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THE FUNCTION OF WELLS IN SETTLEMENTS OF CENTRAL EUROPEAN COMMUNITIES IN LATE ANTIQUITY

AN EXAMPLE OF THE PRZEWORSK CULTURE FROM KWIATKÓW (WOJ. WIELKOPOLSKIE/PL)

The function of wells is an issue inseparably connected to the problem of their location within the space of the settlement[1]. The intended use of water collectors is not always as obvious and unambiguous as it might seem. In the past, these facilities fulfilled various functions, quite frequently of special importance. Accordingly, the term »well« has become somewhat conventional, given their functional diversity. A special emphasis is placed in this article on the finds from Poland related to the Pre-Roman Iron Age and the Roman Iron Age against the background of discoveries from Central European *Barbaricum* (Piotrowska 2019). The site that is mainly presented in this work is the settlement of the Przeworsk Culture in Kwiatków (woj. wielkopolskie/PL), where over 100 wells were discovered, most of which were associated with the Roman Iron Age and the Migration Period (Piotrowska 2015; Kot/Piotrowska/Schellner 2015; Rzepecki/Kot/Piotrowska 2016; Piotrowska 2016, 63-95; 2019). The character of the finds obtained from the water collectors, their constructions and their location within the settlement indicate that the intended use of these structures varied.

THE FUNCTION OF THE WELL WITHIN A SETTLEMENT – CHARACTER OF THE DATA AND METHODS

In recent years, Polish archaeology has noted an increased excavation and identification of water collectors on archaeological sites recorded in the course of research carried out within large linear constructions (e. g. motorways) where archaeological rescue excavation and research was carried out in advance of the works (Piotrowska 2017; 2019). Consequently, this increase in the number of identified sites has resulted in a change in our perception and analysis and a growing interdisciplinary cooperation is noticeable in the research on wells. The deployment of various fields of science was made in order to obtain the most complete picture of the type of features. The cooperation with natural sciences is of particular importance here. Palaeoecological analyses (including plant macroremains or palynological analyses) facilitate additional interpretation of their function. On the other hand, an estimation of the degree of suitability of drinking water, i. e. its quality, is possible thanks to geochemical analyses, which make it easier to answer the question of whether these features were used for industrial purposes or as sources of drinking water. The cultural and social background may be related to the way the individual water collector was constructed within the site, especially its location within the settlement and its functions (e. g. cult).

The internal fills of wells are useful for conducting all types of palaeoenvironmental analyses. This type of analysis was used previously at the site in Kwiatków, where during excavations in 2013 a full sequence of sediments was collected from two wells (Piotrowska/Forysiak in print). The geochemical analysis, carried out

because of the presence of a fossil forest beneath the site, was of particular importance, as most of the wells from this settlement were »anchored« in organic deposits connected with the horizon of the paleoforest, which could have had an impact on the quality and, thus, the usability of the water drawn (Petera-Zganiacz et al. 2015; 2019).

At sites located without an access to rivers, natural springs or lakes, wells were some of the first facilities to be built in the area of the new settlement. Throughout history, these features have also been found in settlements located near natural water sources, and their presence in that case was probably dictated by pragmatic reasons and the desire to have a water collector directly within the settlement (Piotrowska 2019). Another reason why the need for building wells appeared could simply be a higher demand for water, e. g. it was necessary for a specialized production or due to some seasonal difficulties with access to flowing water. In Kwiatków, in the period when the settlement was inhabited, there were many natural watercourses in its vicinity and the question should be asked, why were so many wells dug there (Piotrowska 2015; 2019). From the current perspective, the number of collectors built in Kwiatków may seem surprising, however, it should be remembered that the settlement was in use for several centuries and the said features might have been used in different ways. The question, whether they were just wet wells or were used for other purposes, is a fascinating research task which has already been marked in the literature (Nowakowski/Waluś 1986, 52-55; Michalski 1983, 164; Skowron 2014, 110-116).

Obviously, wells within villages performed various functions – sometimes more than one at a time. Definitely, the first and most obvious one was the provision of drinking water for both humans and animals (cattle require a great deal of water, especially in winter). Wells were also used as water storage tanks and collecting rainwater could be an additional way of obtaining water. However, in the case of the settlements without an access to natural watercourses, the presence of a well was indispensable. Rainwater was also collected in natural depressions (Gaude 1995, 92). As far as using the titular features as food storage places is concerned, it seems that, at the same time as being sources of water, they also served as »fridges«, simply because it was cold enough inside. In addition to serving as places for the extraction (and storage) of drinking water for the site, the wells also performed other important functions in the economy of the then communities. The presence of wells in the vicinity of such facilities as furnaces, hearths or charcoal stacks is not surprising – especially if the facilities providing a fire risk were situated close to the houses of the settlement. Wells were also features connected with crafts and production like tanning, pottery and antler artefacts. What is interesting is that they were used in salt extraction. Wells had many symbolic meanings in folk tradition – they were the subject of folk tales and legends. They were also special features within archaeological sites. The social function of wells is also worth mentioning.

This contribution concerns the less obvious functions of wells in the settlements of the said group to be discussed with reference to some analogies from other areas. Against this background, an attempt is made to explain the phenomenon of the high number and the possible purpose of water collectors in the context of the settlement in Kwiatków.

WELLS – SOURCE OF WATER FOR CONSUMPTION

The function of wells as sources of drinking water is indicated by, among other things, the finds of whole vessels or those suitable for reconstruction, as recorded in the lower parts of the constructions, or layers of stones laid on the bottoms with the aim of filtering the water and preventing stirring up any mud while drawing up. Some wells yielded filters of brushwood or branches, used in order to improve the quality of water (Gaude 1995, 100 with further literature). Probably, such functions can be also assigned to the double-

Fig. 1 Kwiatków 11/20 (woj. wielkopolskie/PL). Wells with double casings and planks or stones on the bottoms: **a** feature no. 437. – **b** feature no. 724. – **c** feature no. 563. – **d** feature no. 219. – (Photos E. Schellner).

cased features – it was a method of extending their lifespans and, probably, improve the quality of water affected by the old wooden construction. Double-cased wells occurred at the site in Kwiatków (**fig. 1**), but they are also known from the areas west of the Przeworsk Culture region (e. g. Leube 2009, 168). Moreover, wells with stones, planks and layers of gravel on their bases were also discovered within the site mentioned (**fig. 1**). The well served as a source of water for both consumption and economic purposes, when there were single features of this type in the inhabited area. Often, however, in the case of a larger number of water collectors recorded in one place, these features are ascribed to only this one intended use due to a lack of clear evidence for other functions.

WELLS – WATER STORAGE TANKS

Wells recorded during archaeological research in most cases served as water collectors indispensable to the local community for preparing meals, watering animals or conducting basic production. However, the issue of drawing water from the wells itself raises a question (present in literature) as to whether all such facilities were indeed deep water sources, or, perhaps, some of them were just rainwater storage cisterns (Nowakowski/Waluś 1986, 55; Michalski 1983, 164; Skowron 2014, 110-116). This interpretation was proposed in the case of some features represented in the Przeworsk Culture. Features characterized by a

moderate depth not reaching the groundwater level could be assigned the role of potential rainwater cisterns. Such a function has been assigned to, among other things, features from the site of Wiktorów 1-4 (woj. łódzkie/PL) (Moszczyński 2010, 78; Skowron 2014, 116)[2]. Those features were recorded in the vicinity of the sources associated with the production of pottery, which is why they were interpreted as storage tanks for rainwater used in the production of vessels (Moszczyński 2010, 80)[3].
In Kwiatków, all of the features discovered reached the water-bearing layers. The majority of the constructions broke through the organic-mineral layers and their bases were found between 93.4 and 94.3 m amsl; in Kwiatków 20, further south, the well base was recorded at between 93.6 and 94.6 m amsl. The original depths of these features were 1.5-4 m. The location of the site was determined by the hydrogeological conditions. An abundance of water in that environment ensured that the water resources in the wells were renewed quickly, providing a regular access to them as the aquiferous level was characterized there by high stability (Twardy et al. 2017)[4]. For these reasons, there were no features recorded in that part of the study area that could be interpreted as cisterns.

WELLS AS RETTING PITS FOR FLAX – WELLS OR RETTERIES?

