Excavating in the Land of the Devil

Past and Current Research on Prehistoric Flint Mines

12th International Conference

UISPP Commission on Flint Mining in Pre- and Protohistoric Times

6-8 May 2025, Worthing, West Sussex, England

Conference Program & Abstract Book

WTM worthing theatres and museum

INSTITUTE OF ARCHAEOLOGY AND ETHNOLOGY POLISH ACADEMY OF SCIENCES

ENGLISH HERITAGE

UISPP

12th International Conference
UISPP Commission on Flint Mining in Pre- and Protohistoric Times

"Excavating in the Land of the Devil:
Past and Current Research on Prehistoric Flint Mines"

6-8th May 2025

at Worthing Museum and Art Gallery, Worthing (West Sussex, England) and English Heritage Grime's Graves and Grime's Graves Visitor Centre (Norfolk, East of England)

Organising Committee and Partners
Dagmara H. Werra (Institute of Archaeology and Ethnology, Polish Academy of Sciences, Vice-president of the UISPP Commission on "Flint Mining in Pre- and Protohistoric Times");
Jon Bączkowski (Faculty of Arts and Humanities, School of Humanities, Department of Archaeology, University of Southampton; member of the UISPP Commission on "Flint Mining in Pre- and Protohistoric Times", The Sussex Archaeological Society);
Anne Teather (Visiting Fellow, Faculty of Science and Technology, Department of Archaeology and Anthropology, University of Bournemouth).
James Sainsbury (Curator of Archaeology) – Worthing Museum and Art Gallery;
Dickon Whitewood (Curator of Collections & Interiors, East) - English Heritage;

Worthing Museum and Art Gallery
(Worthing, West Sussex, England)

Conference program

Tuesday 6 May 2025

9:00-9:30 Registration Conference Registration at the Worthing Museum and Art Gallery - the Richmond Room

9:30-10:00 **Welcome speeches**

10:00-10:20 **James Sainsbury** *John Pull & Worthing's Stone Age Revolution*

10:20-10:40 **Joep Orbons** *1982 Excavation Harrow Hill*

10:40-11:00 **David Field & Peter Topping** *A Re-assessment of Prehistoric Flint Extraction in Britain and Ireland: Part 1 Origins*

11:00-11:25 Discussion and coffee break

11:25-11:45 **Peter Topping & David J Field** *A Re-assessment of Prehistoric Flint Extraction in Britain and Ireland: Part 2*

11:45-12:05 **Jenifer Wexler** & **Dickon Whitewood** *Grime's Graves 'Digging Deeper' project*

12:05-12:25 **Marie-Jose Schreurs** *Starting from Scratch, but a Great Experience.... Consolidation of the Rijckholt-Sint Geertruid Flint Mines (2021-2022)*

12:25-12:45 **Joep Orbons** *Rijckholt Flint Mine Restauration 2019-2023*

12:45-13:00 Discussion and coffee break

13:00-14:00 Lunch

14:00-14:20 **Francoise Bostyn** *Old and New Researches on the Flint Mine of Jablines (Seine-et-Marne, France). Rethinking the Organization of the Exploitation and the Use of Flint in the Lower Marne Valley*

14:20-14:40 **François Charraud, Emmanuel Ghesquière & Cyril Marcigny** *Methodological Reflection on the Detection, Excavation and Study of Flint Mines, Based on Neolithic Examples from Normandy*

14:40-15:00 **Magdalena Sudoł-Procyk, Magdalena Malak, Dagmara H. Werra, Hubert Binnebesel & Maciej T. Krajcarz** *Poręba Dzierżna, site. 24 - The Prehistoric Mine of Chocolate Flint in the Udorka Valley (Kraków-Częstochowa Upland, southern Poland). Results of Previous Research, Significance and Prospects*

15:00-15:20 **Emmanuel La O Kirchner** *Picks as a Proxy for Flint Mining? Analysis of Flint Picks and Mining-Related Artefacts from Soke Hill, Hampshire, England*

15:20-15:50 Discussion and coffee break

15:50-16:10 **Dagmara H. Werra, Artur Jedynak & Rafał Siuda** *Underground Art - Graffiti in the Prehistoric Striped Flint Mine iIn Krzemionki. State of Knowledge and a Little More*

16:10-16:30 **Jean Philippe Collin** *The Making and Purpose of Large Blades in Neolithic Middle Belgium. Insights from Orp and Ottenburg*

16:30-16:50 **Guichet Thomas** *Much Ado About Nothing? New Elements About Pressure Blade Making at Spiennes (Belgium)*

16:50-17:10 **Piotr Włodarczak** *The Ideology of Wandering to Flint in the Funeral Rituals of Final Eneolithic Communities in Western Lesser Poland*

17:10-17:30 Discussion and coffee break

17:30-18:00 Meeting of UISPP Commission on Flint mining in Pre- and Protohistoric Times

Wednesday 7 May 2025

9:00-9:20 **Margaret C Brewer-LaPorta, Philip C. LaPorta, Scott A. Minchak & Saverio A LaPorta** *The Tectonic Style and Setting and its Interregional Scale of Pre-Contact Quarry Development: An Application of the District Concept*

9:20-9:40 **Bruno Gómez de Soler** *Chert Landscapes: Geoarchaeology, Prehistoric Exploitation, and Historical Use in Sant Martí de Tous (NE Iberian Peninsula)*

9:40-10:00 **Antonio Tarriño, Hugo H. Hernández, Diego Herrero-Alonso, Cristina López-Tascón, Nuria Castañeda, Irantzu Elorrieta, José Antonio Mujika, Iván Martín-Martín & Sergio Martín-Jarque** *Dispersion and Mobility of Treviño Flint during Prehistory: Strategies and Patterns*

