NICOLAUS COPERNICUS UNIVERSITY IN TORUŃ
Faculty of History


Edited by GRZEGORZ OSIPOWICZ

# EDITORIAL

Dear Readers! The pandemic is taking its toll on all of us, but the development of vaccines raises a lot of hope that summer will be more normal. Therefore, we still believe that we will manage to organize our experimental camp this year, to which we invite you once again! Before that, however, we invite you to read the new issue of our Newsletter, in which you will find, as usual, three main articles. The first goes back to already quite distant history and describes the experimental archaeology/traceological camp organized by the Institute of History and Material Culture of the Russian Academy of Sciences in Izhevsk (western Siberia) in 1995, in which we were lucky to participate. The second article refers to the recently published experimental work accompanying the research on the so-called curved knives, i.e. Mesolithic tools, probably used for the treatment of siliceous plants. The third article introduces our latest experimental research on Early Medieval bone skates. In addition, the issue includes a fragment of the catalogue of the exhibition on experimental archaeology, organized by the MAMUZ Schloss Asparn / Zaya museum, in the preparation of which we participated. On behalf of the entire editorial committee, enjoy reading!

## INSIDE THIS ISSUE



# Experimental courses in NCU

**Fire by friction at the Institute of Archaeology NCU!**

Making a fire in a prehistoric way is one of the things that we want to teach our students during the experimental archaeology and prehistoric technology classes. Here, You can see a movie on our "fire by friction" presentation from one of such meetings! This skill should be considered as one of the most popular among participants indeed :)

If your interested, please scan or click the code. You will see a short movie from this lesson :)

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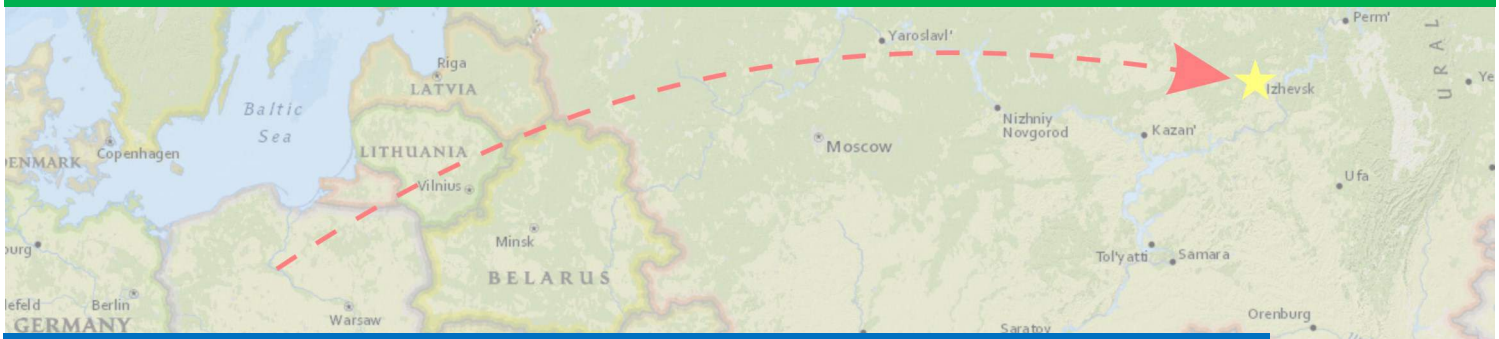



# International School of Traceology and Experimental Archaeology – Izhevsk, Russia, 1995

The Institute for the History of Material Culture of the Russian Academy of Sciences in Saint Petersburg, with the participation of the Udmurt State University in Izhevsk, organized on July 31-August 25, 1995. the fifth edition of the International School of Traceology and Experimental Archaeology. Thanks to the scientific partnership agreement between the Institute of History of Material Culture of the Russian Academy of Sciences and the Institute of Archaeology, Nicolaus Copernicus University in Toruń (IA NCU), the then dr Jolanta Małecka-Kukawka and three students of our Institute (Sylwia Kuźba, Karol Padczyk and Piotr Romanowski), could participate in this event. The trip to Russia was preceded by a two-week series of lectures and laboratory classes conducted for students of IA NCU in April 1995 by prof. G.F. Korobkova, prof. W.I. Szczeliński and L. Czajkina from Saint Petersburg.

Nearly 40 scientists and students from Russia, Ukraine, Morocco and Poland participated in the School in Izhevsk. Lecturers - professors G.F. Korobkova and W.I. Szczeliński gave a total of 40 hours of lectures on various aspects of traceological research. They concerned, inter alia, history of functional analysis, research methodology and experimental works. Part of the lectures included a detailed description of the prehistoric tools and their replicas obtained through the experiment. Much attention has been paid to the traces that are formed during the use of tools, depending on the nature of the work and the material they came into contact with. Each lecture was accompanied by a demonstration of tools - both experimental and prehistoric (Palaeolithic and Neolithic). Each participant had the opportunity to observe them under a microscope. A series of experiments were also performed daily, correlated with the topic of the lecture on that day. Their scope included replication works (making replicas of flint tools using various techniques) and imitation works, involving the processing of various raw materials using previously made replicas of tools.

Fig. 1. Organizers welcoming the group from Toruń (from left: Karol Padczyk, Piotr Romanowski, Ludmiła Czajkina, Jolanata Małecka-Kukawka, Władimir Timofiejew).

Fig. 2. Participants of the International School of Traceology and Experimental Archaeology.

Fig. 3. Experimental cutting of cereals.

As part of the experimental works, various activities were performed related to working in: wood (e.g., wood cutting, debarking, cutting grooves, etc.), bones (cleaning, sawing, engraving, etc.), antler, hides (cleaning of fatty tissue, dehairing, cutting, punching holes, etc.), and shells (drilling holes, sawing). The works also included cutting grass and reeds, archery, spear throwing, etc.

The above-mentioned works were made by the participants of the experiments with tools made of various materials. In addition to the most popular raw material, which was flint, obsidian, dolomite and quartz were also used. For some works shells and fragments of ceramics were also used. All experimental works was documented according to the requirements of the scientific experiment. After the end of the experiments, the tools were observed under a microscope. The organizers also provided the opportunity to compare the experimental tools with examples brought from the rich experimental collection of the Institute for the History of Material Culture RAS in Saint Petersburg.