Facilities of this type were often used for manufacturing purposes for which water was required. This identification will take place particularly in the case of sites with a large number of wells within the research area and where their role as retting pits for flax has been frequently mentioned (Piotrowska 2015). This is particularly the case of the features with wattle construction (**tab. 1, nos 1. 4-5. 9. 14-16**; Żychliński 2007; 2009; 2010; Bednarczyk 1998; Siciński/Stasiak 2004, 100. 101 fig. 8; Brzejszczak/Wybrzak 2012, 113-115; Nierychlewska/Tyszler 2008/2009, 105. 107; Baron 2014, 290. 299-300. 313 fig. 57; Czopek 2011, 216 fig. 74). Seeing things from the point of view dominating Polish literature, the features with wattle construction are mostly classified as retteries, and only those made from hollowed tree trunks or planks represent wells. It must be emphasized here that not every wattle construction was used for retting. It seems that the tendency to interpret and call the wattle constructions »retteries« was initiated by J. Bednarczyk in connection with the discovery of some features linked to the soaking of flax in Karczyn (woj. kujawsko-pomorskie/PL) (**tab. 1, no. 4**; Bednarczyk 1998, 73). The features referred to as retteries in Karczyn are also recorded in the settlements regarded chronologically to be earlier – for example, four features from Nowa Wieś Wrocławska (woj. dolnośląskie/PL) are associated with the Late Pre-Roman Iron Age and interpreted as flax-soaking sites or features related to tanning (**tab. 1, no. 14**; Żygadło 2012, 400-401. 407. 409). In addition to the aforementioned type of construction, another distinction between a rettery and a well is its height. The »casings« made from wattle were lower than those of the features referred to as wells – this criterion was used for the classification of the constructions from the site of Witów 14-15 (woj. małopolskie/PL), where the features referred to as wells were also characterized by casings woven from twigs, though they were taller (**tab. 1, no. 14**; Nierychlewska/Tyszler 2008/2009; Tyszler/Nierychlewska 2018, 124-127). As for this settlement, it is worth noting that one rettery made of wattle and one well made of fragments of a hollowed trunk contained macroremains of flax and hemp (Tyszler/Nierychlewska 2018, 163). The constructions from the site of Nowa Wieś Wrocławska 13 were also distinguished by the moderate height of the »basket« (**tab. 1, no. 10**; Żygadło 2012, 400).
An assemblage of devices used for the pretreatment of flax was recorded at the site of Kolonia Orenice 2-4 and 3 (woj. łódzkie/PL) (**tab. 1, nos 5-6**; Siciński/Stasiak 2004, 100; Siciński 2008, 79). Four assemblages were discovered, consisting of a complex of features, each comprising one well and one rettery, i. e. wattle casings. Here, the wells were used for water exchange during the flax processing (**tab. 1, no. 6**; Siciński

no.	site	features with wattle construction	function	other information	dating
1	Daniszewo 21 (woj. wielkopolskie/PL)	2: 220 and 499	retteries	economic base of the settlement	Late Pre-Roman Iron Age
2	Izdebno Kościelne 21 (woj. mazowieckie/PL)	5: A175, A196, B558, H22, C1041	wells	C1041-wattle basket inserted into the casing of a hollowed out tree; a crown-shaped necklace was recorded inside. Another well with vertically driven posts and 6 »wells« without casings were also recorded	Jastorf Culture LT B2 - LT C1
3	Izdebno Kościelne 21 (woj. mazowieckie/PL)	1: Q621 (well no. 8)	well	a total of 14 wells were recorded	Later Roman Iron Age
4	Karczyn (woj. kujawsko-pomorskie/PL)	complex of features	retteries	peripheral part of the settlement – artisan facility within a shallow water reservoir	Roman Iron Age, 2nd and 3rd century
5	Kolonia Orenice 3 (woj. łódzkie/PL)	830, 832, 843	retteries	2 wells were discovered within a peripheral part of the settlement	Late Pre-Roman Iron Age
6	Kolonia Orenice 2 (woj. łódzkie/PL)	4: 1510, 1620, 1614, 1602 and 1616	4 retteries and 1 well	4 complexes consisting of a well and a rettery	Roman Iron Age
7	Krąplewo 29 (woj. wielkopolskie/PL)	1: 749	well/ rettery	features concentrated around a well; 2 additional wells also exposed	Phase A1 of the Late Pre-Roman Iron Age
8	Kwiatków 11/20 (woj. wielkopolskie/PL)	1293	possible well	whole storage vessel suitable for reconstruction was found inside a possible well	Early Pre-Roman Iron Age, Jastorf Culture?
9	Łęki Majątek 2 and 2A (woj. łódzkie/PL)	2: 29 and 60 + some wattle constructions	retteries	29 yielded human remains. One well was also recorded	Later Roman Iron Age / 3rd century
10	Nowa Wieś Wrocławska 13 (woj. dolnośląskie/PL)	6, 15, 16, 35	possible retteries	the features occurred »paired«	Late Pre-Roman Iron Age
11	Sługocinek 1 (woj. wielkopolskie/PL)	1	well	Przeworsk Culture settlement	Later Pre-Roman Iron Age
12	Tłuste 2 (woj. mazowieckie/PL)	10 wells with i. a. wattle and with post-and-wattle construction	wells	wells associated with the production zone of the settlement – a furnace and a hearth were also recorded	Roman Iron Age, Phases A3 - B2/ C1
13	Wilkowice 8 (woj. dolnośląskie/PL)	90/I, 120/I	wells	wells associated with ironmaking furnaces	Roman Iron Age
14	Witów 14-15 (woj. łódzkie/PL)	10	retteries	stones located at the bottom of a rettery used to weigh down the contents of the basket. The features occurred in the low-lying part of the settlement. Another 9 features interpreted as wells were also recorded	end of the Early Pre-Roman Iron Age and Late Pre-Roman Iron Age
15	Wrocław-Widawa 17 (woj. dolnośląskie/PL)	1: 784	possible flax retting pit	a horse skull was recorded inside the wattle construction; the bottom part contained stones	Late Pre-Roman Iron Age
16	Rozbórz 28 (woj. podkarpackie/PL)	–	possible rettery	wells were also discovered	Roman Iron Age

Tab. 1 List of sites where wattle constructions have been recorded.

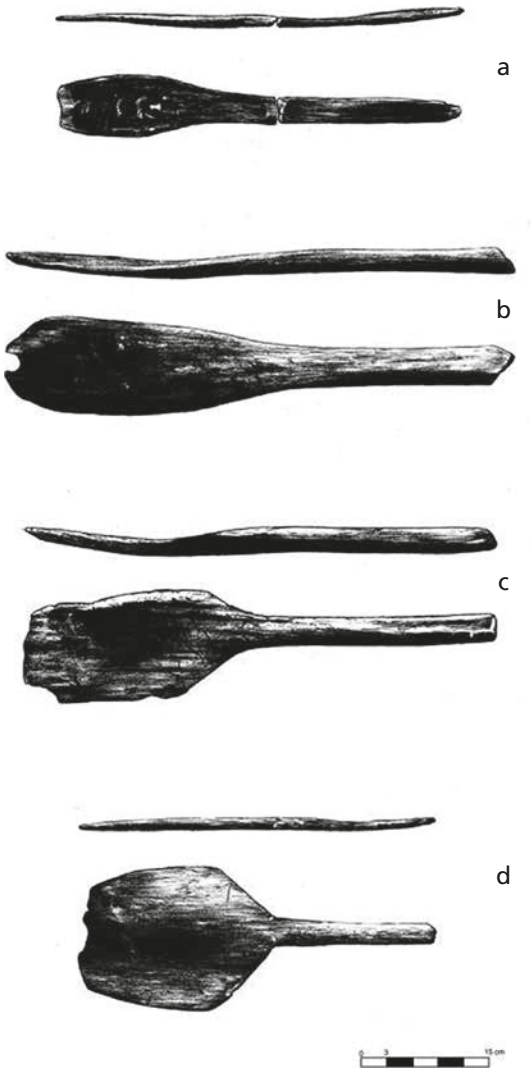

Fig. 2 Kwiatków 11/20 (woj. wielkopolskie/PL). Wooden tools from wells: **a** feature no. 860. – **b** feature no. 765. – **c** feature no. 939. – **d** feature no. 8350. – (Drawings M. Ptycia).

2008, 79 fig. VIII; Siciński/Mueller-Bieniek/Skawińska-Wieser 2015, 356-359). One wattle construction yielded a wooden artefact – a heavy tool probably used in the pretreatment of flax, which would confirm the functional interpretation of the said constructions. On the other hand, the archaeobotanical analysis of the materials obtained from those features did not confirm the putative utility function of the sources (Siciński/Mueller-Bieniek/Skawińska-Wieser 2015, 347. 349. 356. 358. 360-361 fig. 8, 1). Several features with wooden casings were recorded at the site of Janków 40 (woj. łódzkie/PL) which may have functioned as retteries and other wells may have been used as water exchange tanks used in flax-soaking facilities (Skowron 2014, 115)[5].

Three wells at the site of Kwiatków 20 (zone A2), whose constructions represented different types – log construction and casing made of hollowed tree trunks – yielded wooden artefacts, similar in shape to dollies/bats/scutching knives, i. e. tools for breaking the flax (Moszyński 1967, 311. 610-611). These facilities were clustered in one part of zone A2 only and it seems that the presence of the artefacts within the wells may be related to their function (**figs 2-3**). The similarity of the said artefacts to the tools used for flax processing may indicate that those wells served as retteries (perhaps as a secondary function and that is why it is difficult to decide whether to call these features retteries or wells). What is more, a cluster of hearths was recorded in the vicinity of the wells, which could also have been used for drying part-processed flax. One more similar tool was recovered from the fill of the well in zone A1. Dendrochronological dates obtained for the artefacts indicate that they were made from trees felled roughly around the same period – in the mid-2nd century AD[6]. The settlements dated to the Roman Iron Age also yielded some artefacts in the context of the wells similar to those identified at Kwiatków (Seyer 1979, 231. 233 fig. 11; Byrska-Fudali/Przybyła 2012, 538) as well as other features from sites of earlier (Czopek/Pelisiak 2011, 402) and later periods (Hensel 1965, 197. 199 fig. 141; Kałagate/Jaszewska 2011, 445-446 fig. 14). In Kwiatków, one wooden tool had been reused as a »plank« in the side of the casing.

