

AmS-Skrifter 29
Arkeologisk museum, Universitetet i Stavanger
Museum of Archaeology, University of Stavanger

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Pedersen, Marie Dave Amundsen and Sigmund Oehrl (eds)

Technologies – Knowledges – Sustainability Crafting societies in the first millennium CE

*Proceedings of the 74th International Sachsensymposium
in Stavanger, Norway*

Stavanger 2025

Editorial office:

Arkeologisk museum, Universitetet i Stavanger

Museum of Archaeology, University of Stavanger

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Publisher:

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Stavanger 2025

Font: Warnock Pro/Conduit

Printed edition: 100

ISSN 0800-0816

ISBN 978-82-7760-205-9

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Cover photo:

The front page: Amber nuggets and semi-finished amber beads and pendants from pit-house 7/91 in Biskupice, Poland.

Photo: Marcin Woźniak.

The back page: Suspension loop for gold bracteate S12625, from Hå on Jæren, Rogaland. Photo: Annette G. Øvreliid.

Cover design: Ingund Svendsen, AM, UiS.

Amber workshops in central Poland during the Roman Period

ADAM CIEŚLIŃSKI AND MARCIN WOŹNIAK

Adam Cieśliński and Marcin Woźniak 2025. **Amber workshops in central Poland during the Roman Period.** *AmS-Skrifter* 29, 19–28, Stavanger, ISSN 0800-0816, ISBN 978-82-7760-205-9.

Archaeological research conducted since the 1960s in western Mazovia (central region of Poland) has unveiled an extensive iron production centre from the late pre-Roman and Roman Periods, referred to as the Mazovian Centre of Metallurgy. This centre, established by the people of the Przeworsk culture, who inhabited vast areas of southern and central Poland from the 2nd century BC to the mid-5th century AD, indicates a significant scale of local iron production, constituting a crucial – though not the only – aspect of the regional economy. Relics of amber workshops have been recorded at several settlements, and remains of all stages of amber processing were discovered: lumps of raw material, semi-finished, and finished products (mainly beads). The presence of amber workshops in western Mazovia is somewhat surprising, as amber does not occur naturally in this part of Poland. Its import could have been linked to an exchange of goods, possibly including regionally produced iron.

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Key words: amber processing, workshops, Roman Period, Mazovian Centre of Metallurgy, central Poland, Przeworsk culture

Introduction

During archaeological research carried out since the 1960s in western Mazovia (central part of Poland west of Warsaw), an extensive iron production centre of the late pre-Roman and Roman Periods was discovered, called the Mazovian Centre of Metallurgy (Orzechowski 2013, 211–20; Woyda 2002, 2005). This centre was created by the people of the Przeworsk culture, who between the 2nd century BC and the middle of the 5th century AD inhabited vast territories of Central Europe, with a core area located in southern and central Poland. The Przeworsk culture has been defined primarily on the basis of characteristic features of burial rites and products of material culture (e.g. predominance of cremation, frequent furnishing of male graves with weapons, local forms of clothing, and ornaments made of iron); to a lesser extent, it is distinguished from neighbouring cultural units in terms of settlement and craftsmanship (cf. Andrzejowski 2010; Kontny 2016; Schuster 2020).

Extensive excavations at the sites in Mazovia also revealed other facets of local production. Among these findings, the most unexpected has been the discovery of

amber working activities. Remains of amber processing were identified at five settlements of the Przeworsk culture: Biskupice, Izdebno Kościelne, Regów, Tłuste, and Wierzbin (Figure 1).