At this point, it is worth mentioning a few words about the organization of the School itself. It took place in a holiday resort, surrounded by West Siberian forests, 30 km from Izhevsk. Equipping the laboratory room with binocular and metallographic microscopes, appropriate lighting, supplying with flint and other materials necessary for the experiments (e.g., meat, bones, hides, shells) took place at an enormous cost, above all, however, by a great effort of the people involved in this project. Despite the sometimes-mounting difficulties related to the lack of permanent transport, a trip to Votkinsk - the city of composer Pyotr Tchaikovsky was organized. Considering the economic conditions of the former Eastern Bloc countries at that time, the organizers deserve words of great appreciation. Participation in the "expedition" to Izhevsk gave the opportunity to get to know the research workshop of Russian archaeologists "from behind the scenes", which in the dimension of experimental archaeology is extremely valuable.

Detailed information about the School can be found in article written by Jolanta Małecka-Kukawka, entitled: International School of Traceology and Experimental Archaeology in Izhevsk in 1995, published in the journal Acta Universitatis Nicolai Copernici (Małecka-Kukawka 1996).

Fig. 4. Preparations for throwing spears.

Fig. 5. Participants of the School during experimental works related to hide tanning.

Fig. 6. Experimental works with processing of bones (from left: : Piotr Romanowski, Karol Padczyk, Sylwia Kuźba).

Fig. 7. The beauty of the forests of West Siberia.

## References :

**Małecka-Kukawka J., 1996.** Międzynarodowa szkoła traseologiczno-eksperymentalna w Iżewsku w 1995 roku, Acta Universitatis Nicolai Copernici. Archeologia, z. 26, 144-145

# International Camp of Experimental Archaeology

## Toruń 2021

We invite everyone interested in experimental archaeology to participate in a two-week ***International Camp of Experimental Archaeology***, connected with a seminar presenting the state of art of this method in Poland and accompanying traceological workshops.

The event is organized by the Department of Prehistory of the Institute of Archaeology, Nicolaus Copernicus University in Toruń, in cooperation with the Society for Experimental Prehistoric Archaeology (SEPA).

Papers presented during the seminar and the results of experimental work carried out during the camp will be published in the book entitled ***Experimental Archaeology in Poland***. The event is directed to all people who want to deepen the knowledge in the field of experimental archaeology, as well as in the traceological method.

**The covid is still dangerous but we are still optimistic. The final "yes or no" decision for the Camp this year will be made in April**

**June 14-27, 2021**

**(initial date, depends on the pandemic situation)**

More information about the camp, including the number of places and fees, can be found on the event website: **http://www.exarchcamp.umk.pl**


NICOLAUS COPERNICUS UNIVERSITY IN TORUŃ

# Plant processing in the Late Mesolithic Poland : in search for function of the mysterious "curved knives"

Studies on the treatment and use of plants in the Mesolithic are difficult due to the small number of sources. However, they are important because it was one of the basic branches of the economy of the early Holocene community. Here, we present an information about the experimental program that was realized to interpret a function of the very interesting Mesolithic/Neolithic tools, so-called curved knives.

These tools are associated with the treatment of silica plants, but their actual function is not fully understood. The research that is described below was based on a collection of 66 products of this type from 5 sites in central Poland. As a result of microscopic analysis, eight types of curved knives were distinguished. In order to identify the plant species the knives were used on an experimental program was planned and realized. Full results of the studies has been published in the article by G. Osipowicz: Plant processing in the Late Mesolithic Poland : in search for function of the mysterious "curved knives", Archaeol. Anthropol. Sci., Vol. 11 no. 7, p. 3613-3628.

*Experimental study results*

The program of experimental studies was based on findings of studies performed on site 6 in Ludowice, which could be a place specializing in siliceous plant processing. Thus, the location was probably not a coincidence, but determined by easy access to the raw material. In this case, such plants should be found in the palynological profile.

In line with the results of the conducted studies of this type, at the time when the Mesolithic settlements in Ludowice were functioning the prevailing herbaceous plants were sedges (Cyperaceae) and grasses (Poaceae), which are local species of the peat bog situated here. Ferns (Filicales monolete) and marsh ferns (Thelypteris palustris) are represented and a relatively high and stable curve is created by the eagle fern (Pteridium aquilinum). Wetland plant species are increasingly represented, among which nearly continuous curves are formed by the bogbean (Menyanthes trifoliata), water lilies (Nymphaea), the bur-reed (Sparganium) and the common cattail (Typha latifolia).