Feature no. 2581 from Kwiatków 11 is extremely compelling. Its fill was subjected to macroremain analysis, which showed, among other things, the presence of seeds from bogs and involucra of *Linum usitatissimum* (common flax). It can be assumed here that they constituted a small admixture which got into the well's sediments from the neighbouring fields or they might indicate that the remaining well pit was utilised as a rettery[7]. The selection of that well for such a process seems justified by its peripheral location, as the soaking process was accompanied by unpleasant smells. So, the site in Kwiatków shows another example of the probable secondary use of a log well as a place for soaking flax. At the site in Berlin-Spandau, the bottom part of one of the wells with a quadrangular casing contained wooden poles which slantwise reached

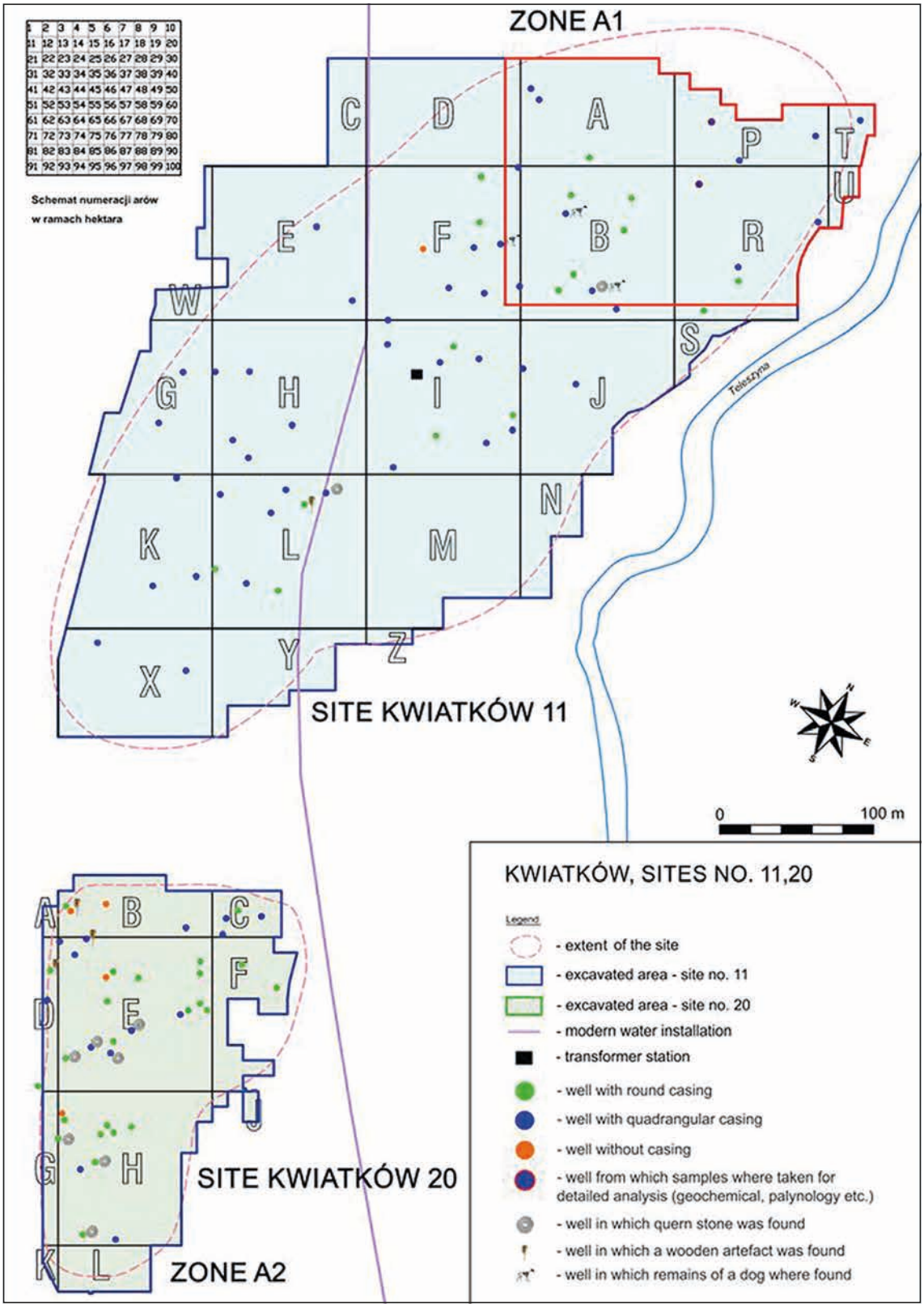

Fig. 3 Kwiatków 11/20 (woj. wielkopolskie/PL). Extent of the sites and excavated areas with marked locations of the discovered wells and some finds recorded within their fills. – (Illustration M. Piotrowska with changes; after Rzepecki 2016, 7 fig. 2).

Fig. 4 Kwiatków 11/20 (woj. wielkopolskie/PL). Well no. 1293. – (Photo E. Schellner).

the bottom of the well shaft. It seems likely that they were used for keeping the soaking flax under water (Gehrke/von Müller 1972, 81). Another artefact discovered inside was a fragment of a wooden paddle/shovel, similar to the wooden tools recorded in Kwiatków (Gehrke/von Müller 1972, 83 fig. 12; 84).

Interestingly, the dimensions of the wattle retteries discovered at the Przeworsk Culture sites are similar to the dimensions of wells with circular casings. In the future, more emphasis should be placed on the properties of these constructions as well as the differences between them. Undoubtedly, it was easier to build light and simple wattle features than to drill and hollow out an oak trunk. The wattle constructions could therefore be temporary facilities, which, after a short time of use, could be easily replaced by a new »basket«. On the other hand, oak constructions were probably more durable and did not require such frequent replacement. It can therefore be concluded that the features characterized by more durable constructions than the wattle ones were sometimes used for soaking flax and hemp.

The features interpreted as wells and built in a wattle construction are recorded at the site dated to the beginning of the common era in Dallgow-Döberitz (Lkr. Havelland/D; Schöneburg 1996). In northern Germany, in the 4th and 5th centuries , wells with wattle casings were very rare – those were the areas where wood was in short supply (Gaude 1995, 75). This technique is rare in the case of wells (cf. Geschwendt 1972).

Worth mentioning is also the Viking settlement of Næs (Vordingborg; Sjælland/DK), where among 50 wells discovered the majority were characterized by a wattle construction. These features were clustered mainly outside the built-up areas, in places where the groundwater was easily accessible. The main function of those features was to provide drinking water but they also served as flax-soaking facilities (Møller Hansen/Høier 2000, 68-69). Like in Kwiatków, hearths were registered in the vicinity of some of the wells. They were probably used for drying linen and the settlement was a specialized point of production of linen fabric (Møller Hansen/Høier 2000, 81-82). Kærgård (Blavandshuk, Ribe; Syddanmark/DK) is another site that should be mentioned here. Although the traces of flax were few there, some seeds of nettle were recorded instead. As in Kwiatków, the archaeobotanical evidence is sparse, but the archaeological evidence was more abundant and indicates that fabric was made there. A large number of wells, pits with water, the presence of ladders in the wells and logs facilitating an access to these features may indicate that they were used for flax-soaking, and the vicinal hearths were probably used for its drying. Moreover, spindle whorls were found in the dugouts (Fiedler Terkildsen/Høyem Andreasen 2014, 92-93 fig. 32).

Among more than a hundred wells recorded at the site in Kwiatków, only one feature was distinguished by a structure made of wattle (feature no. 1293) (**fig. 4**); however, in this case, it was not used for soaking flax. More probably, it was a typical collector of drinking water (**tab. 1, no. 8**). It is worth noting that the feature yielded a vessel suitable for full reconstruction, which indicates connections with the Jastorf Culture (Kot-Legieć/Piotrowska in print). Therefore, that feature may be placed chronologically earlier in date than the other wells located within the same settlement. In spite of its considerable size, the vessel recovered from inside the wattle »basket« belonged to a thin-walled pottery that may have been used for drawing water. Sometimes, wattle constructions have also been interpreted as wells (**tab. 1, nos. 2-3. 7. 11-13**;

Domaradzka/Waluś 2009-2010; Machajewski/Rozen 2016; Machajewski 2016; Kaczor/Żółkiewski 2018; Krzyszowski 2005, 194; 2012; Makiewicz 2004; Danys-Lasek et al. 2009-2010; Nowaczyk/Nowaczyk 2003, 260 fig. 6).