Amber workshops in Mazovia: an overview of finds

Biskupice, Brwinów Commune

Biskupice is a large multiphased site with materials from the Stone Age to modern times. It is situated at a wide elevation near the valley of the Zimna Woda river and was discovered in 1971 during field walking. Excavations carried out between 1976 and 1992 covered an area of approximately 31.500m² and unearthed several thousands of features, such as the remains of timber-post buildings above ground, pit-houses, wells, lime kilns, hearths, clay pits, and about 3.700 smelting furnaces for iron production of the Przeworsk culture from the late pre-Roman, Roman, and early Migration Periods (the archaeological finds and research documentation are stored in the Museum of Ancient Mazovian Metallurgy

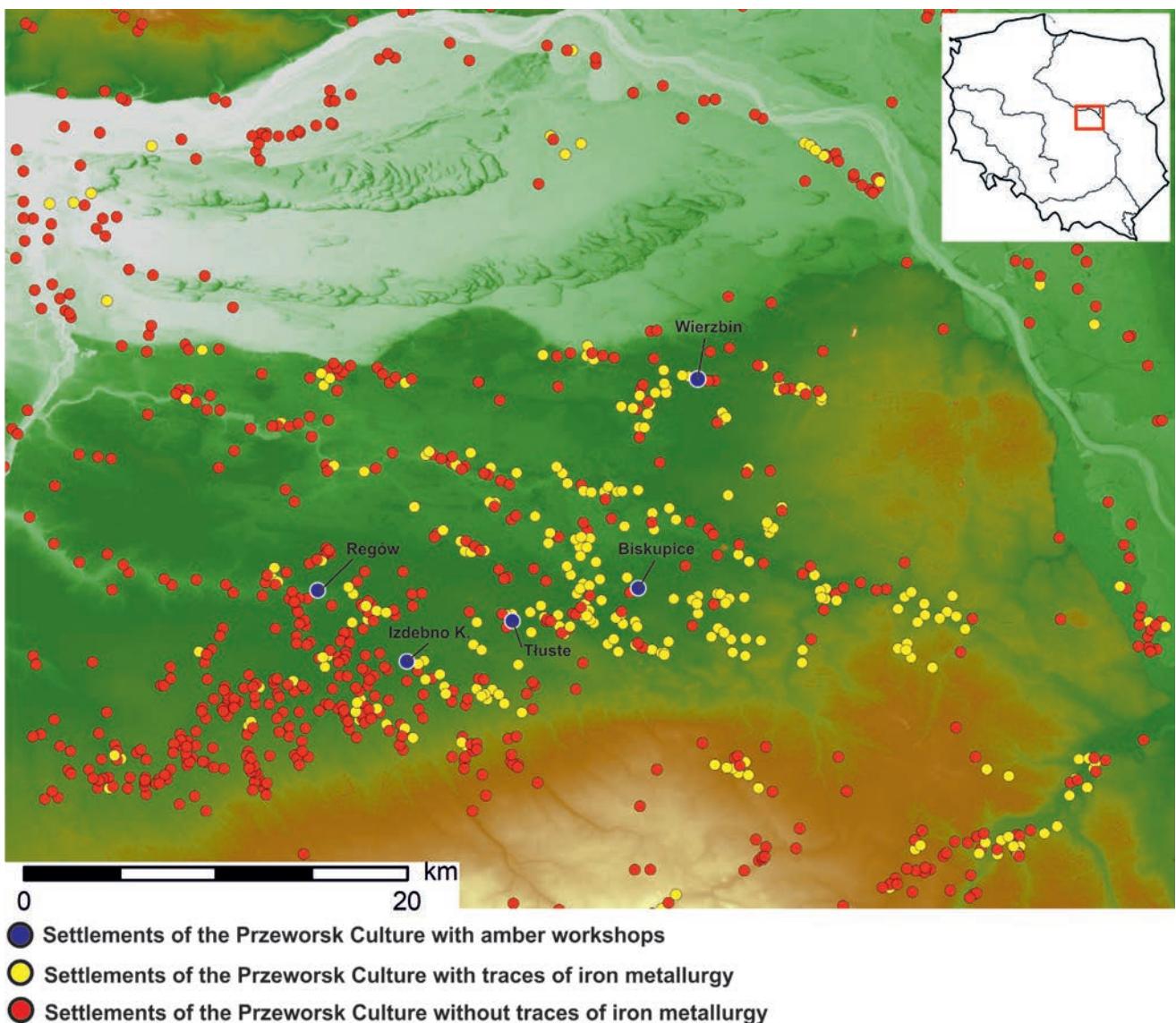


Figure 1. Location of amber workshops within the context of the West Mazovian settlement cluster of the Przeworsk culture. Compiled by Marek Baczewski.

in Pruszków). Remains of amber processing, including artefacts and raw material nuggets with a total weight of approximately 4.5kg, were found in 43 features of various functions. The majority of this material (over 90%) was concentrated in four pit-houses, which likely served as workshops; one of them contained a dense layer of amber artefacts (Figure 2), others only scattered deposits. Various stages of amber processing were evident, including raw material nuggets, production waste, and semi-finished products (Figure 3). Notably, many of these objects, such as disc-shaped beads or elongated pendants, were failed or damaged.

