

CHRONOLOGY OF THE MESOLITHIC IHREN 8 SITE (CENTRAL UKRAINE)

Ihren 8 (Igren 8, Ogrin 8; Dnipropetrovsk obl./UA) is the reference site for the Mesolithic in Central Ukraine (Telegin 1982, 110–112; Zaliznyak 1998, 175–179; Telegin 2002; Zaliznyak 2005; 2020, 95–97). It yielded remains of ten structures, interpreted as »pit-dwellings« (Telegin 2002), an abundant lithic assemblage (over 2500 artefacts; Zaliznyak 2018), an outstanding collection of worked bone (Telegin 2002) and a large archaeozoological assemblage (Stupak et al. 2022). The Mesolithic complexes of the site were extensively dated by the radiocarbon approach as early as the late 1970s (Telegin 1982, 5). However, the dates diverged notably (Man’ko 2005; Biagi/Kiosak 2010). The earliest date can be calibrated to the time slot of 9751–9270 calBCE, 2σ , while the latest date encompasses 4680–4348 calBCE, 2σ . Recently, several series of AMS dates were obtained for Ihren 8 with reasonable results (Biagi et al. 2007; Lillie et al. 2009). This paper aims at 1) the presentation of two new AMS dates from Ihren 8 and 2) the analysis of hitherto available dating evidence for this site.

STATE OF THE ART

The site is situated on the high promontory at the confluence of the rivers Samara and Dnieper, on the territory of the city of Dnipro in Central Ukraine (**fig. 1**). Prior to the flooding of the surrounding area by an artificial lake for a hydroelectric power plant, the elevated site lay 5–7 m above vast stretches of marshy lowland. The promontory was separated from the land to the east by a channel of the Samara called the Shyianka (now dry), so in the past it may have become an island periodically, when the latter channel carried water.

The first phase of fieldwork around the promontory of Ihren was carried out by Mykhailo (Mikhail) O. Miller during the 1930s. From 1931, Miller chaired the archaeological branch of the Dnipropetrovsk (now – Dnipro) Regional Museum and was actively involved in a large-scale rescue archaeological expedition investigating the River Dnieper’s banks prior to their flooding by »Lenin’s lake« – a reservoir of the Dnieper Hydroelectric Station (Miller 1956). In 1932, he undertook excavations at the site designated as number 8. He uncovered finds of the Middle Ages, 19 burials, eight of them assigned to the Late Neolithic (now Eneolithic) and the remains of a »Neolithic site«. The geologist Ilarion A. Lepikash studied the soil sections in detail (Lepikash 1934; Miller 1935). The Soviet purge of archaeology stopped their work (Miller emigrated, Lepikash executed; Yanenko 2016). In 1942, under German occupation, fieldwork was resumed for a short time (Miller 1956).

In 1945–1946, an area of 50 m² was excavated by A. V. Dobrovolskyi on the site (Dobrovolskyi 1949). He described the stratigraphy (**fig. 2**) and defined the following cultural strata: layers F, E1 and E yielded microlithic industry, remains of non-domesticated fauna and only two potsherds (among them – a pointed bottom of a vessel). So, they were left by people with a »completely extractive economy« (Dobrovolskyi 1949, 250). Layer D1 yielded lithics, over ten potsherds with comb and linear decorations as well as remains of domestic cattle and goat (analysed by V. Zubareva and I. Pidoplichko). 13 burials were uncovered by the excavation most of which are today attributed to the Serechnyi Stog culture (second half of the 5th millen-



Fig. 1 Location of the site of Ihren 8 on a map of Central and Eastern Europe (A) and on a map of the Dnipro (Dniepropetrovsk) region (B). – (A map earthdata.com; B map Deutsche Heereskarte, M-36-131-C, 1943).

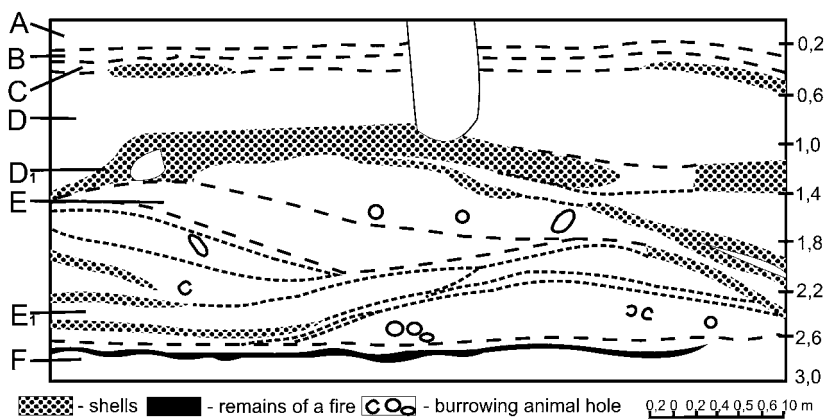


Fig. 2 Stratigraphic layers of Ihren 8: **A** modern, barely visible grey sandy soil. – **B** thin dark humic sand. – **C** low-humic sand. – **D** humic dark-grey sand, lies horizontally. – **D1** grey ashy, low-humic sand with multiple shells. – **E1** yellow dune sand with oblique stripes of shells and grey spots. – **E** greyish-yellow dune sand filling the space between dunes. – **F** white-yellow river-sand, lies horizontally. – (Redrawn after Dobrovolskyi 1949, 245).

nium BCE, Early Eneolithic), while some to the Eneolithic Dereivka culture (5th/4th millennium BCE; Kotova 2005; 2008; Rassamakin 2017). Medieval remains dating to the 12th and 13rd centuries AD were recorded in layer C (Dobrovolskyi 1949, 244).