A slightly higher popularity of the wattle technique in building well casings is noted in the materials dated to the Late Pre-Roman Iron Age. However, wells built using log construction or a hollowed out trunk were also recorded among them (e. g. Byrska-Fudali/Przybyła 2012, 543-544). Such light constructions were considered rare in the space of Przeworsk Culture sites (Nowakowski/Waluś 1986, 46). The newer studies also confirm that features with wattle casings rarely served as wells (in the traditional sense of the word) in the Przeworsk Culture – no settlement from the Roman Iron Age, where the only artificial water collector would be a well with wattle casing, was recorded. The wells with casings made from hollowed out tree trunks or using log construction can be considered to be typical wells (Nowakowski/Waluś 1986). In the case of the sites representing the Przeworsk Culture, the features with wattle casing (if any occur) are usually accompanied by the water collectors characterized by more durable constructions (e. g. Machajewski 2016).

Fig. 5 Food storage in a well, year 1989. – (Photo I. Kabat; http://cyfrowearchiwum.amu.edu.pl/archive/2103 [21.7.2020]).

WELLS AS »REFRIGERATORS« – STORAGE FACILITIES

In many languages, the word »well« comes from »cold water« (Polish: *stud* – cold, to cool down) (Brückner 1927) or from warm springs which cool down after reaching the surface from underground (Grimm/Grimm 1860). One of the functions fulfilled by the presented constructions is connected with the cold inside the well shaft and wells discovered at some sites have been interpreted as places related to food storage[8]. Interpreted in this way, the constructions were often located at sites in the immediate vicinity of natural water reservoirs and watercourses. At that time, those facilities could serve as pantries intended for storing food because of the cold inside the well structure (Skowron 2006, 42). Therefore, it cannot be ruled out that the presence of the vessels made from organic materials, such as containers of tree bark recovered from the base of the casings, was connected with the storage of food products in the well, as the temperature inside the well would have been low, which protected the products from deterioration. The vessels were placed in buckets or baskets, and then lowered deep into the well casing and hung above the water surface (Bystroń 1932; Labuda 2003; Hartleb 2010; Piotrowska 2017) (**fig. 5**)[9].

This aforementioned function was assigned to the construction discovered at the site in Dopiewo (woj. wielkopolskie/PL) which was referred to as a »pit-fridge«. It consisted of a burnt-out tree trunk dug into the bank of the watercourse adjacent to the Przeworsk Culture settlement and containing two wooden vessels, among other things (Czerniak/Kabaciński 2004, 154). One of the many wells discovered at the site of Polwica 5 (woj. wielkopolskie/PL) was probably reused as a food storage facility. Bark lining was found within it, under which there was a layer of ash, which was interpreted as insulation applied to the interior with the aim of preventing moisture (Dobrakowski et al. 2001, 145). One of the wells discovered at the site of Wiktorów (woj. łódzkie/PL) is ascribed with the »fridge« function due to its construction type. It was built in the form of a stone shaft dug into a clay substratum, but not reaching the aquifer

Fig. 6 Kwiatków 11/20 (woj. wielkopolskie/PL). A container (bucket?) made of bark from well no. 4012 *in situ*. – (Photo E. Schellner).

(Moszczyński 2010, 79). Among 27 wells discovered at the site of Domasław (woj. dolnośląskie/PL), only four features had wooden casings preserved and the authors of the article on this site associate some of these features with the function of »cold store« (Żygadło et al. 2012, 497). A similar purpose could have been served by the feature discovered in Pierzyska 2 (woj. wielkopolskie/PL); however, this was not a »classical« well because of its slight depression below the substrate level and a lack of traces of any wooden construction (Kamyszek/Żygadło 2013, 171-172). Two wells from the settlement of Litwinki 3 (woj. warmińsko-mazurskie/PL) are also associated with the food storage function (Rogalski 2018, 51).

Another very interesting discovery is worth quoting here, regardless of the fact that it does not come from the prehistoric period under discussion, as it shows another way of using the well. A fish trap was discovered in one of the wells from the Bronze Age in the settlement located in West Frisia (Roessingh 2013, 158 fig. 8). This find indicates that the facility might be used for storing caught fish or for watering an empty fish trap to keep its good quality.

In the case of the site in Kwiatków, a part of the well could have served as a food storage facility, and this may have been an additional function. It is worth mentioning that several wells discovered at this site yielded the remains of »containers« of organic materials – in four features there were artefacts (buckets?) of bark recorded in the lower parts of the casings (**fig. 6**)[10]. Fragments of heavily damaged bark containers were also recovered from the wells at the site in Berlin-Marzahn (Seyer 1979, 231 fig. 8). The bottom and wall of one of the bark containers were sewn together, which may indicate its function was for food storage rather than the drawing of water (Seyer 1979, 229).

WELLS USED FOR OTHER CRAFTS

Tanning is another type of economic activity that requires a lot of water. Unfortunately, it is difficult to determine which well may have provided water for the tanning process on the basis of archaeological sources or to establish such an interpretation (Żygadło 2012, 401. 407). However, it can be speculated that within the majority of the settlements, or rather on their outskirts, tanning was very popular and required a constant access to a large amount of water[11]. The odour or specific smell that accompanies the tanning activity, must have resulted in these features being located away from the residential zone, to the »leeward«, i. e. probably on the south-eastern foreground of the site, because this wind direction belongs to the most rarely occurring one in the climate zone in which Poland lies. Similarly, it is difficult to identify which water source may have been used in the production of pottery; however, identifying furnaces used in the firing of vessels in the vicinity of the wells may be helpful with this identification. It should be noted that the title site yielded wells located in the vicinity of furnaces.

The craft which is easier to identify, owing to the »traces« sometimes left in the wells, is the production of antler artefacts. In this case, water collectors were used to soak the raw material and acidic water from the retting process could be used to soften the antlers (Siciński 2008, 84). Finds of deer antlers were recorded

in the facilities located near the well at the site in Krąplewo (woj. wielkopolskie/PL), which may indicate that the raw material was soaked in it (Kaczor/Żółkiewski 2018, 367). Fragments of antlers were also found in Kwiatków in one of the wells (feature no. 8526) – this well might have been used for the soaking of antlers before processing it. The titular features are also discovered near charcoal piles (i. a. Bednarczyk/Romańska/Sujecka 2010, 423). The water from wells could also be used to soak the wood from which the lathe-worked vessels were made (Zimmermann 1992, 293). Water collectors are also found near single hearths and their clusters, including the ones in zone A2 in Kwiatków. Although the determination of the function of these features poses some issues, the activities related to the use of fire may have required the presence of a well in the vicinity[12].

Wells belonging to this category of use were often reused as dumps. The well shaft, relatively deep compared to other archaeological features, became a convenient place for depositing waste and this has been confirmed by the finds from the inside of these features. In this case, it is crucial to analyse the distribution level and the state of preservation of the material obtained from the fill (e. g. a significant degree of fragmentation of pottery found at different levels, post-consumer waste, etc.), which can serve as a basis for assigning this function to the then inactive water collectors. Wells from Magnice (woj. dolnośląskie/PL) served as waste pits (Baron et al. 2011, 112). On the other hand, at the site in Kwiatków very few wells were used as dumps. What we can note more often, rather, is that the water collectors were left abandoned to undergo a slow process of filling or a deliberate, one-time back-filling of the deep holes which, due to their considerable depth, posed a threat to the settlement's inhabitants.

WELLS AND SALT EXTRACTION

An interesting discovery was made at the sites in Inowrocław (woj. kujawsko-pomorskie/PL), which has added another interpretation to the use of wells. On the one hand, the constructional details in the form of a deep shaft in which a wattle construction was embedded might suggest that it was a »classical« place of water collection. However, as will be shown below, it can also fulfil a completely different function. Traces of salt extraction dating to the first centuries of our era were found at the sites of Inowrocław 100/101. These sites are located on the edge of the salt dome and there was a concentration of halophytes in its vicinity. A settlement consisting of a residential area and a production area with brine trenches, brine wells, brine reservoirs, graduation towers and furnaces related to salt extraction was recorded there (Bednarczyk et al. 2015, 112-113). The brine was collected with the help of trenches and wells. The wells were characterized by a depth of between 3 and 4.5 m and a wattle construction. One of them contained a fragment of a ladder made from the trunk of a pine tree (Bednarczyk et al. 2015, 114. 116 fig. 5).