10:00-10:20 **Tomasz Oberc & Jakub M. Niebylski** Exploitation and Distribution of Jurassic G Chert in the Regional Range Among Funnel-Beaker and Baden Cultures' Settlements of the Western Lesser Poland

10:20-10:40 Discussion and coffee break

10:40-11:00 **Hubert Binnebesel** *What Happened to the Flint Workshops from the Udorka Valley and Where are They? Project of Geoarchaeological Research at the Mining Site in Poręba Dzierżna (site 24, Lesser Poland Voivodeship, Poland)*

11:00-11:20 **Sara Mandera, Michael Brandl, Magdalena Sudoł-Procyk, Christoph A. Hauzenberger, Dagmara H. Werra, Katarzyna Kerneder-Gubała & Maciej T.**

Krajcarz *Tracing the Provenance of "Chocolate Flint" Raw Material–Petrographic and Geochemical Methods to Discriminate Between Two Source Regions*

11:20-11:40 **Janusz Budziszewski, Michał Jakubczak, Dawid Jagłowski, Jakub Karczewski & Aleksandra Wołk** *Survey of Flint Mine Remains in Agrarian Areas. Case Study of the "Bednarzu" Chocolate Flint Mine in Kotlarka (Central Poland)*

11:40-12:00 Discussion and coffee break

12:00-13:00 Lunch

13:00-13:30 Poster session

1) **Philip C. LaPorta, Margaret C. Brewer-LaPorta, Scott A. Minchak & Saverio A LaPorta** *The Regional Scale of Pre-Contact Quarries: Stratigraphic and Sedimentary Facies Relationships*
2) **Scott A. Minchak, Philip C. LaPorta, Margaret C Brewer-LaPorta, & Saverio A LaPorta** *The Chain of Operation Across Three Tectonic Provinces: Quarry and Mine Instrument Types; Half Products and Products*
3) **Helena Wehren, Anna Kienholz & Jehanne Affolter** *Found in Sursee-Zellmoos (Switzerland) But from Where Did It Come?*
4) **Emmanuel La O Kirchner** *Picks as a Proxy for Flint Mining? Analysis of Flint Picks and Mining-Related Artefacts from Soke Hill, Hampshire, England*

13:30-14:00 Workshops and projection of the film: *Harrow Hill Excavation 1982, Not the Scientific Story* by Joep Orbons

14:00 Trip to Cissbury Hill. Neolithic Flint Mines and Iron Age Hillfort
(guide – James Sainsbury**)**

Thursday 8 May 2025

7:30-11:00 Trip to Grime's Graves - Prehistoric Flint Mine

11:40-16:30 Visiting Grime's Graves - Prehistoric Flint Mine
(guides – Jenifer Wexler & Dickon Whitewood)

16:30-20:00 Trip back to Worthing

Friday 9 May 2025

Post-conference Trip to Neolithic Wessex

7:00-20:00 A full day of exploration through Neolithic Wessex

Visit to Stonehenge, Durrington Walls, and Woodhenge, with the possibility of also visiting the Avebury landscape, including the henge itself, Silbury Hill, and the West Kennet long barrow.

(guides – Anne Teather and Jon Baczkowski)

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John Pull & Worthing's Stone Age Revolution

John Henry Pull was born in 1899 to a working-class family in Sussex. As a child he displayed a natural talent for illustration, and he would often explore the countryside near Worthing, where he grew up, drawing plants, birds and buildings.

Like many in his generation, John joined the army in 1916 and fought on the Western Front, where he was gassed and captured in the German Spring Offensive of 1918. The care he received from Belgian nuns whilst a prisoner of war led to John keeping in touch with the convent for the rest of his life.

On his return from the war he would often 'take the air' on the local downs to help heal the lung damage from his time in the trenches. It was during one of these excursions that he discovered the flint mining complex at Blackpatch, at a mere 22 years of age. John gained permission to excavate from the Duke of Norfolk and with a small group of friends began to dig into 'Pit 1' in May of the same year. At some point during that summer, John either asked for help from the Worthing Archaeological Society, or help was forced upon him. He was ultimately seen as an 'upstart amateur' by those in the established archaeological community, who needed to be monitored, if nothing else. This is clearly seen in the events that followed - his report on Blackpatch was denied publication due to the 'poor illustrations' of flint tools, despite evidence that his first drawings were wholly sufficient. The excavation of Pit 1 was then published without his knowledge by the upper-class archaeologists in Sussex, with acrimony and splits within the community following, and finally a smear campaign was launched against John by an anonymous individual in the local newspapers.

Undeterred, John continued his work at Blackpatch for another decade, excavating mine shafts, flint working floors and later burial mounds constructed from the mining spoil. In the meantime the Worthing Archaeological Society had begun work on the flint mine complex at Harrow Hill, just across the valley from Blackpatch. This period of work culminated in John's publication of 'The Flint Miners of Blackpatch' in 1932 - a book that not only had some cutting-edge analysis for the time, but was also written in a way that made it readable to the general public. Furthermore, John often published short articles in the local newspapers about his excavations and findings, which did much to educate and promote archaeology to the people of Worthing. This was at a time when archaeology continued to be the preserve of the middle and upper classes.

John then began work at Church Hill (1932-1948), excavating a number of important mine shafts either side of the Second World War. He explored the relationship between later Bronze Age activity in and around the shafts, in addition to connections between Church Hill and the nearby Blackpatch. As at Blackpatch he dug with family members, friends and work colleagues - always on weekends or summer evenings, whilst working fulltime as a postman in Worthing. It was after the war ended that John was brought back into the established archaeological fold, a testament to his efforts, and to the changes in society as a whole over this period.