The work on the site of Ihren 8 was resumed by Dmytro Ya. Telegin (2002), while his collaborators Leonid L. Zaliznyak and Dmytro Yu. Nuzhnyi directed much work »on the site« (Zaliznyak 2018). The site was excavated several times between 1973 and 1990. The excavated area exceeds 1000m². Recently, a new episode of fieldwork took place at Ihren 8 with a focus on the Medieval settlement (Zaliznyak et al. 2020). D. Ya. Telegin attributed the Mesolithic assemblage of Ihren 8 to the Kukrek culture and treated the site as a reference assemblage for the Dnieper Rapids' variant of Kukrek (Telegin 1982, 114–116). The Ihren 8 site served as a cornerstone around which broad interpretations of seasonal economic behaviour in the Mesolithic have been built (Telegin 2002). D. Ya. Telegin anticipated ten »pit-dwellings« stretching along the bank of the River Samara and interpreted the site as a »long-lasting base settlement« of hunters, gatherers

and fishermen. Each »pit-dwelling« was a lens of grey ashy sand covered by massive »caps« of shells, some 5–8 m in diameter and 0.5–1 m thick. The lenses were covered by other sediments including two horizons of humic sand. The cultural layer of the site was found at a depth of 2 m by »pit-dwelling 8« (Telegin 2002, 8). So, D. Ya. Telegin concluded that the pits were excavated from this depth into sterile white-yellow river sand (horizon F of A. V. Dobrovolskyi).

In 1998, L. L. Zaliznyak interpreted the site of Ihren 8 as a settlement consisting of five to seven families, who occupied the site during winter, left it in spring for lowland temporary shelters, and returned to it periodically (Zaliznyak 1998). His interpretation was re-emphasized in 2018. Ihren 8 was not a »permanent settlement« but rather a »place of traditional wintering« occupied and re-occupied by a »small group [obschyna] of river fishermen and hunters comprising some 30 people« (Zaliznyak 2018, 16–17). Taking prey seasonality and topographical conditions into account, L. L. Zaliznyak suggested that the inhabitants of Ihren 8 wintered in one or two large »pit-dwellings«, then repaired them the following winter or built new dwellings next to them (Zaliznyak et al. 2020).

The chronology of the site has been discussed on many occasions. A. V. Dobrovolskyi attributed the site to the Neolithic, comparing potsherds from layer D1 to finds from the sites of Vovchok (Zaporizka obl./UA) and Malyy Dubovy (Zaporizka obl./UA) of the early Middle Neolithic of the Dnieper Rapids and sherds from layer D above to finds from the site of Seredny Stog (Zaporizka obl./UA) from the end of the Neolithic of the Dnieper Rapids (Dobrovolskyi 1949). In modern-day terminology his observations would be interpreted as follows: the pottery from layer D1 are attributed to the Dnieper-Donetsk cultural complex, probably the Kyiv-Cherkasy culture. Some sherds resemble Azov-Dnieper culture ceramics (N. Kotova, pers. comm., with thanks). The pottery from layer D belongs to the Seredny Stog Early Eneolithic culture, as are most burials from the cemetery recovered in this layer. Nowadays, the Dnieper-Donetsk cultural complex as well as the Azov-Dnieper culture, are attributed to the Neolithic, even in the absence of direct evidence for farming and herding at the respective sites (Kotova 2015; Tovkailo 2020). In regard to the attribution of potsherds, the observations of A. V. Dobrovolskyi are still valid and confirmed by recent fieldwork. However, the lithic inventory from the layers below layer D1 can be attributed to the Mesolithic and belongs to the Kukrek culture or cultural complex (Telegin 1982).

In 1982, D. Ya. Telegin published the first radiocarbon dates for Ihren 8. They included five dates of the Kyiv laboratory and a single Berlin laboratory date on shells of freshwater gastropods, as well as one Kyiv date on charcoal (Telegin 1982, tab. 5). D. Ya. Telegin defined the chronology of the site as »early phases of the Late Mesolithic« (Telegin 1982, 116). In 2002, he re-emphasized this interpretation adding that the site was in use in the late 8th – early 7th millennium BCE (by uncalibrated dates; Telegin 2002, 58), publishing four new Berlin dates (including one date on charcoal) and eight new Kyiv dates on shells (Telegin 2002, tab. 8). Unfortunately, his dates contradicted a new series of conventional radiocarbon dates on bones obtained in the Kyiv laboratory (Zaitseva et al. 1997).

Telegin's conclusion (Telegin 1985) became widely accepted and was reported in several textbooks (Stanko et al. 1999, 139; Zaliznyak 2022, 147), while it was questioned by V. O. Man'ko, who received a series of radiocarbon dates directly from the organic content of potsherds coming from complexes of Ihren 8. They encompassed the late 7th – early 6th millennium BCE, corresponding well to the chronology of the Surskyi »Neolithic« culture. As a result, he proposed re-attributing the main complex of the site to the pottery using Surskyi culture (Man'ko 2005). The traditional (»D. Ya. Telegin's«) chronology of the site was re-enforced by the studies of L. L. Zaliznyak (1998; 2005; 2018). He and different co-authors obtained four new AMS dates from assemblages of Ihren 8 (Biagi et al. 2007; Lillie et al. 2009). These dates were supposed to be the »most relevant« and appeared to define the chronology of Ihren 8 as a »Late Mesolithic site in the Boreal period« in the latest studies of L. L. Zaliznyak and his students (Zaliznyak 2018; Stupak et al. 2022).

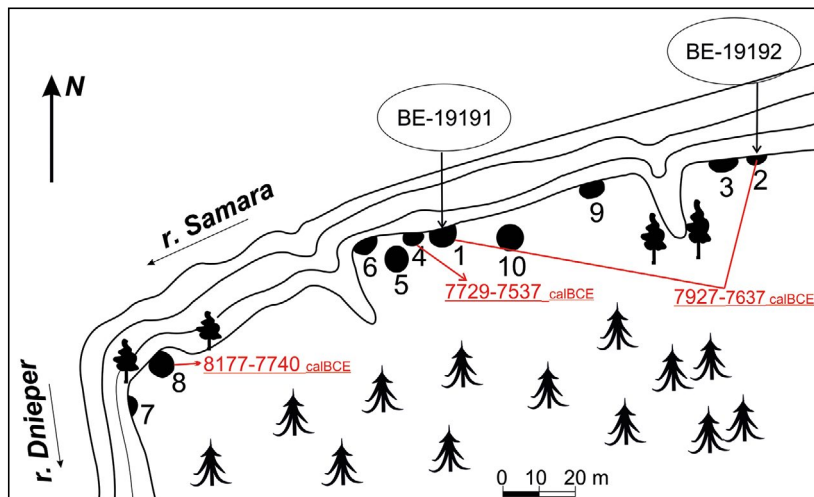


Fig. 3 Plan of Ihren 8: ● = complexes 1–10. – BE-xxxxx = indication of the location of the samples. – (Redrawn after Telegin 2002, 6 fig. 3; with modifications).

lab code	sample label	material	age_uncal (y BP)	±1s (y)	δ13C (‰)	calBCE, 2σ
BE-19191	1_Ihren-8_74, PD1, DII bottom, 2 m	bone	8712	37	-22.2	7938–7596
BE-19192	2_Ihren-8_PD2, D2–D3	bone	8740	37	-23.2	7942–7604

Tab. 1 Details of new radiocarbon dates for the site of Ihren 8. – PD = »pit dwelling«. – D2–D3, DII = stratigraphic layers.