SYMBOLIC, RITUAL AND CULT FUNCTIONS ASSOCIATED WITH WELLS

Wells are features characterized by extremely rich symbolism (i. a. Wuttke 1900; Arendt 1971; Kowalski 1998, 535-538; Köhler 2016), which resulted in a direct impact on their function. It is impossible to list all their meanings here, but it is worth paying attention to some selected aspects of the *sacrum* connected with them. Most significant is the fact that water had a special position in prehistoric societies (Woźny 1996). In folk culture, this element still has many meanings, as water has, above all, cleansing and healing powers (Moszyński 1967; Tylkowa 1983; Grabińska-Szczęśniak 2003; Labeda 2003). In the case of wells, this feature, as a cultural element, acquires the characteristics of another cultural element, i. e. water, with the

result that the activities connected with the well acquire special properties. The well is a place of interpenetration of two worlds (Kowalski 1998, 537). It is a special feature, constituting an *axis mundi* in many cultures – it connects heaven with earth and the chthonic world, i. e. it has a mediational character (Kopaliński 1990, 406; Kowalski 1998, 535). These features were also the residence of the drowned and evil powers, hence, for example, placing a ban on peering into wells. Water collectors are also encountered in holy places where they constitute the »centre of the world« and played a special role in various religions. The motif of the well occurs, for example, in the Old Testament where meetings are usually made at the well. These facilities were also located in cemeteries and in some cases well water was believed to have unique properties. Wells are also an element of legends and fairy tales and appear in proverbs (Gralak 2012, 122). It is sometimes argued in literature that wells with no detectable casings are considered to be places where victims were deposited (Leube 2009, 164).Confirmation of the special significance of the well can also be found in archaeological sources where they were not only places for water exstraction, but also for offering sacrifices and sometimes even burials. The exceptional meaning of these features is also confirmed by the finds related to the Przeworsk Culture recorded at the site in Kwiatków.

Natural springs, rivers, lakes and bogs played a particularly important role in religious beliefs and practices among the Celts, who are known to have influenced the Przeworsk Culture community (e. g. Łuczkiewicz/Schönfelder 2009, 41-42). Numerous votive offerings are found in them (Cunliffe 1997, 200). In the case of shafts of considerable depth reaching below the groundwater level, it is not entirely certain whether they originally served as wells or were excavated for ritual practices. Obviously, they could also serve as both (Cunliffe 1997, 201 fig. 161). Wells were also places where dead animals could have been dumped to make the water collectors unusable – for example, enemies poisoning the water.

The rich symbolism of water and, thus, also the wells means that they could play important roles in the rituals of the communities who used them, for example in death and burial. This situation occurs in the case of one of the wells identified at the Przeworsk Culture settlement in Konarzewo (woj. zachodniopomorskie/PL), where, in addition to burnt human remains, numerous artefacts like beads, combs and fragments of vessels were recorded (Makiewicz et al. 2008). Another, no less interesting and mysterious discovery was identified at the Przeworsk Culture site in Łęki Majątek (woj. łódzkie/PL), where wattle retteries exposed in the immediate vicinity of the burial site and some human remains were found in one of those features (**tab. 1, no. 9**; Brzejszczak/Wybrzak 2012, 119-120 fig. 9, 3). However, it cannot be ruled out that the rettery was used to hide the corpse of a man who fell victim to a crime. A similar find was made during the rescue excavation before the construction of the S-5 route. A human skeleton was discovered there in the well dating to the Przeworsk Culture[13]. Human remains are also recorded in wells, for example in Germany (i. a. Albrecht 2014, 165-167).

The links between these features and the cult sphere are indicated by the finds recovered from the fills of the wells. Firstly, the recorded remains of dogs should be mentioned (**tab. 2, nos 1-15**; Bednarczyk 1982; Andrałojć 1986, 73; Jurkiewicz/Machajewski 2006, 144; Waszczuk 2018, 7-9; Żółkiewski/Kaczor 2018, 352. 361; Siciński 2016, 236; Sielicka 2015, 165-168; Woźniak/Anc 2010; Piotrowska/Waszczuk in print; Marchelak 2011, 82; Gralak 2012, 108. 112; in print; Nowaczyk/Nowaczyk 2003, 255. 257. 288; Krupska/Chrzanowska 2003, 359). The features from the Roman Iron Age contain remains of dogs – both of complete skeletons and single bones and also remains of other animals (Gralak 2012; Piotrowska 2016; Piotrowska/Waszczuk in print). The occurrences of dog remains at the Przeworsk Culture sites is not surprising. However, skeletal deposits of these animals found in wells account for only a small percentage of all finds of this type, which means that the discoveries from the Kwiatków settlement contribute to deepening the state of our knowledge about this compelling issue (Piotrowska/Waszczuk in print).

no.	site	feature no.	character of remains	type of well (construction of casing)	dating
1	Inowrocław 95 (woj. kujawsko-pomorskie/PL)	3724	two complete dog skeletons*	lack of preserved structure	Roman Iron Age
2	Janków 8-11 (woj. łódzkie/PL)	964	a complete skeleton of one individual	quadrangular casing, log construction	Roman Iron Age
3	Krąplewo 29 (woj. wielkopolskie/PL)	755D	a substantial part of the skeleton	circular casing made from two fragments of a hollowed out tree trunk	Early and Late Roman Iron Age
4	Kruszyn 10 (woj. kujawsko-pomorskie/PL)	1361	skull	lack of casing	Roman Iron Age B2 - C1/D
5	Kruszyn 11** (woj. kujawsko-pomorskie/PL)	897	remains of one individual	no information (lack of casing?)	Roman Iron Age (?)
6	Kwiatków 11 (woj. wielkopolskie/PL)	194	remains of one individual	quadrangular casing, log construction	C1a
7	Kwiatków 11 (woj. wielkopolskie/PL)	7500	remains of one individual	quadrangular casing, log construction	Early or Late Roman Iron Age
8	Kwiatków 11*** (woj. wielkopolskie/PL)	219	skull, mandible, fragment of humerus	quadrangular casing, log construction	Early or Late Roman Iron Age
9	Ludwinowo 3 (woj. kujawsko-pomorskie/PL)	1134	remains of one individual in the lower part of the feature	lack of casing	Roman Iron Age
10	Polwica 4 (woj. dolnośląskie/PL)	P4/968	26 bones of one individual	quadrangular casing	Late Roman Iron Age and Migration Period
11	Polwica 5 (woj. dolnośląskie/PL)	P5/677	the remains of four**** individuals in the upper parts of the feature	a lack of remains of casing	
12	Polwica 5 (woj. dolnośląskie/PL)	P5/1964	a complete skeleton of one individual	a lack of remains of casing	Late Roman Iron Age and Migration Period
13	Polwica 5 (woj. dolnośląskie/PL)	P5/2809	fragmented remains of three individuals	a lack of remains of casing	Late Roman Iron Age and Migration Period
14	Polwica 5 (woj. dolnośląskie/PL)	P5/1288	29 bones (post-consumer waste)	quadrangular casing	Late Roman Iron Age and Migration Period
15	Skrzypnik 8 (woj. dolnośląskie/PL)	S8/2452	87 bones (post-consumer waste)	quadrangular casing	Late Roman Iron Age and Migration Period
16	Wilkowice 8 (woj. dolnośląskie/PL)	85/I	a »relatively complete« skeleton of one individual	quadrangular casing, log construction	early period of Roman influence

Tab. 2 List of Przeworsk Culture sites with wells which yielded intentionally deposited dog remains (this is evidenced by their larger number, complete skeletons and the anatomical arrangement of the remains).

* In addition to the remains of dogs, two horse, two bovine skulls and bones belonging to two cows and a calf were recorded (Bednarczyk 1982; Andrałojć 1986, 73, VI: 23). Curiously, no reference to this find was made in the catalogue of the work by K. Sielicka (2015).

** The work by K. Sielicka records the find of a dog's skeleton in the well as representative of the Przeworsk Culture dated to the period of Roman influence (Sielicka 2015, 165 cat. no. 35). However, in the study of the animal remains from this site, the authors say that the remains in question were recorded in a well of unknown chronology (Woźniak/Anc 2010, 171. 182 catalogue of bone remains 5).

*** The site in Kwiatków yielded the remains of one dog, though its maxilla was recorded in another well. This specimen was not included in the table above, as the maxilla (most likely) got into the water by accident, due to some post-depositional processes (Piotrowska/Waszczuk in print).

**** Only in the case of two of them was it possible to ascertain their positions – both rested on their left sides (Gralak 2012, 108).

Fig. 7 Kwiatków 11/20 (woj. wielkopolskie/PL). Remains of a dog *in situ* in well no. 194. – (Photo E. Schellner).

The phenomenon of depositing dogs in wells in Kwiatków was rather incidental. The remains of these animals occurred in two forms: skeletal deposits (features nos 194, 219, 7500 – **tab. 2, nos 6-8**) and single bones (feature no. 2555). The dog from well no. 194 was deposited into the well in whole (perhaps in a bag tied and laden with stones) after the feature ceased to be used as a water collector (**fig. 7**). In the case of the remains of the animal from feature no. 7500, their presence in the well is not clear: the animal could have accidently fallen into an unsecured well shaft or, perhaps, the find is associated with cult practices. Difficulties are caused by an interpretation of the finds of skull, mandible and humerus from feature no. 219. However, the fact that they occurred in the context of the finding of a quern-stone may prove their uniqueness (Hopman 2010). A similar situation as in the case of feature no. 219 from Kwiatków occurred at the site in Magnice, near Wrocław[14]. The other type of find was represented by a dog's jaw extracted from the water collector no. 2555. In this case, its presence should most likely be treated as accidental (Piotrowska/Waszczuk in print).

