

The programmes included an introductory evening, four fieldwork days, and one day for student presentations and discussion. Fieldwork covered the following topics: (a) Pleistocene impact structure and associated sediments (Fig. 29), (b) sedimentology of kame-terraces (Fig. 30), and (c) Pleistocene sediment complex consisting of 14 allostratigraphic units (Fig. 31).



Fig. 30. Location Jurandvor – on top of the Pleistocene kame-terrace with well developed slope-dipping stratification, overlooking Baščanska Draga valley, which had been occupied by a valley glacier during the Middle Pleistocene (MIS 12 time equivalent).

The topics were observed and discussed at four key-locations on Krk Island. After the fieldwork, an introductory presentation for the next day was given. Since the group was interdisciplinary, a lot of basic geology was covered regarding sedimentary processes, field analyses of sediments, validity and usage of particular analyses (especially dating methods of predominantly carbonate clastics), processes in glacial environments, and glaciation of karst, etc. Palaeoclimate issues were discussed regarding the importance of “reading” palaeoclimate from sediments. For the first time, the impact structure of Krk Island was included, but poor weather conditions prevented full field observation, and the group continued work indoors. On the last day of the workshop, each student-participant presented their research work in progress, under following titles: Pleistocene Glaciations in the Teke Peninsula SW of Turkey (O. Altınay), Analyses of Tectonic Evolution of Dinarides by Analog Modeling (M. Poletto), Palaeolithic and the Pleistocene River Terraces (I. Kajtaz), Defining changes of terrain morphology in front of the glacier after glacial floods (M. Kornas), and Krk impact melt rocks (M. Čalogović). A fruitful discussion went on, as well as the exchange of knowledge in Quaternary sciences between young and senior researchers.

The key-locations Baška-Zarok and Baška-Gajevi were discussed in particular with colleagues from



Fig. 31. Location Zarok – a part of an extensive coastal section of the Pleistocene sedimentary complex consisting of 14 allostratigraphic units, predominantly glacialfluvial.

Italy. Future collaboration in correlating sites and solving the chronostratigraphy was also considered.

The details about the DIG Workshop, including guidebooks for download, are still available at the [web page](#).

1804S - Mezhyrich International Archaeology Summer School, interdisciplinary study of an Upper Pleistocene site

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Investigating a Prehistoric mammoth bone dwelling: from field and lab research to education

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Among Upper Pleistocene archaeological sites of the Eastern European Plain, open air settlements with monumental dwellings made of mammoth bones, in the Middle Dnieper region dating to 15 ka BP, are particularly famous. Four such sites were uncovered in Ukraine during the 20th century: Mizyn, Dobranichivka, Hintsy and Mezhyrich. In the latter one, a specific type of Epigravettian lithic industry, belonging to the Late Upper Palaeolithic, was named Mezhyrichian, which is similar to Dobranichivka, Hintsy and two other, Semenivka I-III, and Buzhanka II.

In Mezhyrich, the cultural layers have been well preserved down to 2.5-3 meters below the modern surface, yielding stone and osseous artefacts made of bone, antler and ivory. Since its discovery 50 years ago, four dwellings made of mammoth bones surrounded by archaeological structures were found, which are grouped in different household complexes. The first uncovered mammoth bone dwelling was reconstructed by I.G. Pidoplichko and exhibited in the National Museum of Natural History of Ukraine. Its basal part was made of 25 mammoth skulls, which were surrounded by mammoth mandibles stacked in piles. The fourth dwelling, discovered in 1976, was partially excavated and left in place for the purpose of future museum construction.

Since 2010, a Ukrainian-French expedition, led by P. Shydlovskiy in collaboration with S. Péan, has been excavating the site. Research has been focused on the pits and working areas surrounding dwellings nos. 1 and 2. Interdisciplinary studies have been carried out to determine the geological

and chrono-stratigraphical setting of the cultural layers, the palynological, microcharcoal, microfauna and malacofauna content, the zooarchaeological interpretation of the mammal bone material, and typo-technological features of the lithic industry. Mezhyrich is a unique site for conducting both research and for teaching the application of different natural science methods in archaeology within the context of an International Archaeology Summer School: because of a precisely described loess stratigraphy, the very well preserved cultural layers have been yielding representative collections of lithic and osseous artefacts, made of bone, ivory and antler, and faunal remains (Fig. 32).



Fig. 32. Working with the bones of fourth dwelling construction.

The 2018 Mezhyrich International Archaeology Summer School, which took place from 15 to 30 July, was dedicated to young scientists in archaeology, especially Master students, PhD students and post-graduate early career researchers, from the following institutions of Ukraine and France: Taras Shevchenko National University of Kyiv, National University “Kyiv-Mohyla Academy”, Institute of Archaeology NAS of Ukraine, Muséum National d’Histoire Naturelle in Paris. In the frame of an international field expedition, students were able to learn modern methods related to field work, analyses and interpretation of Upper Palaeolithic materials: methods of archaeological materials analysis, sampling, lithic industry analysis, preservation and storage of faunal materials and interdisciplinary analyses including geology, zooarchaeology and palynology.