In 1952, at 53 years of age, John finally had the opportunity to excavate at Cissbury Ring. Previous work by Pitt Rivers, and other lesser-known antiquarians, had done much to elucidate the archaeology of flint mining at Cissbury. However, this work had taken place in the 1860s and 1870s, when ideas around the nature of Stone Age society, culture and technology were in their infancy. John now had the backing and resources of the Worthing Archaeological

Society and targeted the smaller in-filled shafts at the southern end of the Cissbury complex. Whilst excavating ‘Shaft 27’ John and the team discovered the partially burnt remains of an ox in the shaft fill. When reaching the bottom of the shaft an inhumation of a young woman was found in remarkably good condition, despite damage to her skull. Beyond the skeletal remains, within the galleries, a number of carvings were recorded on the chalk walls, including a red deer, a fish, a bird and a short-horned bull with a rope around its neck - the earliest example of art representing a domesticated animal in Britain.

Unfortunately John was murdered during a bank robbery at Worthing in 1960 whilst working as a security guard. Much of his work was never published as a result, though the vast majority of his archive made its way to Worthing Museum in the year following. Since then we have continued to receive donations relating to John from those who knew him, including a number of flint tools he gifted to children who helped excavate in the 1950s.

John Pull was a trailblazing amateur archaeologist - a working-class hero, who disseminated his discoveries to the wider public, and was fiercely passionate about education. He was a pioneer of environmental archaeology, for example he learned all there was to know about snail species and the environments they lived in. Along with his team of friends and family, he excavated more flint mine shafts over forty years than any other individual in Sussex.

Worthing Museum has a permanent display to honour his memory, and the Worthing Archaeological Society hosts the annual John Pull Memorial Lecture. In 2005 Channel Four’s Time Team excavated at Blackpatch and told the story of John’s struggles against the established antiquarian cabal in the 1920s. In 2024 a Blue Plaque dedicated to John was unveiled at the museum.

Keywords: Blackpatch, Church Hill, Cissbury Ring, John Pull, Amateur Archaeologist

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1982 excavation Harrow Hill

Prior to the 1983 Brighton Flint mining Conference, the British museum organized an excavation of a neolithic flint mine at Harrow Hill in the summer of 1982. The visit to the newly excavated flint mine was the highlight of the 1983 symposium.

The 1982 excavation of the flint mine at Harrow Hill was carried out by the Dutch group that excavated the Rijckholt flint mine in the period 1964-1972. It was organized by Sjeuf Felder. My father was also part of the Rijckholt excavation team, so was I as a young 17 year old together with my brother. My father made pictures of the activities that took place around the excavation. One member had an 8 mm film camera and filmed our work and the life of an excavation team at Harrow Hill.

My father's photographs and the film have never been shown to people outside the excavation team. During the presentation, some lively pictures and film fragments will be presented of the life and times of the excavation team and the life around the excavation. The photographs and film give a unique insight into the personal love and interest in flint mining of the team member. It does not present scientific information, just a look back into time with people important for the 1970s and 1980s flint mining excavations like Sieveking, Felder, Mortimer, and Weisgerber. The excavation in Harrow Hill was one of the important sparks that started my long career in archaeology.

Keywords: Harrow Hill, 1982, excavation, personal interest, film and photographs, Brighton flint symposium

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A Re-assessment of prehistoric flint extraction in Britain and Ireland: Part 1 Origins

Following comprehensive survey of the British prehistoric mine sites during the 1990s certain factors stood out as deserving attention. Most significantly, we questioned the need for monumental subterranean extraction when material could easily be obtained on the surface. Just why go to the bother of doing it, after all, some mines targeted poorer quality material than was available nearby. We noted too, the way that mines cluster close together and searched for answers as to why this should be. Our initial C14 dates started to point to dates earlier than what was then accepted as the beginning of the Neolithic. Years of research since has led us in certain directions, not least away from an economic model. More Mesolithic extraction sites are being discovered, but more early C14 dates for the major flint mine sites have also resulted in a backdating of the Neolithic. How can we reconcile indigenous presence and traditional use of the landscape with the Neolithic pioneering and need for axeheads. This paper considers a the development of mining from and an indigenous perspective and surprises in its conclusions.

Keywords: origins, Mesolithic, axeheads, pits, quarry

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A Re-assessment of Prehistoric Flint Extraction in Britain And Ireland: Part 2

This paper will present a re-examination of the flint mines which developed from the Mesolithic/Neolithic transition through to the Middle Bronze Age. It will demonstrate elements of continuity, and speculate upon the probable social context of those using the mines. A major theme is the objectification and uselife of the products from these mines and pits and their role in the cosmographic ordering of society. Traditional models of the possible roles of mines in a *'market economy'* will be challenged, and alternative paradigms demonstrated. Overall, the paper will show that although there was indeed technological and social change surrounding the introduction of galleried mines, there was also a strong element of continuity in their adoption and use in Britain and Ireland.

Keywords: Indigenes, acculturation, ritualised extraction

Jennifer Wexler[1] and Dickon Whitewood[1]
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Grimes Graves: 'Digging Deeper' Project & Re-assembling the Grime's Graves archaeological assemblage: future scope and possibilities

Grimes Graves is the largest flint mine in Britain, with deep-scale mining was undertaken from around 4,500 years ago. At a time when people were transforming their world on a massive scale, the communal effort needed to build the deep, galleried mines would have been would have been as monumental as constructing stone circles. Special meaning was probably derived from this mining of the deep, flawless flint, adding layers of meaning to the objects made here. English Heritage has recently completed a project (Digging Deeper) to better highlight the special nature and history of the mines. This includes putting up new interpretation boards to identify key features within the landscape, walking trails to explore further, family and kids-targeted trails, new interpretation in the Visitor's centre and new building over and immersive experience in Pit 1 (the main pit access for visitors) to improve access into the mine. Community-focused projects were developed alongside the reinterpretation project. Recently, we have initiated a new project to reassemble key archaeological assemblages from a range of museums, focusing primarily on the faunal and skeletal collections. This project will employ aDNA, isotopes, and new dating techniques to gain a better understand of the site's development. This paper will present the findings of the recent interpretation project at as well as the scope for future research at Grimes Graves.