It is worth noting that at the sites where the largest number of wells with dog remains were recorded – in Polwica-Skrzypnik (woj. dolnośląskie/PL) and at the site in Kwiatków all these features were characterized by log constructions with quadrangular casings (**tab. 2, nos 6-8. 10. 14**). The stratigraphy of their fills indicates that they were deliberately backfilled after they ceased to be used. In addition, they were distinguishable by the presence of charred wooden elements in their fills. Accordingly, it can be assumed that the backfilling of the shafts was accompanied by a burning ritual (cf. Gralak 2012, 119. 122-123). It is known from ethnographic analogies that the well was treated in a special way. As P. Kowalski writes: »the meaning of the well is primarily associated with the water filling its depth, whose mirror is the final frontier[...]« and: »The well dug in the ground and leading down into the darkness to the land of the dead is a passage where the boundaries of the human world can be crossed« (transl. from Kowalski 1998, 535). Their presence is also recorded west of our region at the Dallgow-Döberitz site, where a dog's skeleton was discovered in a well dated to the Roman Iron Age (Schöneburg 1993-1994, 96; Leube 2009, 164).

The phenomenon of depositing animal remains in wells of the Przeworsk Culture has also been reported for other animal species. Although those finds were not recorded at the site in Kwiatków, they are worth a brief digression in the context of wells from the Przeworsk Culture sites. A bovine skull was found in one of the wells in Janków (Jurkiewicz/Machajewski 2006, 145) and in one of the wells in Inowrocław both horse and

bovine skulls and complete dog skeletons were discovered (Bednarczyk 1982). A roebuck was deposited in a well in Konarzewo (Makiewicz et al. 2008). In one of the wells in Polwica 4 a horse skull was found at the bottom (Gralak 2012, 115-116 fig. 8). An analogous discovery took place in a well at the site in Płoski (woj. leszczyńskie/PL; Wróbel 1992, 52 fig. 3) and in Magnice (Baron et al. 2011, 55). Additionally, deposits of horse skulls from Polwica/Skrzypnik suggest a prior decapitation. It was, probably, an important element of a ritual (Gralak 2012, 116).

SOCIAL FUNCTIONS OF WELLS

These features, located in its centre, were an important element in the spatial organisation of the settlement or farmstead (Piotrowska 2019). An educated guess can be made here that keeping such a facility clean was in the interest of all inhabitants and the construction of the well was one of the first activities that was performed when settling in a place without direct access to flowing water. The construction of the well was probably a joint effort of a given community, especially when the place for the settlement was selected on a hill, away from natural watercourses.

It is vital to remember that people used to meet at wells, where they talked and exchanged information. Consequently, it is possible that those features, as meeting places, were roofed – not only for purely pragmatic reasons to protect against pollution, but also to protect against metereological conditions during neighbourly chats. As W. Hensel puts it, the immediate surroundings of the water collector were »a natural meeting place, and thus, exchange of information. Therefore, the wells under shelter would provide favourable conditions while it was raining for example to exchange the local rumours by the housewives, so curious to hear the news from the neighbourhood that they might, in the heat of conversation, accidentally drop the pot« (transl. from Hensel 1987, 57).

In the context of the social function performed by the wells, an issue of shared and private property arises. In Mąkolice (woj. łódzkie/PL), the one well functioned as a centrally located feature, in the place that separated the zones of the farmstead with different intended uses. The character of the location of the latter water collector was more pragmatic – in the vicinity of furnaces situated at the outskirts of the inhabited area, with the aim to minimize the risk of fire (Piotrowska 2019). In Magnice, wells were also situated in the middle of the settlement in the area of the empty square (Baron et al. 2011). The communal/public wells probably also functioned at the site of Feddersen Wierde (Lkr. Cuxhaven/D), where only three artificial water collectors were discovered (Haarnagel 1979, 168). Some settlements, such as Barhorst (Lkr. Havelland/D), Berlin-Kaulsdorf, Berlin-Marzahn and Gielde (Lkr. Wolfenbüttel/D) were characterized by concentrations of wells outside the centres of the occupied area. Consequently, it can be concluded that not each household possessed its own well but the wells were shared. This is indicated by the finds dated to the 4th and the 5th centuries, obtained from the site of Hjemsted (Sydjylland/DK), where some »openings« were noted in the fences between the farms, which might indicate that one, common well was used there (Ethelberg 1986, 21). Wells from Dallgow-Döberitz dated to the Roman Iron Age are distributed quite evenly and it was not possible to identify any private wells associated with any specific households there. A similar situation was noted in the case of the site Berlin-Neukölln (Seyer 1979, 137). Communal wells were built when the groundwater was deep and their construction required a lot of work. Cleaning and repairing the well might have been an important social aspect connected with these facilities. The ethnographic sources reveal that wells were cleaned during the spring (Wiepert 1933, 280). Archaeological sources also indicate that wells were cleaned. Occasionally, a more difficult location was chosen in terms of access to groundwater (e. g. an elevated area), in order to dig a well just to emphasize that the given community is able to make such

Fig. 8 Trought and a well, 1960. – (Photo B. Linette; http://cyfrowearchiwum.amu.edu.pl/archive?main=koryto [21.7.2020]).

an effort. Some wells in Flögeln (Lkr. Cuxhaven/D) were interpreted as signs of the high status or manifestations of prestige. For example, two large wells belonged to farms where they could have been dug at a lower lying site but were located higher and, therefore, must have been quite deep. The stone constructions leading to the water collectors mentioned must have entailed a great deal of construction and effort, considering the size of the stones (Zimmermann 1992, 294).

Wells also performed various social and economic functions in the area of the settlement in Kwiatków. A perfect example of this are two water collectors from zone A1 (features nos 2581 and 2555). Not only their location but also the amount and character of the material obtained from their fills indicate its different purpose. Apparently, despite the moderate distance between both these features (about 35 m), their contents and intended uses are different – feature no. 2555 can be considered to be a private well, whereas no. 2581 was a shared facility (Piotrowska in print). The features performing a function of »private« wells in Kwiatków were located in the vicinity of small half-dugouts of post constructions at their backs (Piotrowska 2019; in print). However, feature no. 2581 could be associated with supplying the animals bred by the inhabitants of the settlement. Looking at the plan of zone A1, it seems that the hypothesis regarding the relationship between the aforementioned well and watering the animals is plausible. Moreover, one feature in the vicinity of this well was interpreted as a possible, small ditch (?), measuring several metres long, for watering animals. It cannot be ruled out that the other wells located at the periphery of this settlement (away from other features of the Przeworsk Culture or zones intensively exploited by their residents) were also linked to providing animals with an access to water. The livestock was probably kept out of doors at the outskirts of the settlement or they roamed freely in the surrounding areas (Zimmermann 1999, 304; Piotrowska in print).

Cattle dominated at the settlement in Kwiatków where pigs, goats and sheep were bred to a lesser extent (Waszczuk 2016, 348). The needs of herbivores were not the same and, therefore, it is most likely that the breeding of sheep may indicate that some wells from Kwiatków were used for watering them. A dry environment, away from bodies of water is also the most appropriate for these animals. Sheep are particularly prone to infection from liver fluke, which occur mainly on plants in the vicinity of water reservoirs (Oczapowski 1840, 320; 1844). The risk of parasitic infection during watering from natural reservoirs and the probability of using wells for watering sheep was highlighted in the archaeozoological analysis of the remains from the site in Kwiatków (Waszczuk 2016; Oczapowski 1840, 256). When winters were dry, it was necessary to water the sheep and cattle frequently – wells were especially useful during the cold months for watering animals, when they needed much more water (Burszta 1964, 132). Moreover, wells provide water which is less cold in winter and fresher in summer than that in open bodies of water (Löhner 1839, 36).

A justification for distinguishing between the wells used by the inhabitants of the settlement and those utilised for watering animals is also found among the finds recorded in the casings, such as e. g. wooden troughs, which, in turn (as known from the ethnographic analogies), by being placed by the wells, did not leave any traces that could serve as archaeological evidence (Erixon 1930, 200) (**fig. 8**). Additionally, the vicinal area of the wells sometimes yield features that can be considered to be remains of animal drinking troughs. This is how, for example, the pits recorded near water collectors are defined, and the ethnographic

analogies constitute the basis of such an interpretation (Tyszler/Nierychlewska 2018, 123). In addition, some deep pits without traces of wooden constructions in which, presumably, water could be collected, were referred to as places for watering animals (Bobrowski et al. 2006, 91).