The teaching team gathered scientists from different Ukrainian and French institutions: Taras Shevchenko National University of Kyiv, National Academy of Sciences of Ukraine, Muséum National d’Histoire Naturelle, Paris, France. They are experienced in field excavation of prehistoric sites, methods of processing archaeological materials and are specialized in techno-typological analyses of lithic industries, zooarchaeological and archaeobotanical analyses.

Mezhyrich is the base site each year for conducting excavations and teaching field archaeological practice for master students from from the Department of Archaeology and Museology at Taras Shevchenko National University of Kyiv. From 1 to 15 July a limited area of the cultural layer, related to the first mammoth bone dwelling, was opened. This area was ready for the training of

students during the summer school, which took place from 15 to 30 July.



Fig. 33. Mezhyrich. The fourth mammoth bone dwelling.

Research works at Mezhyrich were funded within the framework of the Ukrainian State Fund for Fundamental Research project (No. F77/82-2017) "Mezhyrich mammoth-hunters' settlement: archaeological research and museum studies". This project includes a cleaning of the stratigraphical sections of the cultural layers, the study of pit No.6 and the partial restoration of the fourth mammoth bone dwelling construction remains, still preserved at the site.

One of the tasks of the expedition was to carry out work to strengthen the construction of the fourth dwelling, the consolidation of the bones used as building elements, and the preliminary excavations inside the structure.

The remains of dwelling no.4 are configured in an accumulation of mammoth bones in the shape of an elongated oval (5.85 x 4.62 m), the long axis being oriented from west to east (Fig. 33). The accumulation is 0.6 m high above the ancient surface, which resulted from the collapse of the construction made of mammoth bones as raw material. Building elements include mammoth skulls, mandibles, long bones, scapulae and pelvis bones. The sequential and symmetric use of mammoth bones shows the technical, functional and aesthetic aspects of this type of ancient architecture.

Conservation techniques were accomplished first on bone samples out of the dwelling. Chemical compounds and modes obtained from their application were identified for a better preservation of bone remains. Available adhesive substances based on polymers and synthetic resins were used, notably with the advice and practices of associated French zooarchaeologists.

Sweeping of the internal space of the fourth dwelling enabled investigation of the heterogeneity of the cultural layer in filling the construction. In the south-eastern part the remains of small and medium-size mammals in anatomical order were identified in association with tools for skin processing – four awls made from long bones of a hare. In the opposite part of the house, directly next to the skulls of the mammoth, forming the "base" of the dwelling, accumulations of flint products were recorded. The accumulation represents production wastes, cores and several tools, which testifies to the presence of a flint-

processing workshop here. Such a spatial distribution of finds could result from a functional specification of different sectors within this structure.

In addition, archaeological excavations were carried out in the first and second dwelling complexes: respectively, 6 m² of a dense cultural layer among a working area at the south of dwelling no. 1, and the northern sector of pit No.6 associated to dwelling no. 2.

Lithic and faunal remains were analysed during the summer school, which gave students the opportunity to learn both field and lab research techniques: mapping of uncovered finds, developing an inventory of lithic and osseous artefacts and faunal remains, and the restoration of bones.

Lectures and practical lessons were taught to a group of Ukrainian and French Early Career Researchers and students. These lectures and lessons focused on field work methods of recording and mapping the archaeological materials excavated at the Mezhyrich site. Lectures were devoted to the specificities of studying archaeological material from Upper Pleistocene sites, in peculiar Upper Palaeolithic settlements attributed to Gravettian and Epigravettian cultural facies.

An important aspect of the work was the exchange of experience between Ukrainian and French scientists, in terms of field methodology of excavation and the application of zooarchaeological methods to the study of Palaeolithic sites.

A separate part of our activities consisted of excursions in the vicinity of the Mezhyrich site in order to study the archaeological and palaeoecological context: archaeological prospection of the surrounding area; review of collections of Pleistocene faunal remains from the "Tarasova Hora" National Reserve and the Kaniv Historical Museum; visit the mammoth bone dwelling remains of the Epigravettian Dobranichivka site preserved in situ in a museum.



Fig. 34. Participants of the Mezhyrich International Archaeology Summer School.

The 2018 Mezhyrich International Archaeology Summer School (Fig. 34) provides students with the training required for them to conduct future field and lab work on other prehistoric sites. For postgraduate students, participation in a summer school will be useful for writing and defending their dissertations.

In the future, based on the experience of leading the summer school, we aim to form an international focus group focused on the cultural, chronological, seasonal, and palaeoeconomy of Upper Palaeolithic sites in the Middle Dnieper basin area.

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