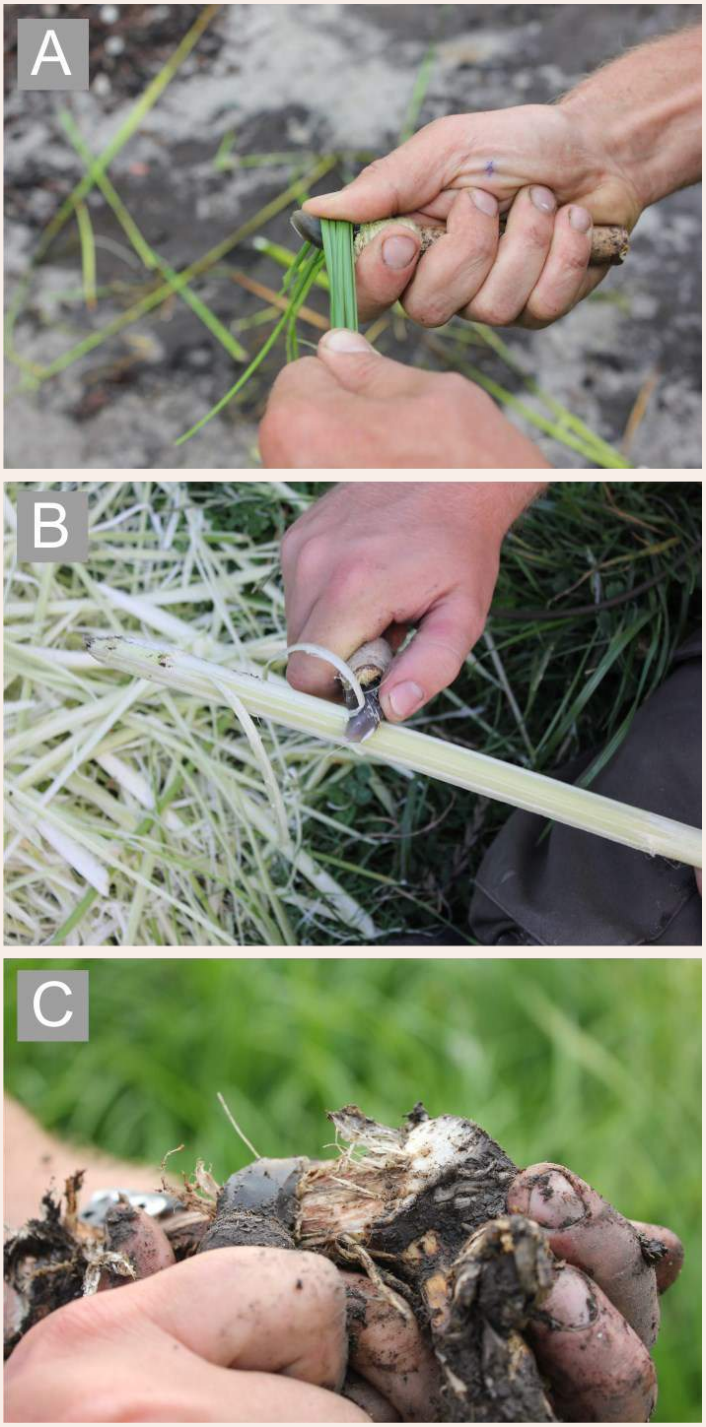



Fig. 1. Examples of experimental work carried out. Processing of a—Carex paniculata, b—stalks of the Typha latifolia, c—rhizomes of the Typha latifolia .

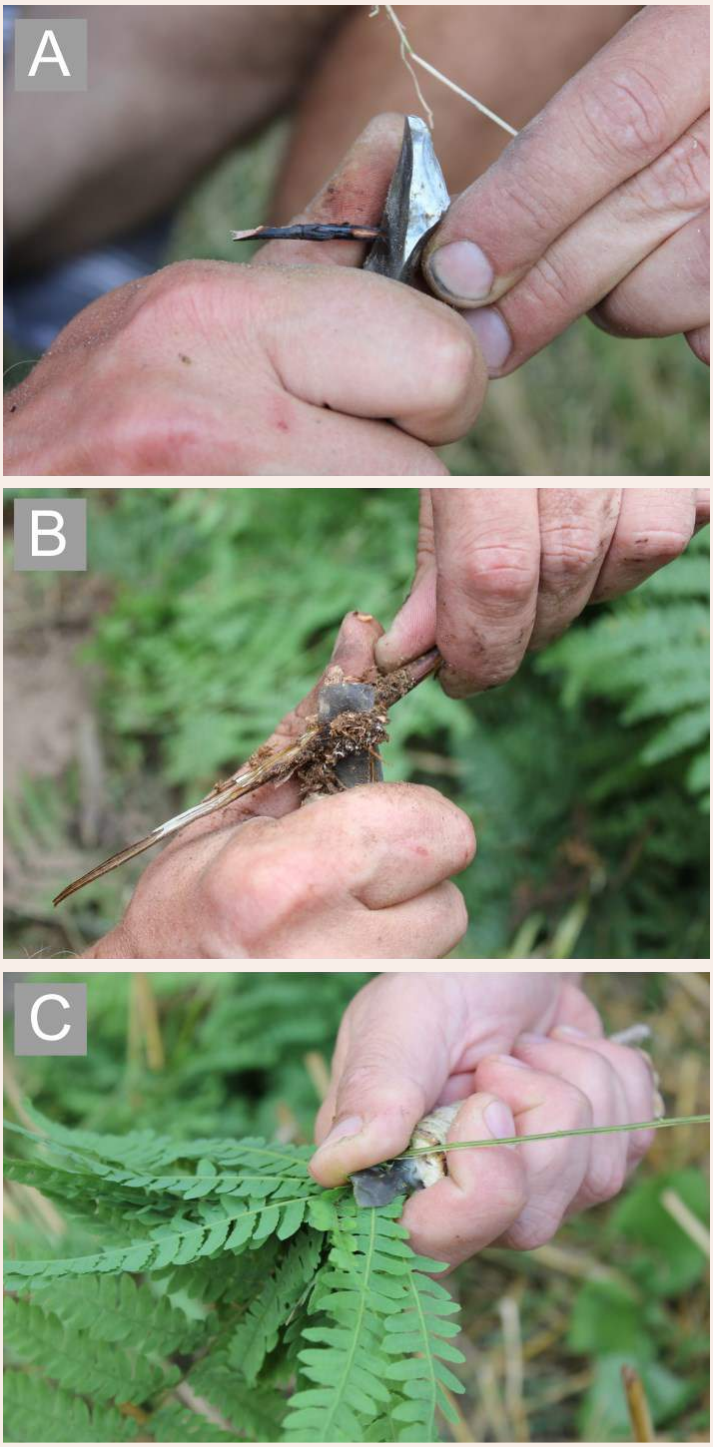



Fig. 2. Examples of experimental work carried out. Processing of a—roots of the Equisetum arvense, b—roots of the Pteridium aquilinum, c—stalks of the Thelypteris palustris .

Of spore plants with a high silica content the common horsetail (Equisetum arvense) can also be identified in small numbers (Noryśkiewicz report ; Osipowicz 2017).

In the experimental program the following plant species were taken into account: two sedge species common in Poland, namely, the greater tussock-sedge (Carex paniculata) and the lesser pond-sedge (Carex acutiformis), the common cattail (Typha latifolia), the marsh fern (Thelypteris palustris), the eagle fern (Pteridium aquilinum) and the horsetail (Equisetum). Other species identified in the palynological profile proved currently inaccessible or (as in the case of the European white water lily) conservation-dependent. All plants taken into account in the experimental program were identified in archaeological contexts and are also used by humans in the present day.

The experiments were more than 60 and up to 90 minutes long. For the purpose of the experiment, 10 blades made of Baltic erratic flint of natural straight or slightly concave working edges (analogous to historical products) were used. The blades were knapped from the same nodule of the raw material, and all tools were hafted. The experiments were conducted in a slightly different manner depending on the species of the processed plant, (Fig. 1, 2). Experiments which involved splitting the fibres of the greater tussock-sedge and the lesser pond-sedge, as well as splitting leaves of the common cattail, entailed the plants being drawn between the tool blade and the thumb at nearly right angles. The splitting of the stems of the common cattail and the common horsetail was performed by whittling with the angle of contact consistently maintained at 30˚. The experimental processing of rhizomes of the common cattail entailed cleaning them from impurities and basal shoots, and then splitting (whittling) into narrow strips. In the course of processing roots of the common horsetail and the eagle fern two activities were performed. First, they were cleaned of impurities, and then the external wooden parts were gently whittled to reach the soft inner 'flesh'. Processing stems of the eagle fern consisted of removing leaves and then cleaning and splitting (whittling) the stems to obtain fibres. In the course of the experiments on the marsh fern, stems and above-ground parts of stems were processed. The work comprised two activities. The first removed leaves by drawing the stems between the tool blade and the thumb. The second attempted to split the fibres in the stems by means of whittling to uncover the 'flesh' of the above-ground parts of stems.