DISCUSSION

For the functional interpretation of the wells, palaeo-environmental research as well as a determination of their place in the settlement area are very useful (Piotrowska 2019). The intended »industrial« use of the well in Kwiatków connected with the pretreatment of flax fibre is a tempting hypothesis in explaining this interesting phenomenon, all the more so, as the only craft testified in the archaeological material from this site is spinning and weaving. Initially, it was also assumed that soaking flax could be aided by the chemical properties of the water filtered through the remains of the fossil forest, as most wells were »anchored« in the organic layer. It was supposed that, perhaps, the water from wells was characterized by a high content of »organics« and, thus, it was not quite fit to drink because water stagnating on organic formations is characterized by an unpleasant taste and smell related to decaying organic matter (Petera-Zganiacz et al. 2015; Twardy 2016; Petera-Zganiacz et al. 2019). On the other hand, water rich in »organics« could be suitable for the soaking process due to the increased number of anaerobic bacteria involved in the separation of the ligneous part of the stem. This was not confirmed in the course of the geochemical studies but research revealed that, owing to the high groundwater flow rate, the water in the wells was of fairly good quality (Okupny 2017). Obviously, this does not preclude the potential industrial use of some of these facilities. The soaking of flax may be related to the features located in the north-western part of the site of Kwiatków 20 (zone A2 – features in which the wooden tools were found – **fig. 3**), and perhaps also a few single wells from Kwiatków 11 (e. g. features nos 2581 and 8350).

Based on the examples presented earlier in the context of wells as features used in the process of soaking flax or hemp, the question must be posed as to whether such a feature is a well or a rettery (**tab. 1, nos 7. 10. 15**). It seems that wattle constructions were predominantly utilised as retteries, while those more durable, made of hollowed out trunks or planks were ascribed the function of wells. However, this is not a rule. Probably, the secondary use of some of the wells was for soaking flax. Following such a functional interpretation, the issue of location of these features can be supportive – they were often situated either on the periphery or outside the built-up area of the settlement.

In the case of the remains of dogs discovered in the wells, a question arises whether those animals entered them accidentally (fell and drowned) and, in consequence of the contamination of the water collector, its use was terminated, or whether it was about deliberate, ritual activities – i. e. the symbolic closing of the well (**tab. 2**). However, the presence of complete dog skeletons, sometimes along with the remains of other animals, terminated the use of the feature by »sealing« its original fill – regardless of whether the animals were intentionally placed there or they accidentally drowned in it. The dog, a popular attribute of chthonic deities, appears in the wells as an element closing the path represented by the well, connecting different levels. Also, the presence of quern-stones in the fills of the wells may be associated with the symbolic closing of these features; the place of occurrence of these stone artefacts in the context of the wells should be taken into account here. In some wells they were recorded in the higher parts of the fill, which may indicate the end of use of those water collectors. The occurrence of the deposits in the well can also be interpreted as a form of »thank you« for using the water collector (Seyer 1979, 156).

The wells discovered at the site in Kwiatków raises one more question – which of them were private water collectors and which were public wells? Were those facilities related to individual farms or were they com-

munal wells available to all residents of the settlement? In the case of the wells discovered west of Poland, there is also an issue of interpreting the features. The erratic distribution pattern of these features within sites is the basis for assigning them to farmsteads located in their immediate vicinity (Leube 2009, 162). In Kwiatków both private and shared communal/public wells were probably in use simultaneously. Several farmsteads or farms not clearly separated from each other could use one well, or such a well could have been private and belonged to a specific household. It is probable that within the area of a settlement wells were placed somewhere between the purely private and the public ones, i. e. some water collectors whose functions were indirect (above Dallgow-Döberitz, Berlin-Neukölln). The division of these features into private and communal/public ones was still in use in the 20th century and there was a custom existing in Greater Poland of building one, commonly shared well in the village as well as locating the water collector within the farmstead at the boundary of the farm, so that others could use it when necessary while passing by (Burszta 1964, 103-104; Drożdż/Caputa 2003, 353-354; Józefów-Czerwińska 2017, 135). Single well facilities prevail in the Przeworsk Culture settlements. They can be considered to be communal/public-shared and their role was to supply all residents of the settlement with water. Sometimes, the presence of two or more rarely several water collectors related to one settlement phase has been noted. A concentration of these features in a specific area may indicate their shared use. The public well served also as the »centre of the world« at the scale of the settlement. Given the low number of wells, it can be assumed that they were communally used facilities. Some farmsteads were connected by commonly shared features, and those could be wells. Private wells occurred less frequently, although in Kwiatków they were found in large numbers forming complexes with semi-dugouts. No traces of fences were recorded there. Did the wells in Kwiatków reflect ownership or were they established for more practical reasons, for example, to have access to water just next to the dwelling?

To sum up, such a large complex of wells discovered in Kwiatków should be explained by various functions performed by these facilities. This number was also influenced by the demand for water by craft-related activities and an easy access to it, i. e. a high and stable groundwater level and sand-rich ground which facilitated their excavation (Twardy 2016). The occurrence of wells is explained in the context of the site in Izdebno Kościelne (woj. mazowieckie/PL) in a similar way (Machajewski 2016, 55). What is more, it is likely that in Kwiatków the need to dig new water collectors was also connected with the rapid sanding up of the wells due to the high rate of groundwater flow, probably resulting in their use for a relatively short time. This could have stimulated building new wells, which produced a conspicuously large number of water collectors (cf. Kirsch 1986, 117). Features with double casings might have been used for a longer period, because they wanted to extend the lifespan of water collectors. Due to the size of the settlement, its long-term and stable character, and the various functions of the wells, it can be presumed that over a dozen water collectors could have been in use at the same time. Unfortunately, due to the fact that wood from old casings were re-used to build new ones, it is difficult to accurately estimate the length of their use. Moreover, pottery is not helpful enough in this case either.

The finds obtained from the wells in Kwiatków represent certain categories of artefacts that indicate intentionality – they are recorded in the features located in their vicinity, and this does not seem to be a random case. This shows that those wells were used more or less simultaneously or shortly consecutively, because similar artefacts, such as wooden bats were disposed of into them, which seems an intentional activity and their presence there additionally indicates the function of those features (**fig. 3**).

A review of the Przeworsk Culture sites and the settlements located outside Poland gives weight to the conclusion that the great number of wells discovered within one site has a local background and is mainly related to natural conditions. A characteristic feature of the hydrological system of the Kolska Valley near Kwiatków is a lack of springs. Assuming that small watercourses could freeze entirely during the winter

months, this could be a hindrance to life and farming, especially in the face of the necessity of a daily watering of farm animals. However, the lack of unfrozen surface water could be compensated by supplying the village with groundwater (Twardy et al. 2017, 15).
Southern Greater Poland, where the Kwiatków site was located, was stable and culturally homogeneous in the Roman Iron Age (Michałowski 2003, 82; Machajewski 2008, 107) and that period is associated with the highest number of wells discovered at this site. The extensive and long-functioning settlement in Kwiatków, where a lot of Roman imports were also found, is a part of that settlement character. The structure of economy in Kwiatków is analogous to other sites of this culture in terms of farm animals, cultivation and the »industrial« use of wells (e. g. Tyszler 2018, 163-164). One of the branches of economics was weaving and spinning, the only craft whose traces were recorded in Kwiatków in substantial numbers. This is also confirmed by archaeobotanical findings (although sparse) and the fact that, since the Roman Iron Age, an increase in the amount of hemp pollen has been detectable in Europe (Lityńska-Zając/Wasylikowa 2005, 126). The stable settlement favoured specialized production. Imports, on the other hand, indicate contacts with the Roman Empire, and their high number (for an occupation site) indicates the wealth of the settlement's inhabitants. It is probable that there was an exchange of goods on a supra-regional scale there, which could be connected with, for example, the discovery of small amounts of amber at the said site. In the Roman Iron Age, not far from Kwiatków, there was a cluster of sites of the Przeworsk Culture with the highest concentration of Roman imports in eastern Greater Poland. It is possible that the reason for this was the Prosna-Warta waterway indicated for that zone (Michałowski 2002, 17-18). A single wattle structure within the entire examined area in Kwiatków, which contained a vessel resembling Jastorf Culture pottery, is associated with an earlier settlement period from the Pre-Roman Iron Age, when the groundwater was not yet used to this extent as it was in the Roman Iron Age.
It should also be remembered that it was a long occupation and a stable settlement and not all the discovered water collectors were in use at the same time. The highest number of wells was probably associated with the settlement dated to the 2nd and 3rd centuries. As the dendrochronological and ^{14}C analyses reveal, the water drawn from the wells was also of great importance for the communities inhabiting that area in the 4th and 5th centuries and in the 6th and 7th centuries. Wells from the latter period show a certain degree of technical advancement, compared with the older constructions, and also some new types of casings occurred in Kwiatków then (e. g. post-and-plank or vertical-horizontal constructions appeared with layers of gravel in the base). The development of skills alongside the acquired experience in building the title features is well seen there. Together, over several centuries, despite the convenient location near the rivers, water drawn from the wells played a significant role in the life and economy of the inhabitants of Kwiatków.