METHODS

The new samples were dated in the Laboratory for the Analysis of Radiocarbon with AMS (LARA) at the University of Bern employing the MICADAS equipment (Szidat et al. 2014). The collagen extraction was performed according to Szidat et al. (2017), which was extended by an additional ultrafiltration step. Radiocarbon dates were calibrated using the online calibration programme OxCal 4.4.2 (Bronk Ramsey/Lee 2013; Bronk Ramsey 2021) using atmospheric data from Reimer et al. (2020). All radiocarbon dates were obtained from fragments of bones and all results are conventional radiocarbon dates (see **tab. 1**; Stuiver/Polach 1977). The samples were obtained from two complexes of Ihren 8 (see **fig. 3**).

Here and hereafter, we differentiate clearly between calibrated ^{14}C dates (cited »calBCE«) and estimates interpolated from ^{14}C dates, typological seriation and stratigraphies (cited »BCE«).

RESULTS

Two new AMS dates were obtained in the LARA from animal bones (**tab. 1**). The samples were selected from the Ihren 8 site, »pit-dwelling 1« and »pit-dwelling 2« from layers DII and D2–D3 respectively, i. e. quite deep within the pits' fillings. The results are consistent. The bone from »pit-dwelling 1« (BE-19191) yielded a date of 7938–7596 calBCE, 2σ, while the bone from »pit-dwelling 2« (BE-19192) was dated to 7942–7604 calBCE, 2σ. In order to understand these new results, they should be placed in the context of previous dating efforts (33 dates; summary see Biagi/Kiosak 2010; also **tabs 2–3**).

»pit-dwelling«	1	2	3	4	5	7	8	10	sum
freshwater shells	2	3	1	1	1	2		1	11
potsherds				1			5		6
fish bone – AMS							1		1
charcoal	1			1					2
animal bones								4	4
animal bones – AMS	1	1		1			2		5
sum	4	4	1	4	1	2	8	5	29

Tab. 2 The spatial distribution of radiocarbon dates of Ihren 8. The number of ¹⁴C dates is given.

lab no.	BP	+/-	material	context
Ki-6259	6860	45	bone	PD10
Ki-6258	6910	50	bone	PD10
Ki-6257	6930	50	bone	PD10
Ki-6256	7080	60	bone	PD10
GrA-33112	8695	45	bone	PD4
<i>BE-19191</i>	<i>8712</i>	<i>37</i>	<i>bone</i>	<i>PD1</i>
<i>BE-19192</i>	<i>8740</i>	<i>37</i>	<i>bone</i>	<i>PD2</i>
OxA-17489	8845	40	cervus bone	PD8
GrA-33113	8880	45	bone	PD8
Ki-806	6930	130	freshwater shells	PD3
Ki-850	7300	130	freshwater shells	PD4
Ki-805	8080	210	freshwater shells	PD2
Ki-368	8860	470	freshwater shells	PD1
Ki-956	9290	110	freshwater shells	PD5
Bln-1707/I	8575	70	freshwater shells	CL-D2
Bln-1707/II	8940	65	freshwater shells	CL-D2
Bln-1797/I	8570	70	freshwater shells / charcoal	PD2
Bln-1797/II	9940	70	freshwater shells / charcoal	PD2
Ki-2171	6500	200	freshwater shells	PD7
Ki-2168	6520	95	freshwater shells	Trench 8
Ki-2169	6650	200	freshwater shells	Sq21
Ki-2170	6820	120	freshwater shells	Sq3
Ki-3034	6650	120	freshwater shells	Trench 8
Ki-3613	5650	80	freshwater shells	PD10
Ki-1206	7120	100	freshwater shells	PD7
Ki-1569	7850	100	freshwater shells	Trench 4
Ki-3613	5650	80	freshwater shells	
Ki-3034	6650	120	freshwater shells	
Bln-1798	8550	80	unidentified charcoal	PD4
Ki-950	8650	100	unidentified charcoal	PD1
Ki-11684	6500	140	potsherd	PD4, D1
Ki-11682	6600	140	potsherd	PD8, D
Ki-11683	6700	140	potsherd	PD8, E
Ki-11685	7050	140	potsherd	PD8, D2
Ki-11686	5600	140	potsherd	PD8, D2
Ki-11681	5800	140	potsherd	PD8, D2

Tab. 3 The Ihren 8 radiocarbon dates. New dates are in italics. – (After Telegin 1982; 2002; Man'ko 2005; Biagi/Kiosak 2010; Zaliznyak et al. 2018).