As a result of the conducted experiments highly diverse wear use-wear traces were produced. Also, a number of correlations between artefacts and experimental tools have been identified that can provide an important step towards interpreting the actual function of the curved knives. At the same time, the large discrepancies in the traces resulting from the processing of different species of silica plants were documented and the probable use of many of their species in the European Mesolithic was suggested. If You want to know more about the results please check this: https://doi.org/10.1007/s12520-019-00784-w

## References :

**Osipowicz G, 2017.** Społeczności mezolityczne Pojezierza Chełmińsko-Dobrzyńskiego. Próba modelowej analizy wieloaspektowej funkcji i organizacji przestrzennej wybranych obozowisk. Nicolaus Copernicus University Press, Toruń

## Intriguing questions

From the early Bronze Age, we dispose of a quite large number of imitations of metal objects, which can be found both in ceramic products and those made of stone raw materials. However, how far could the artisans of this period have gone? Did grinding and polishing a stone object sufficiently bring it closer to shiny metal products? Was there anything else that could be done? Could it be additionally given the right colour and shine? And the most important question, are we able to identify these types of processes by analysing e.g. technological traces? Does the covering of ground stone objects with a layer of metal affect their characteristics?

To answer these interesting questions, we decided to conduct an experiment, the first step of which was grinding the flint arrowhead on a sandstone slab using two methods: (1) dry grinding (Fig. 1A) and (2) grinding with the addition of water. Then, the ground surfaces were "scraped" with the blade of a copper knife to completely cover them with a thin layer of the element in question (Fig. 1B). The next stage of work was to remove the copper layer from the flint point, for which it was necessary to use appropriate chemical processes. The key element of the project was the comparative microscopic analysis of the grinding marks on the experimental arrowhead before and after covering its surface with copper (Fig. 2).

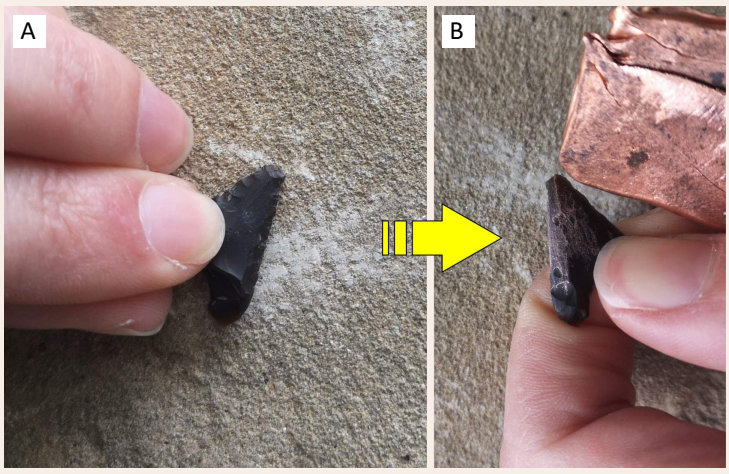



Fig. 1. Experimental work - grinding and copper coating of the flint arrowhead.

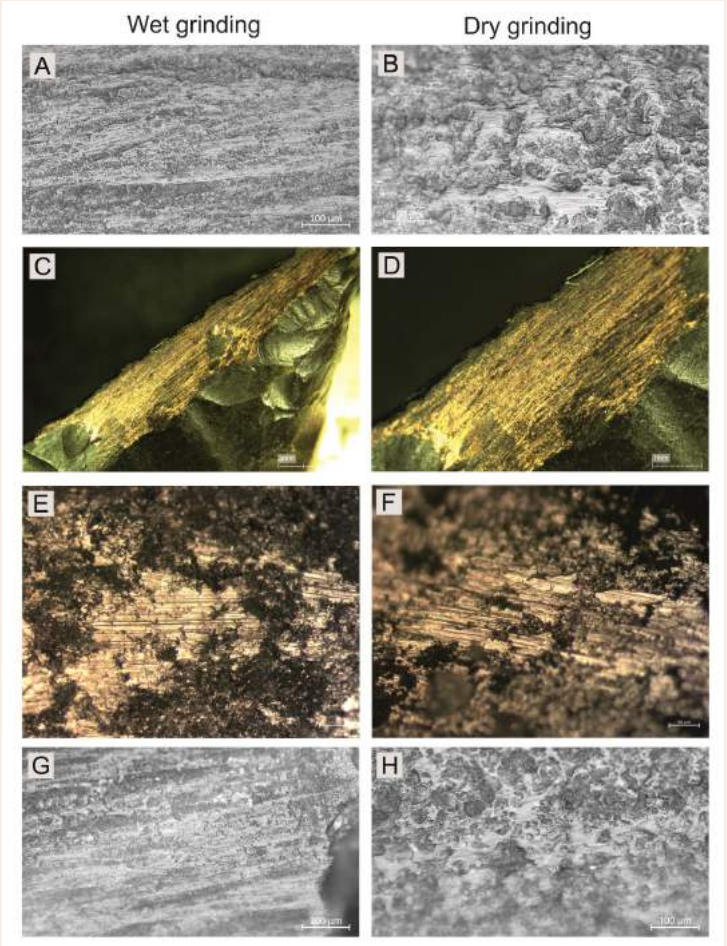
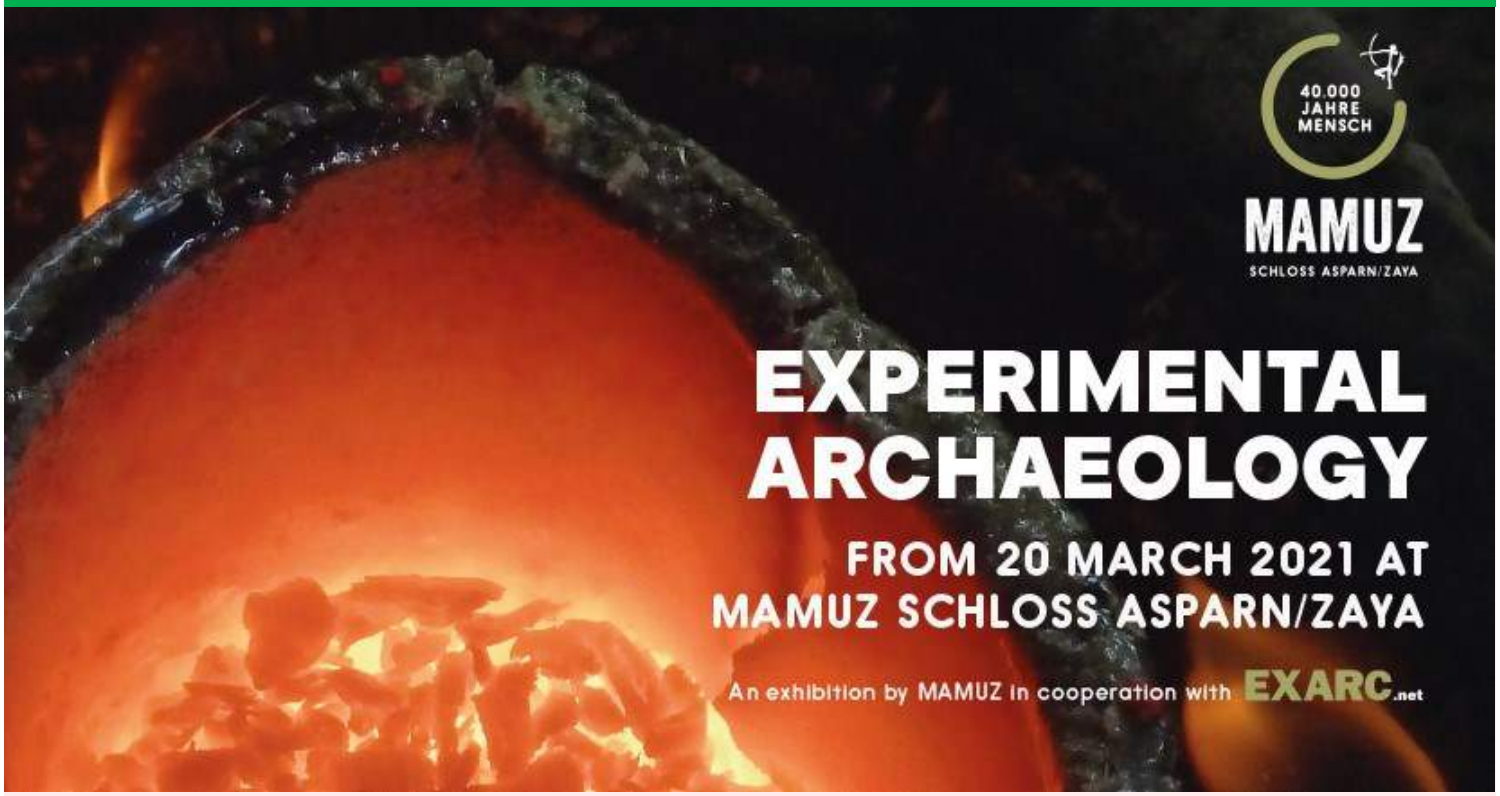