CONCLUSIONS

The wells from Kwiatków, in combination with the discoveries of ones from other sites, constitute a unique group of deatures, not only because of their quantity but also in terms of the variety of their functions. First, they were sources of drinking water for both private and public use, as well as for animals. They were facilities related to the pretreatment of flax (finds of beating bats and macroremains) and it is probable that food was stored in some of them (finds of baskets). They could also be used to soak antler before processing it and, presumably, they also supplied water for tanning. Undoubtedly, certain categories of finds also suggest their cult function (dog remains). These features were treated in a special way – hence the querns and traces of burning discovered in the wells. Also, their secondary use as waste disposal sites should be noted. In addition, as the discoveries at other sites show, wells are also places associated with the extraction of

salt as well as being used as burial sites or places for hiding victims of crimes committed almost 2000 years ago. Moreover, the practical intended use of the wells is beyond doubt but, at the same time, it does not preclude their special importance in the rituals of those days. It seems likely that most of those facilities had secondary functions or were intentionally filled up, in order to put an end to the well's utilisation (to »close it«), as implied by certain artefacts in their fillings. They were also »strategic« objects. Depriving the inhabitants of a given settlement of access to water by, for example, contaminating the well or poisoning it could make the difference between life and death in a given community. This is confirmed by some ethnographic analogies – e. g. in North Africa the Tuaregs intentionally hid wells, placing them outside the settlement, in order to protect them from strangers and enemies (Haberlandt 1912, 31). Wells are also places where valuable items (treasures) are stored while facing turbulent times (cf. Binsfeld 1975, 183). Wells were highly significant for religions worldwide. They were located in cemeteries or near temples and well water was sometimes perceived as having special properties. But this special meaning and rich symbolism is passing away. These are specific archives of time, making it possible to conduct many specialist studies and undertake interdisciplinary research. Their uniqueness makes them some of the most interesting features analysed by archaeologists. Wells had many functions in the past and they had a special meaning given by man. They have now lost most of their unique significance.

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Notes

1) This article is a continuation of the article »Place and Importance of Wells in Settlements of Central European Communities in Late Antiquity« published in this journal (Piotrowska 2019).

2) It seems that, here, it could be a well whose upper parts of the casing had decomposed or been deliberately removed. Moreover, the feature was discovered in the area of the settlement which was probably a communal economic site for farmsteads (Skowron 2014).

3) In such cases, the possibility of the groundwater level changing from the time of the feature's functioning up to its discovery during archaeological excavations should be taken into account. Unfortunately, the authors of the studies or preliminary research results do not always provide arguments that might justify a given interpretation of the function of a feature classified as a well.

4) The analysis of the natural conditions present in the vicinity of the site in Kwiatków, including the hydro-geological conditions, was carried out under grant no. DEC-2015/16/S/HS3/00241 financed by the National Science Centre (Narodowe Centrum Nauki).

5) Another plausible interpretation of this structural component is that it facilitated tying individual planks (Jurkiewicz/Machajewski 2006).

6) The analyses are part of grant no. DEC-2015/16/S/HS3/00241 financed by the National Science Centre (Narodowe Centrum Nauki). The dendrochronological analyses of the artefacts were carried out by Professor M. Krąpiec. The following felling dates for trees used to make tools were obtained from: feature no. 765 – AD 143 (-4/+8), feature no. 939 – AD 146?, feature no. 8350 – AD 147. No dates were obtained for the artefact from feature no. 860. All analysed tools were of oak (Krąpiec 2018).

7) The analysis of the macroremains was carried out under grant no. DEC-2015/16/S/HS3/00241 financed by the National Science Centre (Narodowe Centrum Nauki). The research was carried out by Professor Renata Stachowicz-Rybka. The palynological analyses, carried out within the same grant, did not indicate any evidence of pollen of *Linum usitatissimum* (common flax) in the deposits. However, it should be noted that an accumulation of organic material in the environment of a well's fill is not common (as opposed to lacustrine or peatland environments) (cf. Piotrowska/Forysiak in print). On the other hand, an occurrence of seeds and involucra of this plant shows that *Linum usitatissimum*was cultivated by the inhabitants of the settlement. The palynological analysis was carried out by Dr Katarzyna Korzeń and the results were discussed with Professor Krystyna Milecka.

8) An old practice was to protect products against high temperatures by storing them in a stream or a well. For this purpose, wooden buckets were used, into which pots with milk, cream or meat were inserted and then lowered into the well and hung above the water surface. Another method was to place the

bucket in a stream, surround it with stones and cover with a stone lid, in order to weigh it down.

9) For cool storage sunken huts were also used due to the favourable conditions inside, since such places were cool and moist (Zimmermann 1992).

10) It is possible that the containers used to draw water were inserted into the artefacts made from bark. In this way, when lowering them down the well, the containers could be protected against any potential damage from hitting its walls. However, it seems more likely that the wattle baskets had higher protective and cushioning properties than the bark containers. It cannot be excluded that they were simply used for drawing water.

11) It should be noted, though, that river water was probably used for this purpose (which, unlike well water, was soft and free of mineral admixtures). In later epochs, tanneries were located mainly on rivers or in the vicinity of a mill race or a moat (Sowina 2005; 2009).

12) Wells in the context of sites connected with ironmaking will not be discussed here.

13) http://wroclaw.wyborcza.pl/wroclaw/1,35771,18307713,Trup_w_studni_i_cmentarz_na_budowie_drogi_S5__FOTO_html (22.7.2020).

14) https://archeowiesci.pl/2009/04/16/przeworska-osada-spod-wroclawia/ (22.7.2020).

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Zusammenfassung / Summary / Résumé

Die Funktion von Brunnen in Siedlungen mitteleuropäischer Gemeinschaften in der Spätantike.
Ein Beispiel aus Kwiatków (woj. wielkopolskie/PL) aus der Przeworsk-Kultur

Ziel dieses Aufsatzes ist es, die Funktion von Brunnen im Siedlungskontext mitteleuropäischer Gemeinschaften der Spätantike zu umreißen. Die ursprüngliche Nutzung von Wasserentnahmestellen ist nicht immer so klar und eindeutig, wie es zunächst den Anschein hat. In zurückliegenden Zeiten erfüllten diese Anlagen viele Funktionen, die sehr häufig von besonderer Bedeutung für eine Siedlungsgemeinschaft sein konnten. Das aus Brunnen in Kwiatków und anderen Siedlungen der Przeworsk-Kultur geborgene Fundmaterial, ihre Konstruktionsweise und ihre Einbindung in das Siedlungsumfeld legen nahe, dass der ursprüngliche Nutzungskontext variabel war. Paläoökologische Analysen ermöglichen detailliertere Einblicke in die Funktion der Befunde. Neben einer Verwendung als Trinkwasserquelle für den privaten und öffentlichen Gebrauch sowie das Nutzvieh wurden Brunnen in Kwiatków auch für die Flachsverarbeitung genutzt. Neben der Lagerung von Lebensmitteln können sie ferner auch für das Einweichen von Geweih vor dessen Verarbeitung gedient haben. Einzelne geborgene Fundstücke deuten außerdem eine Nutzung in kultisch-rituellen Zusammenhängen an. Übersetzung: J. Greif

The Function of Wells in Settlements of Central European Communities in Late Antiquity.
An Example of the Przeworsk Culture from Kwiatków (woj. wielkopolskie/PL)

The article's objective is to outline the function of wells in settlement areas of Central European communities in Late Antiquity. The intended use as water collectors is not always as obvious and unambiguous as it might seem. In the past, these facilities fulfilled many functions, quite frequently ones of special importance. The character of the finds obtained from the wells in Kwiatków and other water collectors of the Przeworsk Culture, their constructions and their placement in the area of the settlement indicate that the intended use of these structures varied. Palaeoecological analyses facilitate the further detailing of their functions. In Kwiatków, first and foremost they were sources of drinking water for both private and public use and animals as well. They were also facilities related to the pretreatment of flax. Probably food was stored in some of them, too. They could also be used to soak antler before processing it. Certain categories of finds also suggest their cult function.

La fonction des puits dans les habitats de communautés de l'Antiquité tardive en Europe centrale.
Un exemple tiré de Kwiatków (woj. wielkopolskie/PL), culture de Przeworsk

Cet article a pour but d'esquisser la fonction des puits dans les habitats de communautés de l'Antiquité tardive en Europe centrale. L'utilisation primaire des points d'eau n'est pas toujours aussi claire qu'il paraît au premier abord. Autrefois, ces structures remplissaient différentes fonctions qui pouvaient souvent être très importantes pour une communauté. Les objets recueillis dans les puits de Kwiatków et d'autres habitats de la culture de Przeworsk, le mode de construction et l'intégration de ces puits dans l'environnement de l'habitat suggèrent qu'ils avaient à l'origine une fonction qui pouvait varier selon le contexte. Des analyses paléoécologiques permettent de comprendre la fonction des structures. Sources d'eau potable pour les besoins privés et publiques, et pour le bétail, les puits étaient aussi utilisés pour la transformation du lin. Outre le stockage de nourriture, ils pouvaient aussi servir à ramollir le bois de cerf avant de le travailler. Certains objets indiquent même leur utilisation dans un contexte cultuel. Traduction: Y. Gautier

Schlüsselwörter / Keywords / Mots clés

Polen / römische Kaiserzeit / Przeworsk-Kultur / Siedlung / Brunnen / Funktion von Brunnen
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Pologne / époque impériale romaine / culture de Przeworsk / habitat / puits / fonctions des puits

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