Keywords: Flint, deep mines, interpretation, assemblages

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Starting from scratch, but a great experience.... Consolidation of the Rijckholt-Sint Geertruid flint mines (2021-2022).

The starting point for the designation of archaeological national monuments is to preserve them permanently. One of the monuments is the Neolithic Rijckholt flint mine complex. Part of the mines were explored in the years 1964-1972 and opened up to visitors through a corridor shortly afterwards. A stability survey conducted in 2019 revealed that some gallery systems had become inaccessible due to collapses. In addition, some strut structures from the 1960s and 1970s were in need of major maintenance.
For the consolidation work, the Cultural Heritage Agency granted a subsidy to the current voluntary keepers of the flint mine. In addition, the Heritage Agency was involved as competent authority and advised the volunteers and the archaeological company involved in the reconstruction and research and shared knowledge on prehistoric flint mining. This presentation will cover various aspects of the project, such as the requirements for the archaeological research, framework conditions for the consolidation works and experiences gained during the restoration, expansion and consolidation works, implemented in 2021-2022.

Keywords: Rijckholt flintmines, consolidation, experiences

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Rijckholt Flint Mine restauration 2019-2023

The Rijckholt Flint Mine is since 2017 under management of a volunteer foundation, continuing the public visits that had been taking place since the mid 1970s. The foundation carried out an analyses of the stability, safety and presentation of the prehistoric galleries and the publicly accessible tunnel. The stability of the public part of the mine was good but the prehistoric galleries were in a poor shape, less than 20% of the prehistoric galleries were still accessible in a safe manner. The public presentation in the mine was outdated and the visitors could not see the real beauty of the underground prehistoric mining landscape.
A plan was made for an extensive consolidation to improve safe accessibility to the galleries, to improve the visibility of the prehistoric underground landscape to the public and to allow for future new archaeological research. In cooperation with the State Heritage Foundation, local and regional government and many specialists, this plan was financed and carried out with assistance of volunteers of the foundation.
The publicly accessible tunnel has been enlarged with 30 metres of new tunnels, many new, large windows, the visitors are now fully emerged into the prehistoric landscape.
In the village of Rijckholt, a visitor centre was erected that gives information on the geology, archaeology and landscape of the region and is open during the weekend, run by volunteers of the foundation.

Keywords: Rijckholt flint mine, consolidation, restauration, public presentation, museum

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Old and new researches on the flint mine of Jablines (Seine-et-Marne, France). Rethinking the organization of the exploitation and the use of flint in the lower Marne valley.

Research in the Jablines sector goes back a long way, and is linked to the surface collections made from the early 20th century until the 1980s of abundant lithic artefacts, in particular a large number of flaxed axes. A preventive excavation in 1989 made it possible to document the extraction features, which had previously been poorly documented. In recent years, new researches have been carried out to continue documenting the Jablines sector, to try and clarify what had been envisaged as a mining complex, in particular the possible underground extraction at Coupvray, and to think on the regional scale at the organization of the exploitation of siliceous resources and the use of the resulting products.

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Methodological reflection on the detection, excavation and study of flint mines, based on Neolithic examples from Normandy

Normandy is one of the French regions where flint mines have been recognized and studied for the longest time, since the middle of the 19th century. New research methods were also tested there during several preventive operations (diagnoses and excavations) carried out around 2010. The experience acquired during these excavations makes it possible to share with the archaeological community the methodological contributions of these different research protocols. We will first discuss prospecting methods, making it possible to effectively detect and spatially delimit mining sites. The survey and excavation methods aim to characterize the depositology and petrography of the exploited flints, the variability of extraction techniques, in terms of physical constraints and potential of the deposit, but also to characterize the mining tools and the production carried out on the mine. This work questions sampling protocols to date mining sites in a relevant way, as well as the reasoned use of mechanization: it is about optimizing the relationship between the cost and duration of excavations, the human resources invested, safety issues, and the quantity of information they provide. A protocol of systematic multiplication of radiocarbon datings also makes it possible to offer robust statistical analyzes and spatial or chronometric modeling of mining sites. The impact of these excavations on the natural (landscapes, geology) and archaeological heritage can also be assessed.

Keywords: flint mines, methodology, Normandy, mechanization, radiocarbon dating

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Poręba Dzierżna, site. 24 - the prehistoric mine of chocolate flint in the Udorka Valley (Kraków-Częstochowa Upland, southern Poland). Results of previous research, significance and prospects.

The chocolate flint mine in Poręba Dzierżna, site 24 (Lesser Poland Voivodeship), is situated in the central part of the Kraków-Częstochowa Upland. The site is located on a slope in the south-eastern part of the Udorka Valley, at an altitude of 270 to 350 m above the sea level. The mining field with a characteristic relief of pits and dumps was discovered during the 2013 geological survey and its size approximated with use of Lidar analysis (Sudoł-Procyk et al. 2018). Systematic excavations have been carried out since 2018 (Sudoł-Procyk et al. 2021b).

So-called „chocolate flint" (Polish: krzemień czekoladowy) is one of the most renowned types of siliceous raw materials used in prehistoric times within Poland (Sudoł-Procyk et al. 2021a). Its deposits were previously known only at the north-eastern edge of the Świętokrzyskie (Holy Cross) Mountains, over 100 km away (Krajcarz and Krajcarz 2009). Our discovery of chocolate flint deposits in the Udorka Valley, along with evidences of its extraction and initial processing, redrawn a map of chocolate flint provenance and distribution, with serious implications for studies of the past lithic economy.