Izdebno Kościelne, Grodzisk Mazowiecki Commune

Izdebno Kościelne is a vast multiphased site dated from the Stone Age to modern times, including large

settlements of the Jastorf culture from pre-Roman Period and Przeworsk culture from late Roman and early Migration Periods. It is located in an almost flat area at the edge of the valley of the Basinka river. The sites were discovered in 1971 during survey prospection. Excavations conducted between 1976 and 1978 and in 2008–2009 surveyed approximately 72.000 m² of surface area and revealed a variety of structures and features (Domaradzka et al. 2016; Kołacz 1992, 1995). Materials related to the Przeworsk culture included relicts of timber-post buildings above ground, pit-houses, hearths, wells, clay-extraction pits, and settlement pits (Kołacz 1995; Machajewski 2016). Evidence of amber processing was found in two pit-houses and one pit yielded materials representing all stages of production, including finished products (Kołacz 1995, 25–26; Machajewski 2016,



Figure 2. Layer of amber artefacts discovered during exploration of pit-house 7/91 in Biskupice. Photo by Stefan Woyda, Museum of Ancient Mazovian Metallurgy in Pruszków.

213–16; Wielowiejski 1991, 326–31). Feature D1650/2009 stood out in particular, with over 20.000 amber nuggets and products discovered. Noteworthy among the finds were pendants with cannelure-decorated bodies and miniature combs (Figure 4), which are relatively uncommon at other sites.

Regów, site II, Baranów Commune

Regów is a settlement of the Przeworsk culture from the late pre-Roman and late Roman Periods. It is located on a low elevation (dune) at the edge of a valley by a small watercourse. Rescue excavations in 1978 covered 5000 m² of the site and revealed various features such as pit-houses, farm pits, wells, a lime kiln, and hearths (Walusz 1980; the archaeological finds and research documentation are stored in the Museum of Ancient Mazovian Metallurgy in Pruszków). An amber workshop was identified in one of the pit-houses that yielded 314 amber artefacts at all stages of processing, including several finished products represented by disc-shaped beads (Figure 5; Wielowiejski 1991, 320–26). A set of objects interpreted as tools for



Figure 3. Part of the amber nuggets (left) and semi-finished amber beads and pendants (right) from pit-house 7/91 in Biskupice. Photo by Marcin Woźniak.



Figure 4. Amber pendants from feature D1650 in Izdebno Kościelne. After Henryk Machajewski 2016.

working amber was also documented in the workshop. These tools and the technical aspects of working amber will be addressed below.

Tłuste, Grodzisk Mazowiecki Commune

Tłuste is a large mulitphased site dated from the Stone Age to modern times. It is located on a flat area at the forks of the Rokitnica and Mrowna rivers. The site was discovered during field walking in 1971 and excavated in 1976 and 2008–2009. A total of about 84.400 m² of the site's area was investigated by archaeological excavations, and ca. 4.700 features were found. The most abundantly represented materials were relics of an extensive settlement of the Przeworsk Culture from the final phase of the late pre-Roman to the beginning of the late Roman Periods. More than 840 objects were associated with this unit, including iron smelting furnaces (ca. 330),

wells, lime kilns, hearths, pit-houses, and remains of timber-post buildings above ground as well as numerous pits with various functions (Danys-Lasek et al. 2011; Przeniosło et al. 1976; Waluś 1976, 1977). Amber nuggets were recorded in four pit-houses (Lasek 2011, 497–98). Workshops were probably located in two of them, where the majority of the amber artefacts were found.