Fig. 2. Experimental results: A, B - technological traces observed after grinding the flint arrowhead; C, D - ground surface covered with copper; E, F - copper "residues" on the arrowhead surface: G, H - traces of grinding after removing the copper from the flint surface.

The full results of these works will be discussed elsewhere. At this point, we can only say that the process of grinding a small object like the arrowheads is extremely easy and takes only a few minutes. The situation with the covering its surface with copper is similar. The fact that its subsequent removal is quite a problem indicates the potentially great usefulness of this technique for creating imitations of metal objects in prehistory.




Grzegorz Osipowicz together with members of the Society for Experimental Prehistoric Archeology participates in the organization of the exhibition entitled: **Experimental archaeology**, which will be on display in the **Museum MAMUZ CASTLE ASPARN / ZAYA** in Austria, **from 20.03.2021 to 21.11.2021**. In this event, we will present our experiments on the birch tar production methods that could have been used before the invention of the pottery. We cordially invite you all to be a part of this interesting project and visit the exhibition! We are sure you all will be very satisfied and inspired :)

Below you will find some general information about the exhibition from the Organizers:

*This year's special exhibition is dedicated to the core area of work at MAMUZ Schloss Asparn/Zaya: Experimental archaeology. The exhibition presents exciting and unusual experiments conducted by respected archaeologists from across the globe that have provided revealing insights into the living environments of the ancient world. But can a modern experiment reflect the reality of the past? How is an experiment set up and why is meticulous documentation so important? The exhibition first introduces experimental archaeology as a research method and then presents a broad spectrum of experiments and areas of application.*

*Archaeology is largely concerned with periods from which neither written nor pictorial sources have survived. Traditional archaeological methods are often inadequate for understanding the way in which archaeological finds, such as tools and structures, were made and used. Only scientific experiments can answer specific questions about the technical possibilities, work processes and craftsmanship of our ancestors.*

*But in order to carry out an experiment it is vital to have a mastery of the tools and materials. Experimental archaeologists therefore require not just historical knowledge, but also practical know-how and excellent manual skills.*

*The exhibition shows experiments in areas such as ceramic production, wood technology, bronze casting, glass bead making, textile handicrafts, bone working and metallurgy. Experiments also help understand the processes involved with various activities, such as preparing roast pork 8,000 years ago and are used to show how people lived using a reconstructed Viking house.*

*As Franz Pieler, the scientific director of the MAMUZ who curated the exhibition explains: "Experimental archaeology has always been a core research area at MAMUZ Schloss Asparn/Zaya. In close cooperation with the Working Group Experimental Archaeology of the Austrian Society for Prehistory and Early History (ÖGUF), the museum regularly hosts workshops and teaching events on the open-air archaeological site. Many of the results of the archaeological experiments have been implemented in the model buildings that were built on the open-air site and have been incorporated into the MAMUZ educational programme."*

*The exhibition was organised in cooperation with **EXARC**, a global network of open-air archaeological museums and experimental archaeologists.*

*The exhibition catalogue will be on sale from 20 March at MAMUZ Schloss Asparn/Zaya.*

**On few next pages, you will see the part of the exhibition catalogue describing our experiments :)**

# HERSTELLUNG VON BIRKENPECH IM PALÄOLITHIKUM UND MESOLITHIKUM

BIRCH TAR PRODUCTION IN PALAEOLITHIC AND MESOLITHIC

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# HERSTELLUNG VON BIRKENPECH IM PALÄOLITHIKUM UND MESOLITHIKUM

# BIRCH TAR PRODUCTION IN PALAEOLITHIC AND MESOLITHIC

**Die nachstehend gezeigten Experimente hatten das Ziel, die Methode zur Herstellung von Birkenpech vor der Erfindung der Töpferei nachzuvollziehen.**

**The experiments presented below were aimed to reconstruct the method of the birch tar production before the invention of pottery.**

Autor/Author
Grzegorz Osipowicz

Fotos/Photos
Grzegorz Osipowicz


Abb. 1
Der Ofen während des Öffnens (A) und das gewonnene Birkenpech (B).