The discovery of several chocolate flint deposits in the context of the Poręba Dzierżna mine along with other nearby sites allows us to conclude that the Udorka Valley chocolate flint was a raw material of at least local importance. Ongoing research aims to determine its range and supra-regional significance.

In the presentation, the authors will discuss the results on the size and function of mining features, applied exploitation methods, the chronology of prehistoric miners' activities based on flint product comparative typology and absolute dating, and further research perspectives.

The research is financed by the National Science Centre, Poland, grant No. 2018/30/E/HS3/00567.

Keywords: flint mine, raw material, chocolate flint, prehistoric communities, Udorka Valley, Kraków-Częstochowa Upland, Poland

References:

Krajcarz M. T., Krajcarz M. 2009. The outcrops of jurassic flint raw materials from south-western margin of the Holy Cross Mountains. Acta Archaeologica Carpathica 44: 183-195.

Sudoł-Procyk M., Budziszewski J., Krajcarz M.T., Jakubczak M., Szubski M. 2018. The chocolate flint mines in the Udorka Valley (Częstochowa Upland) – a preliminary report on the field and lidar surveys. In: Werra D.H., Woźny M. (eds.), Between History and Archaeology Papers in honour of J. Lech. Archaeopress Archaeol., Oxford, pp.: 89-102.

Sudoł-Procyk, M., Brandl, M., Krajcarz, M.T., Malak, M., Skrzatek, M., Stefański, D., Trela-Kieferling, E., Werra, D.H., 2021a. Chocolate flint: new perspectives on its deposits, mining, use and distribution by prehistoric communities in Central Europe, Antiquity 95. https://doi.org/10.15184/aqy.2021.48.

Sudoł-Procyk, M., Krajcarz, M.T., Malak, M., Werra, D.H., 2021b. Preliminary characterization of the prehistoric mine of chocolate flint in Poręba Dzierżna, site 24 (Wolbrom commune, Lesser Poland Voivodeship), Sprawozdania Archeologiczne 73, s. 109–135. https://doi.org/10.23858/SA/73.2021.2.2546.

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Picks as a proxy for flint mining? Analysis of flint picks and mining-related artefacts from Soke Hill, Hampshire, England

The identification of flint mining sites primarily relies on the presence of clear features such as pits and spoil heaps or the results of prior excavations. However, these factors are often absent on sites, including the subject of this study – Soke Hill in Hampshire, South East England, a flint mine landscape, where such features were destroyed by agricultural practices. Fieldwalking surveys undertaken from autumn 2020 until spring 2025 on a plateau situated around Soke Hill revealed large amounts of lithics totalling over 2,000 finds. The dateable flintwork collected covers each major period from the Lower Palaeolithic to the Early Bronze Age. Late Neolithic material comprises the largest portion of the assemblage, of which flint picks comprise a significant percentage. Furthermore, the quantity and quality of the Late Neolithic evidence uncovered here suggests intense, localised activity, which has so far proved elusive elsewhere in Hampshire.

This research (the author's bachelor dissertation) posits that flint picks and mining-related artefacts can be used as a proxy in the identification of flint mines, based on the surveys undertaken at Soke Hill. Additionally, flint picks and waisted tools (both under-researched aspects of flint mining in Britain) will be analysed and discussed in the study.

Keywords: Flint picks, flint mine prospection, waisted tools, Late Neolithic, Hampshire, lithic analysis

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Underground art - graffiti in the prehistoric striped flint mine in Krzemionki. State of knowledge and a little more

The Krzemionki Neolithic striped flint mine was discovered more than 100 years ago on July 19, 1922. The mines' period of use is estimated to be from 3700 to 1600 BCE. There are approximately 3,500 shafts. Krzemionki serves as a unique testament illustrating the high level of knowledge and technical skills possessed by Neolithic communities. Its uniqueness was confirmed by its inscription on the UNESCO World Heritage List in 2019. One of the aspects that makes Krzemionki stand out is the presence of rock drawings.

The first graffiti in Krzemionki were discovered at the turn of the 1920s and 1930s during research conducted by Stefan Krukowski. They depicted, among other things, a bull's head, horns, and human feet. Unfortunately, they have not survived to this day. Further discoveries occurred in the 1950s during the expedition led by Tadeusz Żurowski. Aside from the depiction of a human figure, they are challenging to interpret. In the following years, similar drawings were seldom discovered and were typically categorized as so-called "obiaśniska" (explanations) and/or places for cleaning torches. Currently, several dozen drawings have been catalogued. This is an unprecedented situation when comparing Krzemionki to other sites of prehistoric flint.

This presentation will explore the complex history of the discovery and interpretation of the Krzemionki graffiti. The authors will also offer perspectives for future research.

Keywords: flint mining, prehistoric communities, history of archaeology, Neolithic, Poland

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The making and purpose of Large Blades in Neolithic Middle Belgium. Insights from Orp and Ottenburg

The flint mining site of Orp (also known as Jandrain-Jandrenouille) is located in the western part of the silty low plateau of Hesbaye, in the fertile area of Middle Belgium. Although its size and duration are modest compared to other sites in this corner of Europe, such as Spiennes and Rijckholt-Sint-Geertruid, Orp stands out for its strong focus on the knapping of large blades. On top of that, the striking similarity in practices and products across these three sites strongly suggests that they shared expertise and were part of a joint polynuclear supply network of large blades throughout the northwestern part of the Michelsberg area (4250-3600 BCE).

The high level of technical skill involved in producing these blades contrasts with their primary function: large blades were essentially blanks. We will attempt to specify the products sought by the knappers and the villagers by comparing data from the mining waste at Orp with that from the Ottenburg settlement.