Wierzbin, Stare Babice Commune

Wierzbin is an Iron Age settlement connected with Lusatian/Cloche Graves and Przeworsk cultures. It is located on a low elevation at the edge of a valley by a small stream. The site was found in 1973 during field walking. Rescue excavations undertaken in 1981 covered an area of approximately 130m² and revealed remains of timber-post buildings and several pits (the archaeological finds and research documentation is stored in the Museum of Ancient Mazovian Metallurgy in Pruszków). In one of the pits (no. 12), at a depth of about 40cm, 28 lumps of amber with traces of processing as well as four half-finished beads were discovered.

Amber workshops in Mazovia: a short summary

To sum up, amber processing in the area of western Mazovia was conducted within the settlements. The context of excavated local workshops indicates that they usually operated inside semi-subterranean pit-houses that ranged in size from 5 to 28.5 (usually 11–16) square metres and served both economic and workshop functions. In some of them, evidence of other crafts, such as textile production (e.g., Biskupice, feature 10/1 from 1991), was also recorded.

Amber artefacts found in the west-Mazovian settlements of the Przeworsk culture show that the raw material primarily was used for ornaments, such as beads and pendants. The significant number of objects from Biskupice and Izdebno Kościelne suggests that production at these sites was conducted on a considerable scale. Beads could have been made for exchange, but they certainly also found their way to the local market, which is confirmed by various amber ornaments recovered from settlements, away from workshop sites. In cemeteries, this hypothesis is difficult to verify due to the widespread use of cremation in local burial practices, but it is supported by the inventory of the single inhumation grave excavated in the region: stylistic similarities between the pendants from this grave (Barankiewicz 1959, 194, pl. II:3; III:19, 22, 23) and products from local workshops suggest the existence of distribution networks.

