldsmith's art of Byzantium.

Although a French translation was published in the end of the 19. Century, the text was widely ignored, until the French version was translated into German and was technically annotated from a goldsmiths point of view by Jochem Wolters in 2004 and 2006. The evaluation by our project group has shown that both translations proved outworn, which illustrates the necessity of a revised edition. The project, a cooperation between the Römisch-Germanisches Zentralmuseum in Mainz and the Mainz University, is housed at the common interdisciplinary research platform for byzantine studies, the Leibniz Wissenschaftscampus Mainz – Byzanz zwischen Orient und Okzident. The projects aim is an edition with a new translation from the Greek original and with multidisciplinary annotations as result of a scholarly debate between philologists, historians, art historians, specialists for ancient metallurgy and goldsmiths. The long term goal is the promotion of a lasting strategic scientific intercommunication between experts of different disciplines, which work on medieval goldsmithing and related issues. Meanwhile the interdisciplinary work group comprises 16 members including external experts from Berlin and Athens, which partly work with unpublished sources. Special attentiveness will be devoted to a terminology of technical terms from the goldsmith's craft. A further substantial aspect of the project is the question of the cultural exchange on the basis of objects and written sources, concerning for example the mentioned Latin treatise of Theophilus Presbyter, which is because of its elaborateness surely the most considerable of those medieval technical treatises and therefore consistently cited also by byzantinists.

An integral part and unique feature of the undertaking is the evaluation of selected recipe with methods of the experimental archeology by goldsmiths under the aegis of the RGZM's Laboratory for Experimental Archeology (LEA). The attempt of the experiments is not the reenactment of the recipe under as authentic conditions as possible, but focusses very pragmatically on the question, if the single recipe claimed purpose occurs and why it does so, respectively why the purpose is failed and maybe must fail. By this means the experiments yield valuable evidences, for example about the completeness of the manuscript tradition or the physicochemical knowledge of the goldsmiths in medieval Byzantium.

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Barbara Rankl

The Sarcophagi Garden in Ephesus. Technological condition survey of 21 sarcophagi and the conservation and restauration of the so-called "Amazon Battle" sarcophagus

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The first main emphasis of this presentation is the technological condition survey of all objects in the Sarcophagi Garden in Ephesus (Turkey), and concludes with a technological and condition analysis. On the objects are many original tool marks visible. These will be presented in detail.

The second focus is the chest of the so-called "Amazon Battle" sarcophagus dated around 190 AD, from the harbor necropolis in Ephesus. It was excavated in the 1930s and was presented, together with 20 other stone coffins in the Sarcophagi Garden on Ephesus' archaeological site. The object is carved out of pentelic marble with an amazonomachy frieze on all four sides. The poor condition of this valuable object required conservation which was undertaken by the Institute of Conservation and Restoration. This included not only the practical work, but also scientific analysis of the deterioration caused by weathering and biological colonization. The conservation was carried out with innovative methods and generates a scientific foundation for future conservation on similar objects in Ephesus.

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Julia Heeb

New developments at the „Museumsdorf Düppel“ – City museum and “Living Lab“

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Most people working on or with experimental archaeology will have heard of the Museumsdorf Düppel in Berlin. The replica medieval houses of the open air museum were built on the original ground plan uncovered in the excavation of the site. Around 1200 AD the current site of the open air museum was also covered by a horseshoe-shaped settlement. In the course of the excavation the idea was born to make the past come to life, to communicate the results of the excavation in a more hands-on approach. The society “Fördererverein Museumsdorf Düppel” was set up in 1975 and the building of the historic houses began. The members of the society began to experiment in all areas of medieval daily life, many of the first articles in the Bilanz series were written by volunteers in Düppel. Although the open air museum is part of the “Stiftung Stadtmuseum Berlin” since 1995, a professionalization of the museum has only been slowly developing since about two year ago. Especially Prof. Fansa has done a lot for the survival of the museum. This talk will summarize the history of experimental archaeology at the Museumsdorf Düppel as well as exploring the newest developments and potential of the museum. The museum has growing numbers of visitors and increasingly fulfills a function as a living lab for experimental archaeology for the universities in Berlin.

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