Fig. 1
The kiln during opening (A) and the obtained birch tar (B).

Abb. 2
Die Birkenpech-produktion mit der Eier-Methode.

Fig. 2
The final effect of the birch tar production with the eggs method.

Die archäologisch bestätigte Grundmethode zur Herstellung von Birkenpech ist das Zwei-Topf-Verfahren. Dafür war es notwendig, ein großes Loch mit einem kleineren Loch in der Mitte in den Boden zu graben. Im kleineren Loch wurde ein leerer Topf platziert, in dem das später gewonnene Birkenpech gesammelt wurde. Ein wesentlich größerer Topf - mit kleinen Löchern in seinem Boden und vollgestopft mit Birkenrinde - wurde auf den kleinen Behälter gestellt. Mit einem Deckel wurde alles verschlossen und mit einer Mischung aus Sand und Lehm abgedichtet. Der Feuerungsprozess dauerte für gewöhnlich drei bis vier Stunden. Danach hatte man die verschwelte Birkenrinde im oberen Behälter und das flüssige Birkenpech im unteren Topf.

Diese für das Mittelalter bestätigte Methode könnte aber auch schon früher, sogar bereits im Neolithikum, verwendet worden sein. Aber welche Methode könnte bereits vor der Erfindung von Keramik angewandt worden sein? Trotz mehrerer Birkenpechfunde konnten an keinen mesolithischen oder älteren archäologischen Fundstätten irgendwelche Rückstände einer Produktion gefunden werden. Ist es möglich, dass damals eine Herstellungsmethode verwendet wurde, die im archäologischen Kontext keinerlei Spuren hinterließ? Nachstehend werden einige mit Experimenten nachgestellte Techniken vorgestellt, die vielleicht verwendet wurden, ohne archäologisch sichtbare Spuren zu hinterlassen.

The basic archaeologically confirmed method for the birch tar production required using two vessels. It was necessary to a pit with the smaller one in the centre. Inside the smaller pit an empty vessel was placed, as a container for a future birch tar. A larger vessel with small holes in the bottom and birch bark inside was placed on it. The set was covered with a lid and sealed with a mixture of sand and clay. The firing process took usually about 3–4 hours. As a result, one had the charred bark in the upper vessel and the liquid birch tar in the lower one.

This method confirmed for the Middle Ages could have been used also earlier, even in the Neolithic. However, what method could have been used for a birch tar production before the invention of ceramic? Despite finds of the birch tar itself, no remnants of its production places have been discovered at any Mesolithic or earlier archaeological sites. Is it possible that during these times, a method leaving no signs in the archaeological context was in use? The following presents a few experimentally reconstructed techniques that might have been used for this purpose and would not leave any clear traces in an archaeological context.

Abb. 3
Steinblöcke-Ofen während der Feuerung.

Fig. 3
Stone blocks kiln during firing.

**FEUERUNGSANLAGE MIT STEINEN/SAND**

Mit kleinen Steinen wird eine kuppelförmige Ofenanlage gebaut und danach mit einer Mischung aus Sand, Gras und etwas Lehm abgedichtet. Die Ofenkammer wird mit frischer, kleinstreifiger Birkenrinde vollgestopft, mit einem großen Stein verschlossen, abgedichtet und befeuert. Der Feuerungsprozess dauert rund drei bis vier Stunden. Danach lässt man den Ofen rund drei Stunden abkühlen, bevor man ihn öffnet ***(Abb. 1)***. Das auf diese Art hergestellte Birkenpech ist stark mit Holzkohle und Rindenrückständen verunreinigt. An mesolithischen Fundplätzen in Polen und in den Niederlanden sind möglicherweise vor kurzem Reste derartiger Feuerungsanlagen gefunden worden.

**DIE EIER-METHODE**

Hier handelt es sich um eine Nachstellung des historisch weit verbreiteten Zwei-Topf-Verfahrens zur Herstellung von Birkenpech. Man benötigt dafür zwei leere Gänseeier, eines dient als Gefäß für die Rinde, im zweiten wird das hergestellte Birkenpech gesammelt. Ein Ei wird mit Birkenrinde gefüllt und in das zweite Ei gestellt (in ein davor gemachtes Loch von entsprechender Größe). Diese Konstruktion wird mit sandigem Lehm abgedichtet. Für den Feuerungsprozess wird der vorbereitete Ofen mit Glut umschlossen und das Feuer rund 30 Minuten durch Luftzirkulation in Gang gehalten. Danach kühlt der Ofen ab, bevor er geöffnet werden kann. Das obere Ei ist voll verschwelter Rinde und das untere Ei enthält das Birkenpech ***(Abb.2)***. Es wird vermutet, dass schon die Neandertaler diese Methode verwendeten.

**STONE/SAND CHAMBER KILN**

For its construction, small stones are used, that are sealed with a mixture of sand, grass and a little bit of clay. The kiln has the shape of a dome. It is filled up with the fresh birch bark ripped into narrow strips, covered with a big stone, sealed and fired. The firing takes about 3–4 hours. When the firing is finished the kiln is left for about 3 hours to cool down and then it is opened ***(Fig. 1)***. The birch tar made with this method is strongly contaminated with charcoal and the remnants of birch bark. It is possible that the remnants of such a type of kilns have been recently found at the Mesolithic sites located in Poland and Netherlands.

**THE EGGS METHOD**

This method of the birch tar production emulates the typical two-vessel method known from historical times. It requires two empty goose eggs, one of which serves as a bark container, in the second, the produced birch tar is collected. The egg is filled with the birch bark and its placed inside the second egg (in a formerly created hole of appropriate diameter). The construction is sealed with the sandy clay. The firing consists of covering prepared kiln with embers and feeding the fire for ab. 30 minutes by the airflow. Then, the kiln is cooled down and opened. As a result of the process, the upper egg is full of roasted bark and the bottom one contains birch tar ***(Fig. 2)***. The method was suggested to be used by Neanderthals.

**STEINBLÖCKE-FEUERUNGSANLAGE**

Diese Ofenanlage kann direkt auf den Erdboden gebaut werden. Kleine Steine werden mit einem trapezförmigen oder rechteckigen Grundriss aufgeschichtet und mit einer Steinplatte verschlossen. Auf einer Seite bleibt der Ofen offen, die anderen Seiten werden mit Lehm und Sand abgedichtet. Bei einer Feuerungsmethode wird der Ofen mit Birkenrinde gefüllt und von außen befeuert ***(Abb. 3)***. Während des Feuerungsprozesses kondensieren die von der verschwelenden Birkenrinde freigesetzten Teergase an den Ofenwänden und können von dort abgekratzt werden.