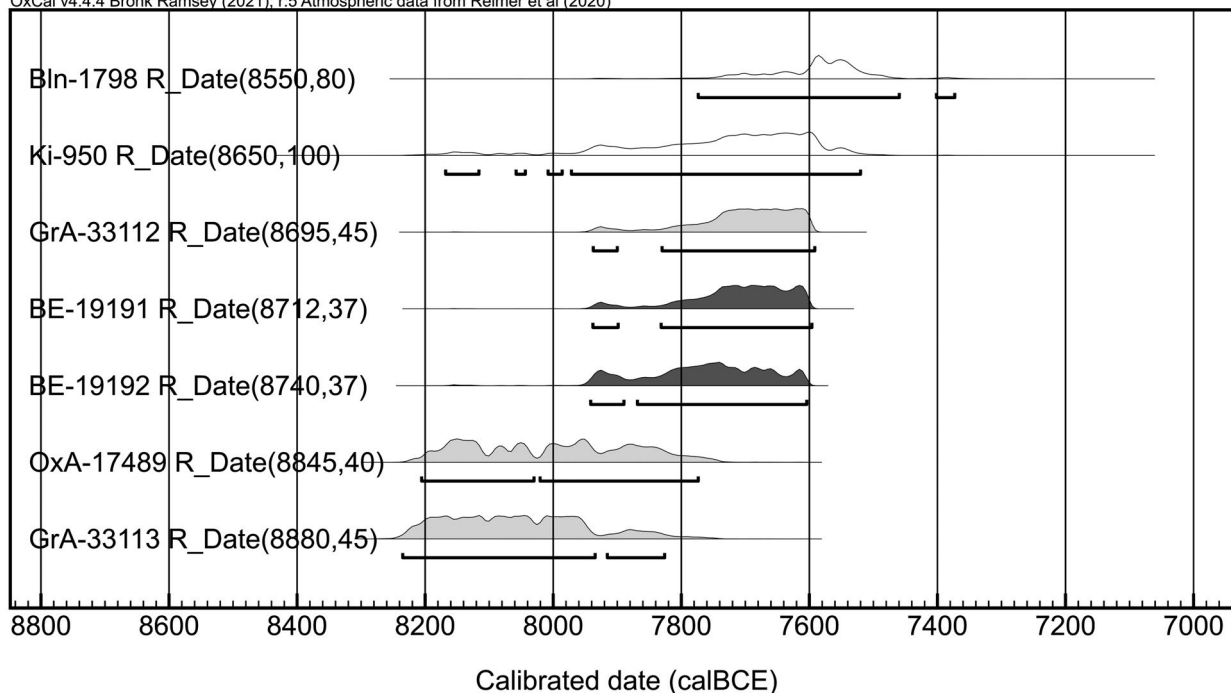


Fig. 4 New dates of Ihren 8 in the context of other AMS dates of bones for this site as well as dates on charcoal. – (Illustration D. Kiosak).

AMS dates usually have smaller uncertainty than conventional radiocarbon dates and, thus, they can be calibrated to more precise time slots (**fig. 4**). When compared with conventional data sets for Ihren 8 (**fig. 5**), it is easy to see that AMS dates from animal bones cluster between 8236 and 7592 calBCE, 2σ , while the only AMS date on a fish bone is much younger and stands apart – 6652–6258 calBCE, 2σ . The conventional dates cover a wide range of 9751–4997 calBCE, 2σ , with specific peaks of probability that will be discussed in the following.

The chronology of the site diverged notably depending on the material of the dated samples, so we plotted separately five sets of dates (**fig. 5**) carried out on freshwater shells in the Kyiv and Berlin laboratories (17 dates), Kyiv »direct« dates on potsherds (6 dates), Kyiv and Berlin inquiries on charcoal (2 dates), a single Oxford AMS date on a fish bone and the Kyiv, Oxford, Groningen and Bern laboratories' results from bones (9 dates).

The results indicate that the accumulation of freshwater shells in the Ihren 8 deposits occurred as a gradual, continuous process taking several millennia between 9041 and 4996 calBCE (modelled, 2σ). Therefore, it is likely that at least some shells were deposited by natural processes rather than reflect human activities (as put forward by Zaliznyak 2018). The unknown freshwater reservoir effect of the River Dnieper makes these dates incomparable with those obtained from materials of terrestrial origin. Furthermore, some shell samples were dated in the Berlin radiocarbon facility. By that time, the Berlin laboratory adopted a peculiar strategy for dating freshwater shell samples (Kohl/Quitta 1978). In order to estimate a possible exchange of inorganic carbon, a sample was divided into two fractions, outer and inner, which were dated separately, producing two dates marked with I and II respectively. The Ihren 8 dates include two such Berlin pairs: Bln-1707/I and II, as well as Bln-1797/I and II. Both were erroneously reported as measurements carried out on charcoal (Telegin 2002; Man'ko 2005). However, the paired indices strongly suggest that the measurements were taken from freshwater shells. It is worth noting that the results showed poor agreement: neither pair could be combined because the χ^2 -test as provided in OxCal fails in both cases.

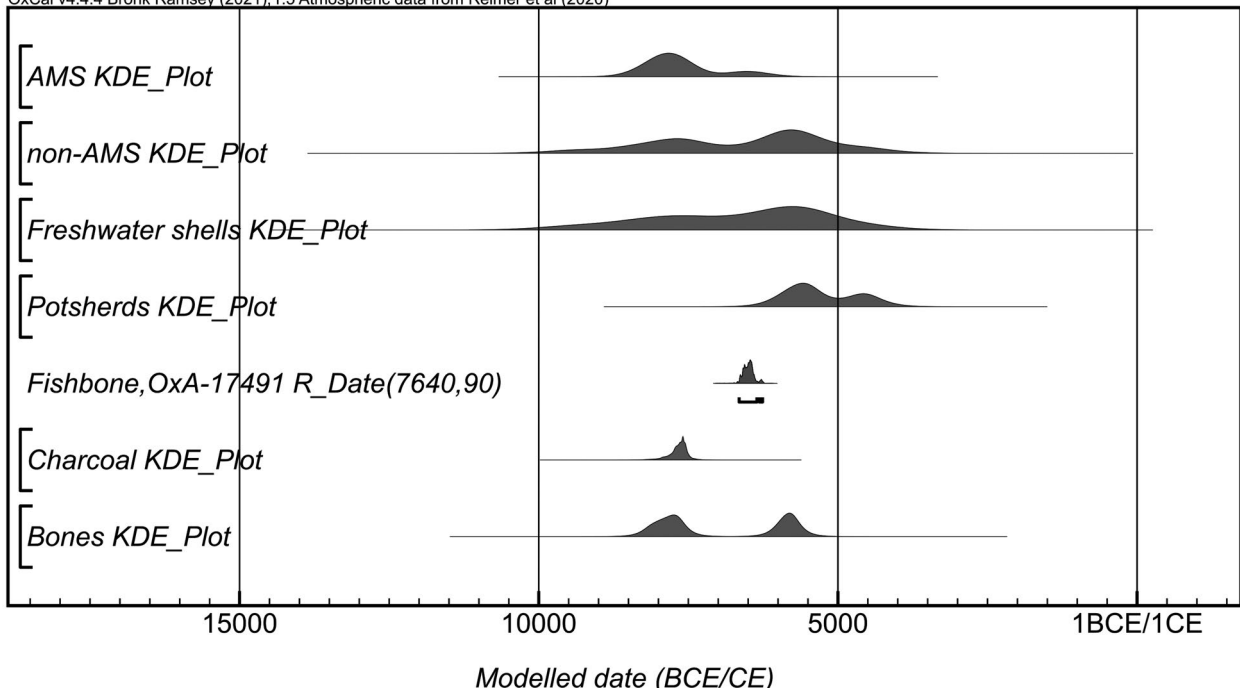


Fig. 5 Comparative analysis of dates of Ihren 8 by the type of analysis and material. – (Illustration D. Kiosak).

