



REVISITING THE FINAL PALAEOLITHIC SITE OF MÜHLHEIM-DIETESHEIM (HESSEN, GERMANY)

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INTRODUCTION

In 1976 – and as part of the Hugo Obermaier Tagung in Giessen that year – a collaboration between Prof. Gerhard Bosinski and the archaeological volunteers in Mühlheim was established. This led to the discovery by volunteer Richard Plackinger and associates and subsequent excavation in 1976, 1977, 1978 and 1980 of the site of Mühlheim-Dietesheim. The site is located on the southern bank of the River Main, just east of Frankfurt (Fruth 1979, 1994), near a historical fording. The lithic assemblage belongs to the Final Palaeolithic Federmessergruppen and the toolstone materials indicate relations to the west and south. Heavy minerals analysis of the sediment profile indicated a stratigraphic position of this site just under the Laacher See eruption, suggesting a mid-Allerød date for the site.

The excavated lithic material and its raw material composition were described in detail by Fruth. The presence of a substantial number of larger pebbles and burnt lithics suggested the presence of at least one fireplace as well as a tent structure. Despite the site's proximity to the Main River, its internal strucure appears to have remained largely intact.

NEW DISCOVERIES IN THE ARCHIVES

In 2022, the legacy materials housed at the depot of the hessenArchäologie (Landesamt für Denkmalpflege Hessen) and at the Stadtmuseum Mühlheim were evaluated, leading to several noteworthy discoveries not mentioned in previous publications:

- **Charcoal** pieces;
- **Ochre** fragments;
- **III. 'A sandstone lamp'**, i.e. a roughly oval, bowl-shaped object reminiscent of Magdalenian lamps.

Following these discoveries, analytical work was begun to refine the dating of the site and better understand the activities that may have occurred at the site.

I. THE CHARCOAL





The location of the site of Mühlheim-Dietesheim on the south bank of the River Main.

II. THE OCHRE





The radiocarbon dating results.Inset: One of the three newly discovered charcoal pieces as seen under the scanning electron microscope.

The newly found charcoal was identified to species (Betula sp.) and sampled for radiocarbon dating. The resulting dates are conistent and fall into the early Holocene. This may indicate an otherwise undetected Early Mesolithic presence, reflect natural fires in the area at this time, or that the charcoal may be contaminated by younger carbon.

While these new radiocarbon dates cannot directly be related to the Final Palaeolithic settlement episode, they do show that organic preservation is possible at the site.



A The small ochre pieces as found in storage and under the scanning electron microscope.

The ochre consists of several small fragments >2 cm in size and vibrant red in colour. SEM-EDX analysis was used to both evaluate its structure and composition.

SEM images revealed cracks in the ochre, which may be caused by deliberate heat treatment. EDX results indicated traces of Al and Si, suggesting the ochre is formed from an admixture of iron oxide and clay. Further analysis is planned to examine the presence of any working traces, and to better determine its composition using XRD.

III. THE SANDSTONE 'LAMP'

The most interesting archival discovery is an irregularly shaped bowl-like sandstone object. It is fragmented into four pieces, showing ancient breaks. The object preserves what looks like crust and is strongly reminiscent of some Magdalenian lamps (type: irregular/natural, following de Beaune 1987) a rare find from Final Palaeolithic open-air sites. Following recent developments in chemically tracing the fuel used in prehistoric lamps (e.g., Robson et al. 2022), two samples were collected for organic residue analysis. The samples were obtained from two areas: the edge (sample 3, 75.6mg) and the centre (sample 4, 138.7mg). Lipids were extracted and derivatised using the acid-catalysed methylation procedure, following Craig et al. (2013) and Heron et al. (2015).









Both lipid profiles share similar key characteristics: generally quite low lipid concentration, fatty acid range from C12:0 to C18:0/C24:0, with clear dominance of C16:0 fatty acid (palmitic/stearic (P/S) acid ratio >3.1), inclusion of several plasticisers compounds e.g. phthalates. A range of mid- and long-chain n-alkanes (from C20 to C27/29), without any clear odd-over-even domination, were detected. This is may be indicative of biomass burning despite shorter-chain n-alkane profiles usually being associated to this activity. Other plant biomarkers (sterols, wax esters, long-chain fatty acids, n-alcohols) are absent, but we might tentatively interpret the lipid profile as degraded burnt organic matter.

REFERENCES

- Craig, O.E., et al. 2013. Earliest evidence for the use of pottery. Nature 496, 351-354.
- de Beaune, S.A. 1987. Palaeolithic Lamps and Their Specialization: A Hypothesis. Current Anthropology 28(4):569–577.
- Fruth, H.-J. 1979. Ein spätpaläolithischer Fundplatz bei Mühlheim-Dietesheim, Kreis Offenbach. Archäologisches Korrespondenzblatt 9:261–266.
- Fruth, H.-J. 1994. Der spätpaläolithische Fundplatz Mühlheim-Dietesheim, Kreis Offenbach. Fundberichte aus Hessen 22/23(1982-83):1-67.
- Heron, C., et al. 2015. Cooking fish and drinking milk? Patterns in pottery use in the southeastern Baltic, 3300-2400 cal BC. Journal of Archaeological Science 63, 33-43.
- Robson, H.K., et al. 2022. Light Production by Ceramic Using Hunter-Gatherer-Fishers of the Circum-Baltic. Proceedings of the Prehistoric Society 88, 25–52.