Keywords: Neolithic, flint mines, large blades, Orp, Ottenburg, Middle Belgium

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Much Ado About Nothing? New elements about pressure blade making at Spiennes (Belgium)

The rapid identification of blades production at Spiennes following its discovery was accompanied by a relatively limited number of technological of these artefacts during the 20th century. In a 2012 paper, Jacques Pelegrin proposed that Spiennes blades might have been produced using the pressure lever technique. The identification of lever pressure blade making constituted a principal theme in the author's PhD dissertation. The purpose of this presentation is to discuss the relevant diagnostic criteria for pressure lever technique at Spiennes and the socio-economic implications of such a technique.

As Spiennes Campanian flint is not very homogeneous, experiments were conducted to produce new reference materials. Furthermore, as most of the Spiennes blades in situ are fragmented, morphological criteria were less relevant. It was necessary to focus on the butt morphology as well as others stigmata, both on blades and cores.

Should our observations prove correct in confirming the use of pressure technique at Spiennes, we did not identify any significant disparities between pressure-made and indirect percussion-made blades with regard to function or use. Those two categories of blades appeart to share a common value. The question therefore arises as to the rationale behind the employment of pressure technique. The question of potential relations between Spiennes and other blades production sites is also raised.

Keywords: Blades; Lithic Technology; Knapping Techniques; Michelsberg Culture; Spiennes.

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The Ideology of Wandering to Flint in the Funeral Rituals of Final Eneolithic Communities in Western Lesser Poland

In the funeral rituals of Final Neolithic communities (ca. 2900-2300 BC) in Western Lesser Poland (Southeastern Poland), there is a notable group of adult male burials, particularly distinguished by their rich equipment. Numerous tools from various materials are placed in these graves, including flint artefacts. The toolset appears as the equipment of a person travelling to the afterlife but also reflects the nature of their earthly journeys. The main components of this inventory are tools used for extracting and processing flint materials. The funeral ritual thus emphasises the significant role of flint working and the journeys undertaken to locations where suitable raw materials could be found. Within the grave inventories, there is an evident selection process favouring specific types of flint from the eastern foreland of the Holy Cross Mountains. Obtaining this flint required undertaking journeys of 100-150 km. Therefore, the funeral ritual brings the ideology of journeying to quarries to the forefront. It can be assumed that such journeys, undertaken to acquire particularly valued flint, were an important aspect of the activity of the Final Eneolithic communities of Lesser Poland. These wanderings served as a key marker of social position, highlighted as strongly as military and hunting activities.

Keywords: Final Eneolithic, Corded Ware culture, economy, flint mining, social organisation

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The Tectonic Style and Setting and its Interregional Scale of Pre-Contact Quarry Development: An Application of the District Concept.

The eastern Appalachians host thousands of raw-material types, each possessing its own diagenetic, crystalline, and microfabric characteristics. Despite the broad range of rock types, all formations were subjected to similar tectonic processes and the resulting array of structural settings. The eastern Appalachians witnessed two episodes of Taconic island-arc accretion associated with isoclinal folding and thrust faulting. This was followed by the Acadian Orogeny, a period of micro-continent accretion, associated with the reactivation of basement faults. The tectonic scenario culminates with the Alleghenian continental collision event, resulting in the development of broad nappe structures and regional overturning and associated downwarping. Field investigations recorded five unique deformation events, each resulting in an overprint of multiple generations of intersecting petrofabric.

The tectonic history of the region determines the outcrop distribution and areal breadth of genetically related raw materials (provinces) suitable for stone-tool manufacture. The large-scale regional structural elements, occurring within the province, circumscribe the various (districts) of quarry activity. Uniqueness to structural settings, as outlined by tectonics, defines the distinct quarry (trends). Nuances occurring within each structural style underpin isolated (slices), (inliers), and structural (outliers). The resulting pre-Contact quarry and mine province map is overprinted by the presence of historic mining and quarry enterprises. CINAQ's research indicates that industrial era mines and quarries (the district concept) are the direct outgrowth of pre-Contact industries.

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Chert Landscapes: Geoarchaeology, Prehistoric Exploitation, and Historical Use in Sant Martí de Tous (NE Iberian Peninsula)

This work presents the progress of a geoarchaeological project conducted in the municipality of Sant Martí de Tous (Barcelona, NE Iberian Peninsula), focusing on the study of chert outcrops in the Sant Genís Formation (Upper Eocene, Priabonian). This formation originated in a depositional environment of shallow saline lakes, where, depending on location (centre or margin of the lake) and phase (dilution, concentration, exposure), it contains massive gypsum, chert, gypsiferous marls, carbonate sediments, gypsarenites, and red and grey lutites.

The main objective of the project is to study the variability and abundance of chert in the region, as well as its potential prehistoric exploitation and historical use as a raw material. Through several geoarchaeological surveys and excavation campaigns, we have worked at three key sites: La Guinardera and La Guinardera Nord, excavated in 2018 and interpreted as a prehistoric chert workshop and a workshop for the production of gunflints during the modern era (18th–19th centuries), respectively; and the site of Cal Sitjo, initiated in 2020 and still under excavation, with a stratigraphic sequence spanning from the Mesolithic (9326–9134 Cal BP) to the Middle Neolithic (5765–5655 Cal BP).

This research offers new insights into the dynamics of territorial occupation and resource exploitation over time in a key chert-rich region of the NE Iberian Peninsula, where numerous important archaeological sites, spanning from the Middle Palaeolithic to recent periods, have been discovered.

Keywords: Chert sources, St. Genís formation, Geoarchaeology, Raw material procurement, archaeological excavations, gunflints, Sant Martí de Tous.

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Dispersion and Mobility of Treviño Flint during Prehistory: Strategies and Patterns.