The dates on potsherds encompass 6222–4063 calBCE (modelled, 2σ). In fact, due to large standard deviations two later dates (Ki-11681 and Ki-11686), as well as three intermediate dates (Ki-11682–11684) can be combined to the time spans of 4781–4351 calBCE and 5667–5378 calBCE, respectively, and only the earliest date (Ki-11685) is a clear outlier. The potsherds came from two complexes of Ihren 8: »pit-dwelling 4« and »pit-dwelling 8«. They were recovered in every layer of the pits' stratifications and so suggesting an attribution of all the contents of the pits to the pottery-using Surskyi culture (Man'ko 2005). However, there is doubt regarding the cultural attribution of the dated potsherds, as they are assigned to four different cultural phases (Man'ko 2005). Therefore, the clustering of these potsherds may be artificial, resulting from the wide standard deviations of the dates. Moreover, many »suspicious« inquiries by the Kyiv laboratory were made on sherds without discriminating the nature and origin of the organic components of the clay used (Zaitseva et al. 2009; called TOCC [total organic carbon content] by Meadows 2020). This approach is subject to criticism from many points of view: averaging carbon content in organic remains of different origins can be highly misleading (Meadows 2020), a reservoir effect is possible for tempers of riverine and marine origin (Boudin et al. 2009) and, finally, it is difficult to exclude the »old shell« i. e. old carbon effect for extremely crushed shell temper (Douka et al. 2010). The »direct« dates on the organic content of pottery were noted to diverge when compared to the dates of other materials. Furthermore, the only AMS date on a fish bone from the Ihren 8 site (Lillie et al. 2009) can be calibrated to the time span 6652–6258 calBCE, 2σ and it is likely affected by the freshwater reservoir effect of the Dnieper (Lillie et al. 2009; Kotova 2018; Lillie et al. 2020).

The two dates (BlN-1798, Ki-950) on charcoal from Ihren 8 encompass the period 8169–7375 calBCE, 2σ . They are consistent and, when combined with the time slot 7760–7518 calBCE, 2σ (fig. 6, Charcoal_3 R_Combine), are in overall good agreement (χ^2 -Test: df=2 T=0.7[5 % 6.0]). However, the dated bones from Ihren 8 (fig. 5) can be divided into two clear groups: the earlier group, 8236–7592 calBCE (2σ), and the later group, 6058–5655 calBCE (2σ). The latter consists of four conventional dates of the Kyiv laboratory,

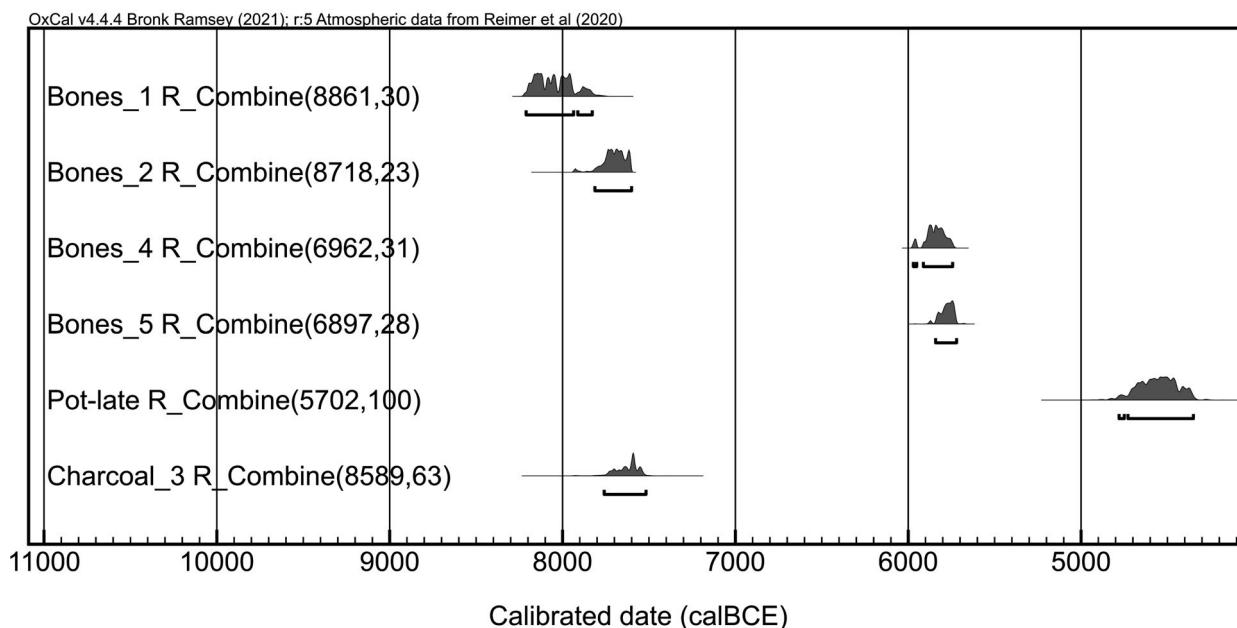


Fig. 6 Combinations of dates of Ihren 8. – (Illustration D. Kiosak).

coming from »pit-dwelling 10«, while the former comprises five AMS dates of the Groningen, Oxford and Bern facilities from »pit-dwellings« 1, 2, 4 and 8. The earlier dates cannot be combined: a χ^2 -test fails. However, two dates (OxA-17489 and GrA-33113) can be combined to 8211–7829 calBCE, 2σ (**fig. 6**, Bones_1 R_Combine). Taking into account that they came from a single complex (»pit-dwelling 8«), this operation seems justified. Meanwhile, three remaining results can be combined to the time slot 7813–7601 calBCE, 2σ (**fig. 6**, Bones_2 R_Combine). It is noteworthy that this group of dates (**fig. 6**, Bones_2 R_Combine) corresponds well with the group of consistent charcoal dates (**fig. 6**, Charcoal_3 R_Combine). The charcoal dates came from the same complexes as the dates from bones, i.e. »pit-dwellings« 1 and 4. In fact, these complexes obtained a pair of dates: a conventional date from charcoal and an AMS date from bone. We will develop this line of reasoning further – in the following paragraphs.