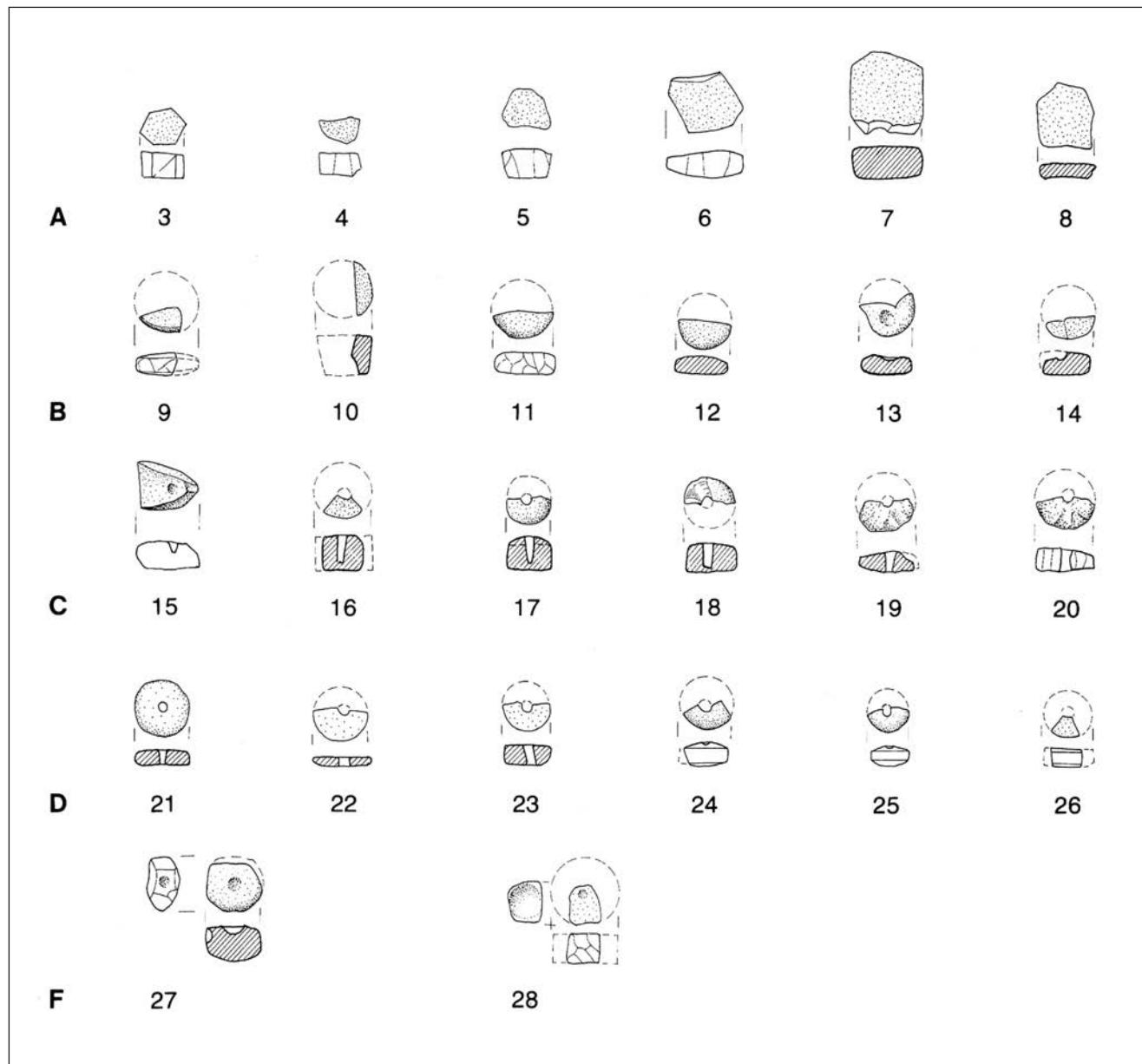


Figure 5. Amber artefacts categorised by degree of processing at Regów, site 2 according to Przemysław Wielowiejski's classification. Group A: Initial forms with traces of machining visible on the surface; Group B: Semi-finished products with grinding marks on the surface; Group C: Semi-finished products with traces of single and double-sided drilling; Group D: End products with ground and polished surfaces; Group F: Objects with traces of reworking. After Przemysław Wielowiejski 1996.

Of the eleven buildings where amber workshops were identified (unfortunately only from two settlements: Izdebno Kościelne and Biskupice), seven yielded artefacts that allowed for more precise dating. Discovered materials – fragments of wheel-made pottery (Izdebno Kościelne, feature 154, D1650; Biskupice, feature 7 from 1990, 70/90 from 1990, 8/1 from 1991), fragments of glass vessels (Izdebno Kościelne, feature D1650) and of terra sigillata (Izdebno Kościelne, feature 154), a multi-layered red deer antler comb (Biskupice, feature 70 from 1990), as well as dress accessories, such

as a brooch (Biskupice, feature 10/1 from 1992) and glass beads (Izdebno Kościelne, feature C366) – indicate that the associated workshops operated in the late Roman Period, primarily during phases C1–C2. At other sites, dating of workshops is imprecise and can only be determined within the general framework of the lifetimes of the settlements themselves, i.e., phases B2–D for Regów and A3–C1 for Tłuste (on the chronological system of the Przeworsk culture and its synchronisation with the absolute chronology cf. Godłowski 1970, 10–27, 101–122; Andrzejowski 2010).

Other amber processing areas in Poland

Another centre of amber processing in Poland has been discovered in Kuyavia (in the Vistula River basin). In the northern part of the area inhabited by a population of the Przeworsk culture, where a group of settlements with remains of workshops was documented, including Gąski, site 18, Jacewo, site 4b, Łojewo, site 4, Konary, site 28, Kuczkowo, site 1 (Cofta-Broniewska 1999, 159–69, figs. 1–26; cf. Wielowiejski 1991, 339–43, 1996, 248–50), Inowrocław, site 100 (Bednarczyk 2008), and Janowice, site 2 (Wiśniewski and Kotlewski 2013, 68).