**BALLEN-METHODE**

Diese Methode wurde durch die Entdeckung von Birkenrindenballen am mesolithischen Fundplatz Star Carr (UK) inspiriert. Bei dieser Methode wird der Birkenrindenballen befeuert ***(Abb. 4)***. Das Pech wird während des Feuerungsprozesses aus der Rinde gewonnen.

**STONE BLOCKS KILN**

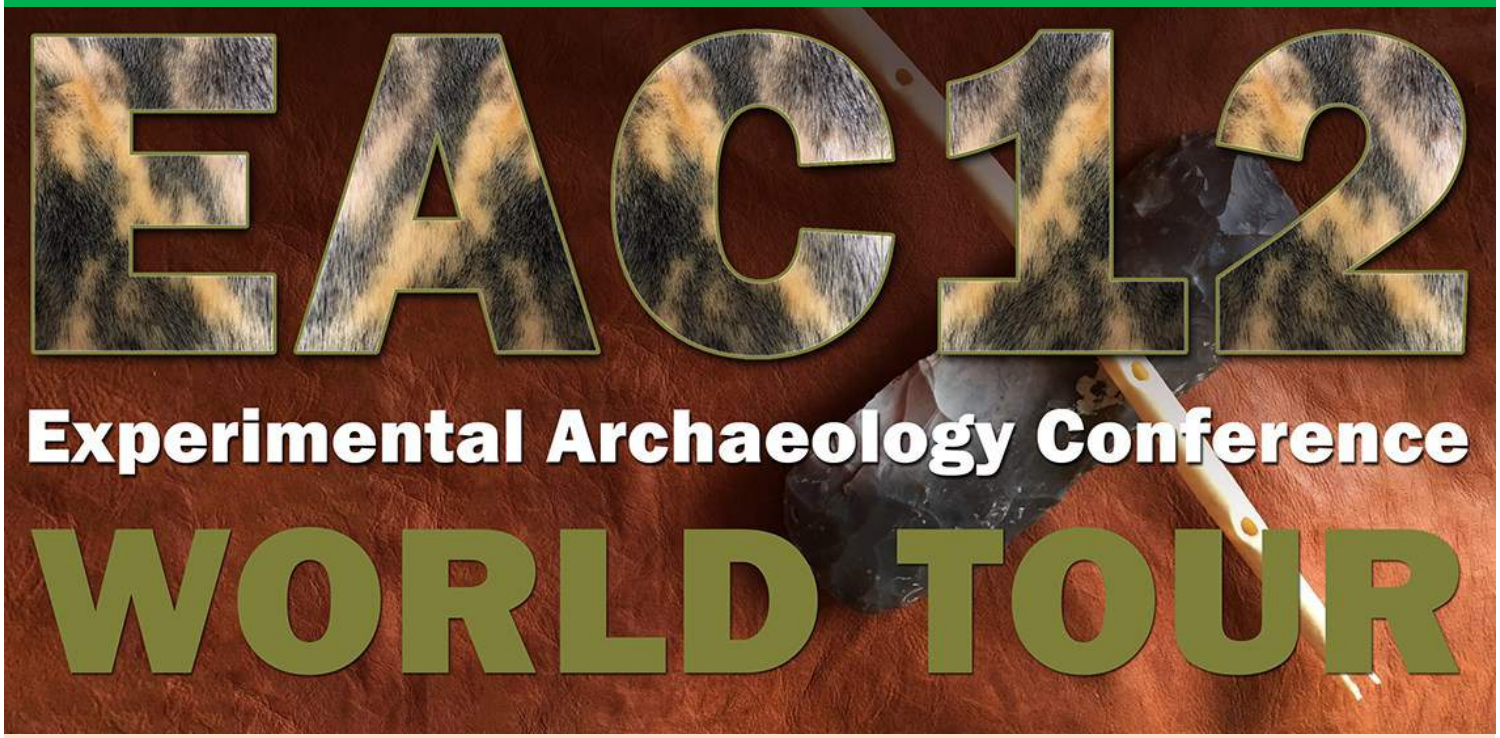
The kiln of this type can be built directly on the ground. To its construction, the small stones are used, that are laid on a trapezoidal or rectangular plan and covered with a stone slab. From one side the kiln is left open, while the other sides are sealed with clay and sand. One of the method of firing consists in filling the kiln with birch bark and its firing from the outside ***(Fig. 3)***. During the firing process, tar gases are released from the roasting bark and condense on the walls of the structure, from where can be collected.

**ROLLS METHOD**

This method was inspired by finds of birch bark rolls identified at the Mesolithic site in Star Carr (UK). It involves firing the birch bark roll ***(Fig. 4)***. The product is collected from the bark during firing.

Abb. 4
Der Birkenrindenballen nach dem Feuerungsprozess mit sichtbarem Pech an seinen Enden.

Fig. 4
The birch bark roll after firing with visible tar on its end.




## Join the #EAC12 Conference live and for Free

Attending **the #EAC12 Experimental Archaeology world tour online conference** is free and open access to all. You will see over 120 experiments from around the world, in 16 sessions spanning over 4 days (**29 March - 1 April**). The Conference will be streamed live on YouTube via https://www.youtube.com/c/ExarcNetofficial. We will be there too! Below our presentations:

### SESSION 12

***The Importance of Experimental Archaeology in Traceological Studies of Prehistoric Osseous Artefacts. Recent Work from the Institute of Archaeology NCU in Toruń, Poland***

Grzegorz Osipowicz & Justyna Orłowska

Traceological studies of osseous artefacts have a long tradition and can be divided into two main streams, i.e. research related to technological issues and typical functional analyses. An important part of both types of research is experimental archaeology. In our presentation, we will demonstrate the most interesting and important recent examples of our works connected with different kinds of osseous artefacts.
The presentation will be divided into two main parts. In the first one, we will present experiments connected with varied technological aspects of bone processing, among others with different kinds of grinding techniques applied to worked bone materials.
In the second one, we will focus on the interpretation of the functional aspects of osseous artefacts. As an example will serve our works associated with Bronze Age bone “knives” from Bruszczewo (Poland), seal bone scrapers, animal tooth pendants and seal craniums frontlets from the Subneolithic sites in Šventoji (Lithuania).