The latter group of dates from bones is heterogeneous (Zaitseva et al. 1997). They cannot be combined with confidence. On the other hand, when the youngest date is discarded, the remaining three can be combined to the time slot 5971–5744 calBCE, 2σ . And, vice versa, when the oldest date is discarded, the remaining three can be combined to the range 5842–5721 calBCE, 2σ . Thus, the earliest and the latest dates cannot be contemporaneous, while the remaining two dates can be synchronous with both the earliest and the latest dates (but not with both at the same time). So, the chronology of »pit-dwelling 10« obtained two equally probable solutions. Both point to the first quarter of the 6th millennium BCE (cf. Man'ko 2005). Unfortunately, precisely these series of Kyiv dates were subjected to profound criticism (Rassamakin 2012; Gaskevych 2014). There are numerous cases where their dates disagree with those from other laboratories (Motuzaitė Matuzevičiute et al. 2015; Kiosak/Lobanova 2021; Salavert et al. 2020; Shatilo 2021). Therefore, in general, the Kyiv dates from 1992 to 2008 require a cross-laboratory validation before any meaningful conclusions can be drawn based on them.

The dates of Ihren 8 cannot be organised in the stratigraphic order due to the peculiarities of the site, where excavations were mostly carried out inside spatially separate complexes. Layers of a fill of one complex do not necessarily correspond to layers of a fill of another complex. However, potsherds were reported from the lowermost layers of some »pit-dwellings«, namely 8 (Man'ko 2005), thus compromising the homoge-

neity of this assemblage. Therefore, the chronology of Ihren 8 should be established complex by complex. »Pit-dwellings« 1, 2, 3, 4, 5, 7, 8 and 10 obtained at least one date each (see **tab. 2**). Unfortunately, the radiocarbon chronologies of pits 3, 5 and 7 are based exclusively on the analysis of shells of freshwater gastropods. Taking into account the unknown reservoir effect for the Dnieper (Kotova 2018), this fact effectively excludes them from meaningful consideration.

»Pit-dwelling 8« is the best-dated complex of the Ihren 8 site. It obtained consistent two AMS dates from animal bones, combined to 8211–7829 calBCE, 2σ , five dates from TOCCs of potsherds as well as a single date from a fish bone. The ages of the sherds can be very inexact because of the methodological deficiencies (see above). However, their very presence indicates a later episode (episodes) of human activity on the site of »pit-dwelling 8«. The dated fish bone may appear older than its actual age due to the reservoir effect. However, this measurement provides a *terminus post quem* for the episode of activity associated with the deposition of this fish bone. Furthermore, it indicates that the dating based on the analysis of animal bones and charcoal is several thousand radiocarbon years earlier.

»Pit-dwelling 1« at Ihren 8 was dated by shells of freshwater gastropods, an animal bone and a charcoal sample. The date from freshwater organisms can be effectively taken out of consideration, while the other two dates can be combined to a time slot of 7934–7596 calBCE, 2σ . »Pit-dwelling 2« is dated from freshwater shells and has a single AMS measurement of animal bone. The latter is calibrated to 7942–7605 calBCE, 2σ . The dates of »pit-dwelling 4« at Ihren 8 carried out on animal bones and charcoal can be calibrated to the time slot 7759–7588 calBCE, 2σ . The dated potsherd reported from the upper layer D1 of the »pit-dwelling 4« indicates a later episode of human activity here. The »pit-dwellings« 1, 2, and 4 could be roughly contemporaneous or complex 4 could postdate the complexes 1 and 2.

»Pit-dwelling 10« at Ihren 8 was dated to the first quarter of the 6th millennium BCE by four Kyiv dates on animal bones. The exact chronology of this complex needs a cross-laboratory validation.

DISCUSSION

The site of Ihren 8 has 90 years of research history. It is the best-dated Mesolithic site of Ukraine with 33 radiocarbon dates. However, despite the accumulation of a significant number of dates since 1976, a meaningful solution to the issue of the site's chronology has not been achieved. At the moment, there are two valid opinions on the site's chronology: 1) the main habitation of Ihren 8 is an encampment of the early Neolithic (pottery-using) Surskyi culture of the late 7th – early 6th millennium BCE (Man'ko 2005); 2) the main habitation of Ihren 8 is a late Mesolithic site of the Boreal period of the late 8th – first half of the 7th millennium non-calibrated BCE (Zaliznyak 2018; Stupak et al. 2022). Our analysis supports the second point of view, and enables us to refine it.

The two new dates obtained as well as other AMS dates on animal bones suggest that the Ihren 8 site resulted from a sequence of Mesolithic activities rather than from a single habitation episode. So far, the earliest dated complex is »pit-dwelling 8«. It existed in the late 9th – early 8th millennium BCE. It was followed by complexes of »pit-dwellings« 1 and 2 dated to 7900–7800 BCE, while »pit-dwelling 4« could have been partially contemporaneous with the two latter pits but, rather, postdates them in the second quarter of the 8th millennium BCE. The later habitation of Ihren 8 occurred at least in the second half of the 7th millennium BCE postdating the OxA-date from a fish bone, while activities of the 6th – 5th millennium BCE are attested by finds of potsherds with characteristic decoration in »pit-dwellings« 4 and 8 (**fig. 7**). Thus, at present, the Mesolithic activity on the site can be subdivided in four chronological horizons: three related to 8200–7600 BCE and at least one significantly younger event.