The production of amber objects varied in scale between the settlements, with the most intensive manufacturing at Jacewo, as evidenced by 5000 excavated amber objects. It is worth noting that this is significantly less than at the Mazovian settlements at Biskupice and Izdebnie Kościelne. At several other sites in Kuyavia, amber artefacts were uncovered on a much smaller scale and included semi-finished products, which might suggest the presence of further amber processing sites at Gąski, site 24, Inowrocław, site 95, and Krusza Zamkowa, site 3 (Cofta-Broniewska 1999, 168–69, figs. 24–26). According to Aleksandra Cofta-Broniewska (1999, 169), some workshops had been operating as early as the Early Roman Period (e.g. Jacewo and Łojewo), others in the Late Roman period (e.g. Konary, Kuczkowo, and Gąski), just as those in Mazovia. Based on bead forms, Przemysław Wielowiejski (1991, 356, 1996, 256) raises doubts regarding the unequivocal dating of other workshops from the Kuyavian region to the Early Roman Period (Wielowiejski 1991, 356–57, fig. 20, 1996, 256, tab. 5) and rather dates the workshops at Jacewo to the Late Roman Period.

These workshops were located in pit-houses or timber-post buildings above ground. Similar to those in Mazovia, raw material and amber objects from all stages of production were recovered from them. What is surprising is the very low proportion of finished items: only six finished artefacts were discovered, while there were several thousand fragments of waste and semi-finished products at the Jacewo workshop. The workshops produced beads and pendants “in the forms of flattened spheres, double cones, cylinders, barrels, pears, figures of eight, and small flat plates” (Cofta-Broniewska 1999, 169). Numerous fragments of Roman imports, principally glass vessels, *terra sigillata*, and glass beads, were found in some of these buildings, e.g. Jacewo, workshop 1, and Gąski, features 104, 366, 458 (Cofta-Broniewska 1999, 159–60, 164–65, figs. 6: 18–25, 13: 1–3, 16: 1–9, 17: 11–22). The presence of luxury items of Roman provenance may be indicative of the profits that local craftsmen derived from the exchange of amber objects.

Additionally, isolated workshops are scattered throughout the area of the Przeworsk culture. For example, waste material from the production of amber objects comes from a settlement in Sosnowiec, Greater Poland, excavated to a small extent in 1927 (Makiewicz 1996, 66–67; Makiewicz and Michałowski 1997; Wielowiejski 1997). It was observed in a pit (No. 2) together with charcoal remains, which may indicate the deliberate burning of amber, such as for ritual purposes, due to its aromatic qualities. As the Przeworsk-culture pottery found at the site is not distinctive, the production remains can be dated only within the broad chronological framework of the settlement’s use from the late pre-Roman to the early Roman Periods.

From Kurowo in Greater Poland comes another accidental discovery of two pits filled with amber, of which at least one lump bore traces of processing. The lack of further data on these features prohibits linking them to the Roman Period (Makiewicz and Michałowski 1997, 151–52; Wielowiejski 1991, 166, fn. 24). Wielowiejski (1996, 315) classifies this context as a potential amber deposit.

At two settlements in southern Poland, workshops were situated outdoors, likely operating seasonally. At Świlcza, two workshops were located in the immediate vicinity of two pit-houses, each forming a functional complex with the building (Gruszczyńska 1984, 1999a, 1999b; cf. Wielowiejski 1991, 332–39, 1996, 237–44). Both specialised in the production of beads, and most of the semi-finished products were at the same stage of processing. The chronology of the workshops correlates with the well-established dating of one of the pit-houses (No. 1): in its annex, a small hoard of ornaments and coins was found, whose date of deposition “can be put at somewhere in the span of an overlapping of the phases D2 and D2/D3 according to J. Tejral” (Schuster 2016, 250, fig. 25). In absolute chronology, this corresponds to the second quarter of the 5th century, as confirmed by the dendrochronological date of a construction element of the house (AD 433±10).

In Jakuszowice, production waste, semi-finished, and finished products were encountered in a cultural layer dating to the Early Roman Period. The workshop itself could not be identified, but it cannot be ruled out that it operated outdoors, as was the case in Świlcza (Wielowiejski 1991, 342–48, 1996, 244–47).