The study of the mobility of lithic raw materials during Prehistory has enabled the development of theoretical models on the distribution of siliceous raw materials across the territory, categorizing them, based on their dispersion radius, as local, regional, tracer, and super-tracer ones. Within this framework, the Treviño Flint prehistoric mining complex (between Burgos and Álava, northern Spain) stands out as a major long-term extraction and distribution center, whose raw material was exploited from at least the Middle Palaeolithic to recent times. The identification of Treviño Flint in archaeological sites over 250 km away from the primary outcrop suggests long-distance exchange networks, varying in intensity by cultural periods due to social and climatic circumstances.

Archaeological data from Pozarrate quarry, dated to the regional Early Neolithic, provide evidence of organized extraction of this raw material. Its widespread distribution across the Cantabrian Coast, western Pyrenees, northern Meseta Central, and Aquitanian Bassin suggests the community consolidation of this resource in prehistoric economies. Therefore, this study analyzes and quantifies the presence of Treviño Flint at destination sites, diachronically contrasting its mobility through distribution models to understand the social and economic dynamics associated with its exploitation and circulation in different prehistoric periods.

Keywords: lithic raw materials; Flint dispersal; Procurement networks; Lithic Archaeometry; Palaeoeconomy; Supply territories

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Exploitation and distribution of Jurassic G Chert in the regional range among Funnel-Beaker and Baden cultures' settlements of the Western Lesser Poland

The so-called Jurassic chert of the G variety is a distinctive lithic raw material, that was acquired in the central Kraków-Częstochowa Upland during the Eneolithic. Workshops utilizing this raw material and focused on the production of axe heads associated with the Funnel Beaker Culture (FBC) and Baden Culture (BdC) have been identified in this region. While blade production is evidenced by core preparation processes, the scale of this production remains unknown.
Recent examinations of settlement sites of FBC and BdC, believed to be recipients of these products, often show high ratio of repair and modifications of tools, indicating periods of low chert supply. Given the popularity of this raw material in the Western Lesser Poland, questions about the scale and methods of its mining arise.
This presentation aims to show the results of an ongoing project associated with site 1 in Bronocice*, that includes sampling and comparing G variety chert from natural outcrops and archaeological sites with attempt to clarify the horizons of its use, and searching for prehistoric exploitation sites. The organization of the workforce for the extraction and transportation of the raw material between source and settlement areas is also considered.

* - "The oldest stages of settlement at Bronocice", NCN PL 2019/35/B/HS3/03860, PI: Piotr Włodarczak.

Keywords: Raw material acquisition, outcrops identification, Southern Poland, Funnel Beaker Culture, Baden culture

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What happened to the flint workshops from the Udorka Valley and where are they? Project of georachaeological research at the mining site in Poręba Dzierżna (site 24, Lesser Poland Voivodeship, Poland)

The chocolate flint mine in the Udorka Valley (site 24 in Poręba Dzierżna, Southern Poland) is located on a slope. To this day, it has preserved a well-readable terrain relief with clear outlines of shafts and heaps. Currently available dating indicates a multiphase nature of the site and its use in the Mesolithic and Neolithic.

The explored part of the mining field is covered by a loess package. This sediment also covers relics of mining shafts. More than half of all flint artifacts found in the mine come from this layer. Typological analysis of these products indicates that they are associated with a flint workshop. The problem is the homogeneity of this assemblage. This layer is redeposited. It was most likely formed as a result of a mudflow, which could have taken place in prehistory. Along with the transport of sediment, artifacts that originally formed one or several flint workshops were also redeposited. In order to establish their chronology, one must first reach the least mixed products, or the relics of the workshop itself.

The presentation will feature current results from the ongoing project. Its aim is to find a method to reconstruct the place of original deposition of artifacts using spatial analysis of the finds. The methodology used will be presented, as well as preliminary research results. Initial interpretations resulting from two seasons of fieldwork and analyses, as well as perspectives for further research will also be presented.

The study was carried out with the support of the National Science Centre (grant number 2018/30/E/HS3/00567).

Keywords: prehistoric mining; flint workshops; stone age; geoarchaeology; GIS Spatial Analysis

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Tracing the provenance of "chocolate flint" raw material – petrographic and geochemical methods to discriminate between two source regions

"Chocolate flint", widely used in prehistoric stone tool production across Central and Eastern Europe, was long thought to originate solely from the Holy Cross Mountains (HCM) in south-central Poland. However, the discovery of additional deposits further southwest, in the Kraków-Częstochowa Upland (KCU), necessitates a reassessment of its distribution and economic significance for Stone Age communities.

Provenance identification of lithic raw materials requires an interdisciplinary approach, integrating archaeology with the methodology of geoscience. This study applies petrographic (macroscopic and microscopic) and geochemical (Laser Ablation ICP-MS) analyses to differentiate "chocolate flint" from HCM and KCU. By combining these methods, we aim to establish reliable provenance criteria for "chocolate flint" and apply them to artefacts from various archaeological sites in Poland.

Determining the raw material's origin is crucial for understanding its distribution and reconstructing models of Stone Age economies, providing new insights into the circulation of "chocolate flint" in prehistoric societies. Additionally, our results contribute to the refinement of methodological approaches in lithic provenance studies.

The research was funded by the National Science Centre, Poland (grants: 2018/30/E/HS3/00567, 2011/03/N/HS3/03973, and 2015/17/N/HS3/01279) and by the Nicolaus Copernicus University in Toruń within the programme Excellence Initiative – Research University (grant 4101.00000070, 03.01.00003785).

Keywords: lithics, provenance identification, archaeometry, geoarchaeology, Central Europe, petrography, geochemistry

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Survey of flint mine remains in agrarian areas. Case study of the "Bednarzu" chocolate flint mine in Kotlarka (central Poland)

Excavations of prehistoric flint mines are extremely time-consuming and expensive and usually result in only a partial picture of the site. Thus, it is essential to develop comprehensive, non-destructive analyses of entire sites of this type. In recent years, LiDAR has created fascinating opportunities to study sites with preserved prehistoric relief. However, most of the prehistoric mining sites today are located in areas completely transformed by modern agricultural activities. Technological changes of recent decades (aerial photography - both satellite and using UAVs, the development of geophysical methods - especially GPR, the ease of precise localization of objects thanks to GPS, or spatial analysis in the GIS environment) have completely changed the possibilities of researching such sites as well. Analyses of the "Bednarzu" site in Kotlarka, discovered in 2011, were used to create an algorithm for comprehensive, non-invasive research of flint mining remains destroyed by modern agricultural activity.