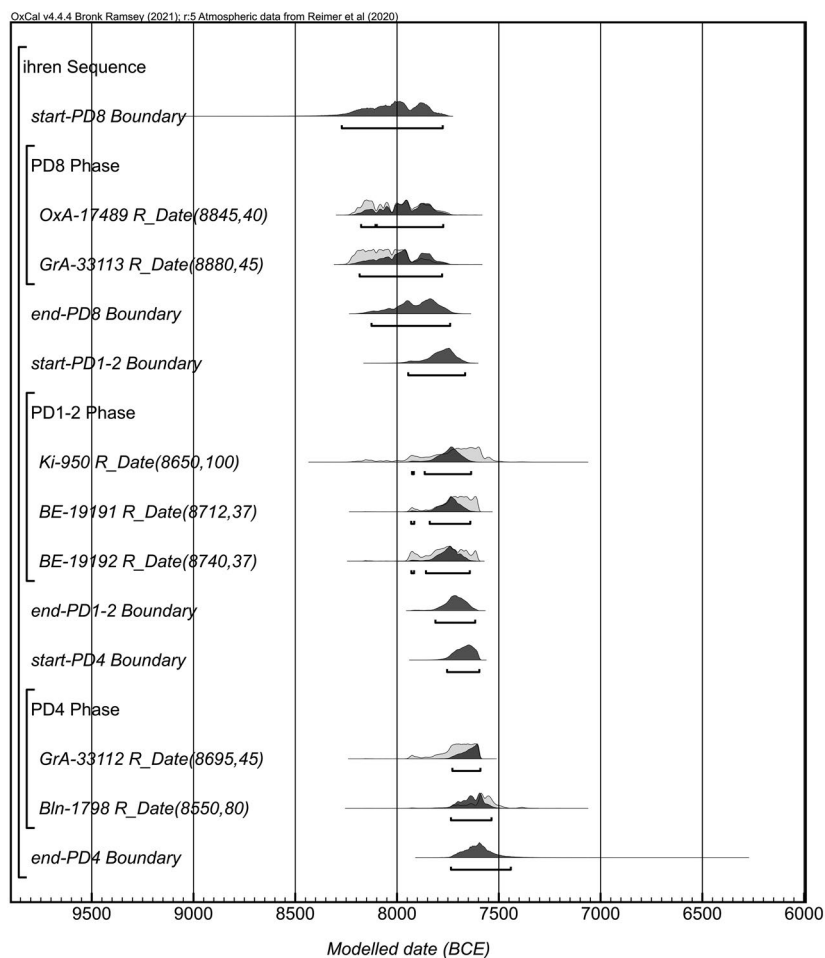


Fig. 7 Bayesian modelled sequence of Ihren 8 habitations. – (Illustration D. Kiosak).

Thus, reconstructions of prehistoric subsistence based solely on the counts of the inhabitants of the Ihren 8 dwellings can be reasonably doubted. The assemblages of Ihren 8 were in function over an extended period of time and do not represent a mere »snapshot« of the Mesolithic community but rather a complex »palimpsest« of activities. A similar conclusion was drawn by L. L. Zaliznyak on other grounds (Zaliznyak 2018, 16).

The numerous artefacts of Ihren 8 are closely related to those found in layer B of the Kamyana Mohyla 1 site (7947–7336 calBCE, modelled, 2σ , Kiosak et al. 2022; Zaporizhzhia obl./UA), the sites of the second stage of Kukrek in Crimea (Kukrek, Domchi Kaia, Ivanivka; Yanevich 1987; Crimean AR/UA), and Melnychna Krucha SU4 (7520–7315 calBCE, modelled, 2σ , Kiosak et al. 2021; Kirovohrad obl./UA). The shared characteristics include: 1) typical fusiform bone points; conical cores with negatives of lamellar detachments all along their perimeters; 2) multiple burins on corners of blade fragments; 3) multiple burins on flakes; 4) end-scrapers usually made on the end of a blank; 5) Kukrek inserts made on wide and massive blades fragments. Kukrek inserts are often the best-represented type in the assemblage; 6) backed points and oblique points form the majority of the microlithic assemblages; and 7) geometric microliths which are doubtful and can be explained due to probable post-depositional disturbances (fig. 8).

The sites of this type were usually attributed to the Kukrek culture or the Kukrek cultural complex (Stanko 1982; Telegin 1982; Zaliznyak 2005). Recently, the 8th millennium BCE sites of this type were united in a single entity named »Kukrek sensu stricto« (Kiosak et al. 2022). Ihren 8 assemblages are the earliest and the