Evidence of amber working has also been recorded in several features at the Zamiechów settlement in south-eastern Poland (Půlpánová-Reszczyńska 2017, 124–28, figs. 3.42–3.48). Feature no. 302, a pit-house that yielded finished beads, half-products, production waste, and

fragments of raw amber, can be classified as an amber workshop (Půlpánová-Reszczyńska 2017, 73–75, figs. 3.14–3.17, 3.18: 1–3). Based on the pottery, the feature should be dated to the end of the Early and the beginning of the Late Roman Periods. In addition, a single urn grave of a woman and a child was uncovered at the site. Its inventory included 16 amber beads, which is extremely rare in cemeteries of the Przeworsk culture, primarily due to the practice of placing personal belongings and grave goods on the cremation pyre (Půlpánová-Reszczyńska 2017, 101–2, figs. 3.23: 4–19; Reszczyńska et al. 2013, 152–53, figs. 3: 4–19, 8: 2–3).

It is also worth referring to the phenomenon of amber hoards (Wielowiejski 1987). The discoveries made before World War II in Partynice (German Hartlieb), today a district of Wrocław, play a special role in the discussion (Nowothing 1936, 1937; Seger 1931; cf. Dulęba and Markiewicz 2021, 517–22). In 1906 and 1936, three pits filled with a total of about 1300–1500 kg of amber (25.5–29.5 Prussian centners; Dulęba and Markiewicz 2021, 535) were found at the pre-Roman Period settlement. In earlier literature, they were attributed to the Przeworsk culture, and their chronology was determined – based on pottery from other features on the site – to the late 1st century BC (Nowothing 1937, 50; cf. Wielowiejski 1991, 355, fig. 20, 1996, 304–5). Fragments of worked and unworked amber were also recorded in one pit-house (No. 1) and in an adjacent pit (feature 11), which may indicate that they are contemporary with the pits interpreted as deposits of raw amber (Dulęba and Markiewicz 2021, 534, figs. 19–20). According to a recent analysis, the pottery from pit-house 1 and pit 11 should be associated with the Jastorf culture population and dated to phase LT C1b (220/210–175/165 BC) and the initial stage of LT C2 (until ca. mid-2nd century BC) (Dulęba and Markiewicz 2021, 537), i.e. to a period clearly earlier than assumed previously. The settlement at Wrocław Partynice was therefore an important site on the amber exchange route to the La Tène World, which is confirmed indirectly by the discovery of an amber workshop at the oppidum of Staré Hradisko in Moravia (Čižmářová 1996; cf. Markiewicz 2023). According to Wielowiejski (1991, 355, 1996, 305), some of the raw material might have been worked on site, in a workshop located in a part of the settlement not yet excavated.

Another large hoard of amber was found in 1914 during trench digging by Austro-Hungarian soldiers at Basonia on the Vistula River (Wielowiejski 1990, 1996, 305–14). Only a small portion of the uncovered amber came into the hands of archaeologists many years after the discovery, but it is estimated that the deposit originally weighed several hundred kilograms. It consisted

of lumps of raw material, partly pre-processed, and an undetermined number of beads. Chronological analysis of the 304 surviving lathe-made beads indicates that the deposit dates back to the early phase of the Migration Period (phase D).

Notes on tools and techniques for working amber

As amber is a soft material, many common implements (knife, sharpener) or tools used in other crafts, such as for working antler, bone, or leather (awl, flint chip), can be used in most production phases. Such instruments have been encountered in several workshops and adjacent features, including, for example, iron knives, bone borers, flint burins/borers, and sandstone polishers/honing stones found at Regów, Izdebno Kościelne, Świlcza, or Jakuszowice (Wielowiejski 1991, 348, fig. 15, 1996, 227–28, 235, 241, 245, figs. 4:1–2, 11:12, 15, 16:18–20).

Iron drills were used to make holes in beads and pendants. A broken drill found at the Mazovian settlement of Tłuste was stuck in an unfinished pendant that stylistically was related to a Roman ram-headed patera handle (Wielowiejski 1991, fig. 17, 1996, 253, 263, fig. 19; Wielowiejski and Wielowiejski 1995).