### SESSION 6

***Let's build Something Big! A few Words about the Open-Air Museum of the Institute of Archaeology, Nicolaus Copernicus University, Poland***

Justyna Kuriga, Grzegorz Osipowicz, Ryszard Kaźmierczak, Justyna Orłowska & Krzysztof Rybka

In 2014, the Institute of Archaeology of the Nicolaus Copernicus University in Toruń acquired funds from the Ministry of Science and Higher Education for the implementation of the "Restructuring of the Cabinet of Artefacts" program. The project was in line with the tendency to intensify interdisciplinary research and the need to create and implement new ways of deepening knowledge about the human past. As part of restructuring activities, part of the backyard of the Institute has been arranged as an open-air archaeological museum from the Stone Age to the Middle Ages with reconstructions of different buildings along with infrastructure, as well as places of burial and worship. Most of the facilities were built using tools and techniques specific to the given epochs. During the work, a number of experiments were carried out, including experiments related to the use of various types of tools made of raw materials such as bone, antler or flint. The structures built so far include a Stone Age turf-covered shallow pit-house, a Mesolithic shelter, Iron Age tombs, a medieval hut, a forge with a smokehouse and a pottery kiln. The museum is used for conducting experiments, teaching activities in the field of experimental archaeology as part of the archaeology study program, museum lessons as part of the Children's University, but also as a space for many educational events such as shows, workshops and archaeological festivals.

# For sledges or skates? Experiments with the early medieval bone “skates”

One of the oldest skates made from animal bones has been found throughout Scandinavia and Russia, including some that date back to around 3000 B.C. Modern scientists believe that the first manufacturers of skates were probably the Finns (Formenti, Minetti 2007). In historical and iconographic sources as well as ethnographic evidence we can find much information on how bone skates were used and how they were used (Fig. 1). Most often, artefacts of this type were made of radial and metapodial bones of horses, deer, less often cattle and pigs. The biggest advantages of this type of bones were its structure and shape. Medieval peoples attached the bone to the bottom of their shoes by drilling holes into the skate (but not always) and threading a strip of leather through to attach them. They were not initially used for recreation, but as a means to get around frozen bodies of water, to move people and goods, and for trade. Skates were a cheap and efficient mode of transportation, they reduced the time and energy of travelling during the winter months (Formenti, Minetti 2007).

A rich collection of such bone skates were discovered at the Early Middle Age site in Ostrów Lednicki (Poland; Fig. 2). "Skates" discovered on the mentioned site varied in types of used long bones for their production and the degree of use-wear traces visible both on their upper surfaces and on the sliding surface.

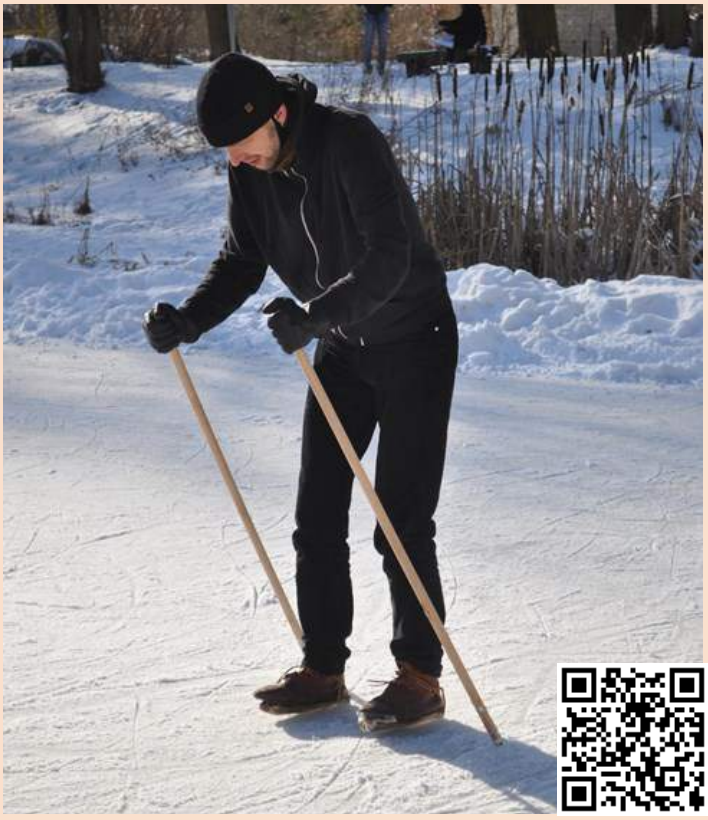
Fig. 1. Image of people ice skating using poles to propel themselves forward. From Olaus Magnus’, Carta Marina (1539).

Fig. 2. Examples of bone skates from Ostrów Lednicki, Poland (photo J. Orłowska).

Our experiments aimed to answer the question of how different types of "skates" were used. Were they used on ice, or maybe on snow. Were they used as skates or maybe as an element of sledges.

For the needs of our experiments, we prepared replicas of skates made of the radial and metacarpal bones of the red deer. We used both bones without preparing of the sliding surface and with grinded one. It was necessary for better understanding of created use-wear traces on them. We have tested two pairs of ice skates and two pairs of sledges.

One of the first activities that we checked was ice skating and skiing in the snow. During experiments, skates were attached to feet with leather straps. We used two wooden poles with metal ends for pushing forward (Fig. 3). At first, we were skating on a frozen lake. After a few minutes of riding and getting used to the skates, the skating was very enjoyable and, above all, effective. Next, we checked our skates on snow, as a kind of cross-country skis. However, unlike skiing on ice, in this case, moving was ineffective and very tiring.



**Scan code or click it to see the video**

Fig. 3. Experimental ice skating.

Fig. 4. Method of fastening the sledge runners.

Fig. 5. Experimental sledding.

**Scan code or click it to see the video**

We also checked the usefulness of the "skates" as an element of the sledges (Fig. 4). We made small wooden sledges and fastened the bone runners with leather straps to them. Sledges were tested when sledging from small snowy hills (Fig. 5). Radial bones best fulfil their role in this case.

At the moment, the experimental work has been completed and now it is time for making proper traceological analyses of all skates and compare them with “skates” from Ostrów Lednicki. We will for sure report about our finding in the future number of Newsletter!

**References:**

**Formenti, F., Minetti, A.E., 2007.** Human locomotion on ice: the evolution of ice-skating energetics through history. Journal of Experimental Biology. 210: 1825-1833

# Popularizing Activity

The Institute of Archaeology of the Nicolaus Copernicus University in Toruń and student organizations connected to it (like the Society for Prehistoric Experimental Archaeology) are involved in the popularization of experimental archaeology among a wider audience. We do it at numerous smaller and bigger festivals, classes and shows of a different type. Some examples of such events below:

## Festival in Kaszczorek village - 2005

## Festival in Biskupin - 2012

## Festival in Słup village - 2014

## Festival in Wietrzychowice - 2017

## Festival in Sarnowo - 2018