Keywords: prehistoric flint mines, chocolate flint, non-invasive studies;

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The Regional Scale of Pre-Contact Quarries: Stratigraphic and Sedimentary Facies Relationships

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Outcrop patterns of pre-Contact chert quarries cropping out within the Wallkill River Valley are determined by the interplay of stratigraphy and structure on the regional scale. Diagenesis of nodular cherts occurs along a flat lying Iapetic carbonate platform, the sedimentary facies of which are persistent for tens of kilometers. The horizontal strata, deposited within sabkha-like settings, preserves cherts within the full spectrum of arid coastal environments. These include algal stromatolite bioherms, carbonate hardgrounds, oolites, algal laminates, anhydrites, tempestites and enterolithic gypsum. While Cambrian cherts are persistent laterally, inhomogeneities present within the shoreline configuration appear during the deposition of the base of the Ordovician section.

The Stonehenge transgression indexes the activation of the internal basement massif. The once laterally persistent sedimentary facies yield to abrupt facies changes over short, along-strike distances. The renewed peritidal conditions preserve chert-replaced oolites, a wide variety of localized algal colonies, algal laminates, silcretes, linings along unconformities, paleo-karst infillings, as well as silicified bentonitic ash lenses. The lower Ordovician culminates with the re-establishment of a renewed sakha-like environment, associated with a featureless flat shoreline, and cherts similar to those occurring along the base of the Cambrian section. Ribbon cherts occur in the deep leg of the Martinsburg Formation, where it is overturned in the Jutland Klippe. Thin bedded radiolarites are intercalated with coarse units bearing conodont fauna and oriented graptolites. Quarries cropping out in this section are small, but numerous.

The Chain of Operation Across Three Tectonic Provinces: Quarry and Mine Instrument Types; Half Products and Products

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First tectonic cycle quarries are developed where structural fabric is closely spaced and intersecting, resulting in the most numerous, but smallest chert quarries, yielding the lowest volume of ore. The quarry tool kit bears wedges and tapered instruments; and petrologic variation is the broadest of all tectonic cycles. First cycle quarries possess the longest chain of operation and the largest class of quarry extraction tools. Quarries are associated with wetlands, fisheries, pro-glacial lakes, shell fisheries, and the eastern avian fly way. Quarry products are locally distributed and caches are uncommon.

Second tectonic cycle quarries occur within larger scale folded and overturned strata of Alleghenian age. Quarry distribution appears as arcuate outcroppings. Quarries are larger, but less plentiful, and the volume of chert extracted is greater. Structural domains are more widely spaced, creating easier access. Extraction tool kits are simpler, bearing fewer wedges, and less varied petrological types. Chain of operation is intermediate between the first and progressive second cycles. Products and half products are more widely distributed, and caches situated at navigable drainages are common.

Progressive second tectonic cycle quarries crop out in rocks of Mississippian-Pennsylvanian age. Cherts are situated along fringes of intracratonic basins, or intercalated within prograding deltas. The distribution of quarries is a succession of concentric circles and arcuate outcroppings. Cherts are thick and horizontal, bearing widely spaced master joints that permit focused extraction. Quarries are the largest, extraction tool kit is the simplest, raw materials possess the widest areal distribution, and caches are abundant.

Found in Sursee-Zellmoos (Switzerland) but from where did it come?

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Sursee-Zellmoos is a prehistoric pile dwelling settlement and part of the UNESCO World Heritage *Prehistoric Pile Dwellings around the Alps*. Occupied from the Neolithic to the Late Bronze Age, the site has recently yielded new lithic artefacts from excavations in its peripheral areas. These discoveries provide fresh insights into raw material procurement and exchange networks. Most silicite artefacts originate from regional sources, while only a few consist of non-local, 'exotic' materials transported over long distances. Among these are two axe blades, one of which remains of unknown origin. Preliminary analyses suggest that this artefact may have come from a mining context, but further investigation is needed to confirm its provenance.

Keywords: Silicite artefacts, raw material sourcing, Neolithic

Picks as a proxy for flint mining?
Analysis of flint picks and mining-related artefacts from Soke Hill, Hampshire, England

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The identification of flint mining sites primarily relies on the presence of clear features such as pits and spoil heaps or the results of prior excavations. However, these factors are often absent on sites, including the subject of this study – Soke Hill in Hampshire, South East England, a flint mine landscape, where such features were destroyed by agricultural practices. Fieldwalking surveys undertaken from autumn 2020 until spring 2025 on a plateau situated around Soke Hill revealed large amounts of lithics totalling over 2,000 finds. The dateable flintwork collected covers each major period from the Lower Palaeolithic to the Early Bronze Age. Late Neolithic material comprises the largest portion of the assemblage, of which flint picks comprise a significant percentage. Furthermore, the quantity and quality of the Late Neolithic evidence uncovered here suggests intense, localised activity, which has so far proved elusive elsewhere in Hampshire.

This research (the author's bachelor dissertation) posits that flint picks and mining-related artefacts can be used as a proxy in the identification of flint mines, based on the surveys undertaken at Soke Hill. Additionally, flint picks and waisted tools (both under-researched aspects of flint mining in Britain) will be analysed and discussed in the study.

Keywords: Flint picks, flint mine prospection, waisted tools, Late Neolithic, Hampshire, lithic analysis