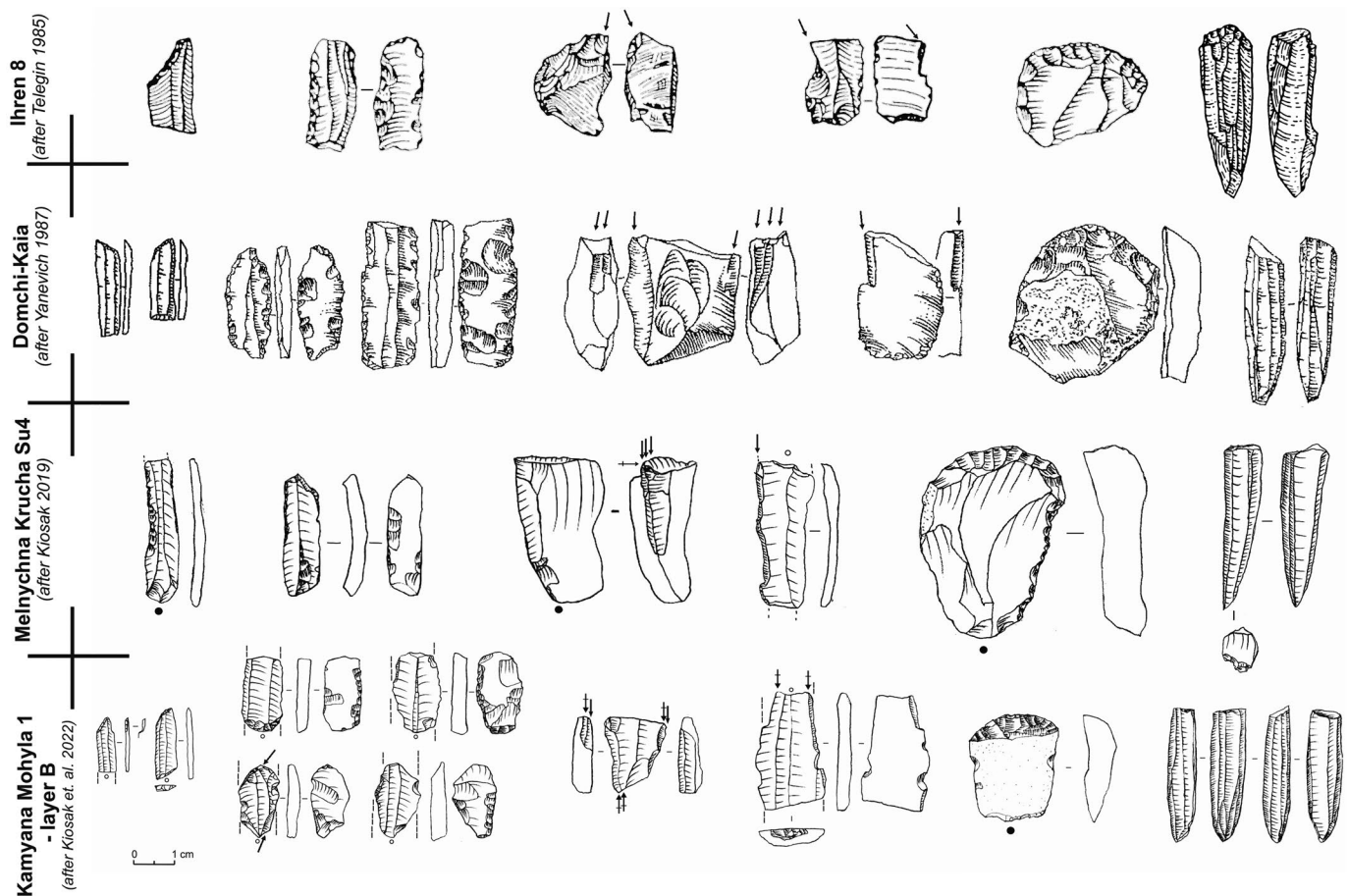


Fig. 8 Comparative table of the 8th millennium BCE lithic inventories from Southern Ukraine. – (Illustration D. Kiosak).

clearest examples of this cultural aspect. Ihren 8 diachronic assemblages open up possibilities for the analysis of the development of this technological complex.

CONCLUSION

Two new radiocarbon dates for the Ihren 8 site add to the relatively small series of reliable AMS measurements for the »pit-dwellings« of this site. The analysis of the series of dates showed that the main Mesolithic habitation existed between 8236 and 7592 calBCE, 2σ , and that it can be subdivided into several chronological periods of the Mesolithic.

The recent programmes of re-dating south-Ukrainian prehistoric sites revealed a group of sites dated predominantly to the 8th millennium BCE. The latter include layer B of the Kamyana Mohyla 1 site (Kiosak et al. 2022), stratigraphic unit SU4 of Melnychna Krucha (Kiosak et al. 2021) and several complexes of Ihren 8. These sites are united by their common characteristics listed above. They are usually attributed to the Late Mesolithic in the Ukrainian archaeological tradition (Stanko 1982; Telegin 1982; Zaliznyak 2005). This assumption is grounded upon the similarities shared by the sites with the later 7th millennium BCE lithic industries: regular blade and bladelet technique, probably with an application of force by pressure, an early appearance of trapezes in the Ukrainian steppes (Telegin 1982). However, the above defined group of

sites is relatively homogeneous and can be effectively opposed both to earlier and later lithic technological complexes. Its chronological position blurs its attribution to the Late Mesolithic and is difficult to understand in the European context, where the Late Mesolithic commonly begins in the early 7th millennium BCE (Kozłowski/Kozłowski 1979; 1984; Biagi/Starnini 2016; Perrin/Defranould 2016). So, we propose to unite these »non-geometric« assemblages under a provisional heading of the »Ukrainian Middle Mesolithic«. They differ from the Middle Mesolithic assemblages of Western Europe by the presence of a fine lamellar technique rather typical for the Late Mesolithic of the West, while the similarities include predominantly a non-geometric shape of microliths.

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Zusammenfassung / Summary / Résumé

Chronologie der mesolithischen Fundstelle Ihren 8 (Zentralukraine)

Der Beitrag schlägt eine präzisere Chronologie für die mesolithischen Ensembles der Fundstelle Ihren 8 in der zentral-ukrainischen Dnjepr-Region vor. Sie basiert auf einer kritischen Analyse der 33 bereits vorhandenen ¹⁴C-Datierungen sowie auf zwei neuen AMS-Datierungen an Knochenfunden. Die Ergebnisse weisen auf mindestens vier mesolithische Phasen hin: Drei liegen in der Zeitspanne zwischen 8200 und 7600 cal BC und eine weitere, deutlich jüngere Phase ist nach 6650 cal BC einzuordnen. Die Ensembles mit regelmäßigen Klingen sind also deutlich älter als sonst für das Spätmesolithikum üblich, sodass für die Südukraine eine mittelmesolithische Phase vorgeschlagen wird.

Chronology of the Mesolithic Ihren 8 Site (Central Ukraine)

The paper proposes a more precise chronology for the Mesolithic assemblages of the Ihren 8 site, Dnipro region, Central Ukraine. It is based on a critical revision of the 33 available radiocarbon dates and the presentation of two new AMS dates carried out on animal bones. The data indicate that there are at least four temporal Mesolithic horizons on the site of Ihren 8: three related to 8200–7600 cal BCE and one significantly later event (post-6650 cal BCE). The assemblages with regular blades are thus notably earlier than usual in the Late Mesolithic here, so that one can postulate a Middle Mesolithic period in the South Ukraine.

Chronologie du site mésolithique Ihren 8 (Ukraine centrale)

Cet article propose une chronologie fine pour les ensembles mésolithiques du site Ihren 8 dans la région du Dniepr, au centre de l'Ukraine. Elle se base sur une analyse critique des 33 dates radiocarbone déjà disponibles et sur deux nouvelles datations SMA effectuées sur des ossements. Les résultats obtenus laissent entrevoir au moins quatre phases mésolithiques. Trois d'entre elles se situent entre 8200 et 7600 cal BC et une quatrième, bien plus récente, après 6650 cal BC. Les ensembles comprenant des lames régulières sont ainsi nettement plus anciens que ceux attribués habituellement au Mésolithique récent, raison pour laquelle on propose ici une phase du Mésolithique moyen en Ukraine.

Traduction: Y. Gautier

Schlüsselwörter / Keywords / Mots-clés

Dnjepr-Region / Mittelmesolithikum / Kukrek-Kultur / ¹⁴C-Datierung / Bayessche Modellierung
Dnieper Rapids region / Middle Mesolithic / Kukrek culture / radiocarbon dating / Bayesian modelling
Région des rapides du Dniepr / Mésolithique moyen / culture de Kukrek / datation radiocarbone / modélisation bayésienne

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