A specialised tool, on the other hand, was the lathe. To date, no remains of such a machine tool have been encountered, although traces of its use can be seen on numerous beads. In the light of the analysis of grave materials from *barbaricum*, the lathe appears in the production of amber beads in phase B2 of the Early Roman Period (cf. Tempelmann-Mączyńska 1985, 97, tab. 6, 8). Ethnographic analogies, for example from the area of north-eastern Mazovia (Kurpie region), indicate that simple devices, similar to the modern “bow” lathe and “small mill” lathe, may have been used (Wielowiejski 1991, 337–38, fig. 17, 1996, 251, 253, fig. 18).

To summarise, beads and pendants crafted by the amber workshops of the Przeworsk culture were predominantly shaped by hand, using knives and similar tools, with a subset undergoing lathe turning during the final processing stage; holes were drilled using bone and iron borers, followed by polishing with stone polishers to achieve the desired finish.

Closing remarks

The existence of numerous amber workshops in the area of the Przeworsk culture is surprising, given that natural amber deposits are found only in a small part of this region, primarily in north-eastern Mazovia (Kurpie region). It is presumed that the majority of raw material

was imported from the southern Baltic Sea shores, particularly from Sambia and the Gulf of Gdańsk, which are known for their abundant deposits of high-quality amber (Bliujienė 2011, 5–11, fig. 2; Wielowiejski 1996, 220–23, fig. 2). Unfortunately, confirmation of this very plausible hypothesis based on physico-chemical analyses is not possible at the present stage of research. Amber deposits from southern Scandinavia, Central Europe, and parts of Eastern Europe (up to the Dnieper basin in Ukraine) geologically belong to the same species, the so-called Baltic amber or succinite (cf. Bliujienė 2011, 335–36).

During the Roman Period, the amber-rich regions in Sambia and at the Gulf of Gdańsk were inhabited by the people of the Wielbark and Dollkeim/Kovrovo cultures (cf. Cieśliński 2016; Nowakowski 1997). Curiously, no remains of amber workshops have been discovered within the territories of these cultural groups, possibly due to a very poor state of research of settlements in the area.

In Scandinavia, the state of research regarding settlements is incomparably better than in Poland, but despite numerous excavations, no feature has been identified so far that could be interpreted as an amber workshop. In his as yet unpublished doctoral thesis on amber artefacts in Northern Europe from the Roman Period to the Germanic Iron Age, Karl Johann Offerman presents a catalogue of settlements where raw amber, semi-finished products, and production waste have been recorded (Offerman 2023, 133–58 with references); of these, only three are in Scandinavia, all of which fall into the category of so-called central places: Lundeborg on Funen (a settlement associated with the central site at Gudme) and Sorte Muld on Bornholm in Denmark, and Helgö in Uppland, Sweden. Unfortunately, at all these settlements, any amber artefacts that could suggest local production have been found outside of structures or features, usually in the cultural layer or as stray finds. Often, there is no basis for precise dating, and the chronological framework for the life span of the settlements themselves is very broad, ranging from the late Roman to the Vendel Periods and even into the Viking Age. For this reason, it is difficult to determine the chronology, frequency, and scale of amber production in Scandinavia and to conduct reliable comparative studies with workshops of the Przeworsk culture. It is worth noting, however, that the number of artefacts confirming local amber production in Northern Europe is so small that it hardly exceeds the amount found at a single small-scale workshop in Central Europe.

The import of raw amber to Mazovia demonstrates contacts of the local population to other regions of *barbaricum*. It might be linked to the trade in locally

smelted iron, as the enormous scale of iron production at the Mazovian Centre of Metallurgy undoubtedly represented an important branch of the local economy that exceeded local demand for this metal. However, the chronology of both phenomena poses a challenge, since most of the dated amber workshops are from the Late Roman Period (3rd to 4th centuries AD), while the metallurgical centre is generally associated with the Early Roman Period (1st to 2nd centuries AD). Unfortunately, despite a 50-year history of fieldwork on Mazovian metallurgical settlements, only 14 radiocarbon dates have been made and for only three sites (Janiszewski 2018). These are partly old analyses (from the 1970s), and their precision is insufficient for modern standards. For a solution of this research problem, more detailed studies are required on the production of amber objects and particularly on the chronology of iron production in Mazovia.

Acknowledgements

The authors thank Karl Johann Offermann for providing the manuscript of his unpublished doctoral thesis.

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