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ENVIRONMENTAL CONDITIONS OF THE DEVELOPMENT OF THE SETTLEMENTS IN THE UPPER AND MIDDLE OBRA RIVER BASIN

A model of the preferred ecological niche in the Neolithic and Early Bronze Age in Greater Poland

The Middle Obra River basin was an area encompassing exceptional environmental conditions for the establishment of settlements – in particular, an extended river pool in the vicinity of black soil sheets. The first Neolithic settlements are related to the Linear Pottery culture. The widest distribution of Neolithic societies is connected with the Funnel Beaker culture. During the Late Neolithic period the settlement network is less dense. This process could be related to climate change. The Early Bronze Age was represented in the Middle Obra River basin by the Kościan group of the Unetice culture – a local community with a barrow cemetery in Łęki Małe and a fortified settlement in Bruszczewo. The continuous occupation of this area can be followed from the Early Neolithic Age (the Linear Pottery culture) to the Early Bronze Age (the Unetice culture).

settlement – the Neolithic – the Early Bronze Age – Poland – Obra River basin

Vliv přírodních podmínek na vývoj pravěkého osídlení na horním a středním toku řeky Obry. Preferované ekologické niky v neolitu až starší době bronzové ve Velkopolsku. Povodí středního toku řeky Obry disponovalo v pravěku výjimečnými přírodními podmínkami pro založení sídlišť, především hustou sítí vodních toků a dostatkem černozemě. První neolitická sídliště patří kultuře s lineární keramikou. Největší rozmach osídlení v rámci neolitu a eneolitu je spojen s kulturou nálevkovitých pohárů. Koncem eneolitu došlo k poklesu intenzity osídlení, což bylo zřejmě způsobeno klimatickými změnami. Starší doba bronzová je na sledovaném území zastoupena únětickou kulturou, k předním lokalitám patří mohylník Łęki Małe a opevněné sídliště Bruszczewo. Od počátku neolitu do starší doby bronzové bylo povodí střední Obry osídleno kontinuálně.

osídlení – neolit – starší doba bronzová – Polsko – povodí řeky Obry

The study concerns the south-western part of Greater Poland and the eastern part of the Lubusz Land (fig. 1). This area was divided into several geographical units (*Bartkowski 1970; Kondracki 1994*). The main waterway in the area included in this study is the Obra River. This river, which flows through the central part

of the above mentioned area, has its source in the Kalisz Upland near Koźmin. It has been canalized and this is particularly visible in its middle part, where the river bifurcates. Water is taken aside by three canals (the northern, central and southern canals) (*Jodłowski 2003*).

It is hard not to underestimate the role of natural conditions in the development of the settlement net, which in a distinct way determine this phenomena. The results of such research can yield great interpretative possibilities especially in the domain of settlement archaeology. For example, much can be learnt about the ecological niches favoured by the respective cultures, the methods of adaptation to the environment used by prehistoric communities, and the influence of climatic-environmental changes on changes in settlement traditions. These issues concerning the studied area have already been mentioned in the literature (cf. *Hładylowicz 1932; Bartkowski 1970; Starkel 1977; Wojciechowski 2000; Okuniewska-Nowaczyk 2005*). However, the current state of research is still far from satisfying. At the same time, one can hope that this project, which is currently being carried out at the Department of Quaternary Geology and Paleogeography of the Adam Mickiewicz University in Poznań, deepens our knowledge of these issues considerably (cf. *Hildebrandt-Radke 2004*).

The locations of settlements were chosen because of a number of favourable environmental conditions. On the basis of conducted analyses one can draw a profile of the most desired ecological niches and a gradation of the respective features of the environment from the most to the least important in the process of making a decision concerning the choice of a niche. The gradation of these features in order of their importance for choosing the location of a settlement is as follows:

1. Hydrography
2. Soils
3. Geomorphology
4. Defensive features
5. Strategic position
6. Flora

The first organized settlement structures of agrarian communities are connected with the horizon of the late **Linear Pottery culture**; **they put the greatest emphasis on the hydrological system and the soil**. All settlement enclaves of this culture were placed directly on the watercourse in the neighbourhood of the most fertile soils in this region. Only in a few cases were they placed on the esker hills (Racot, Łęki Małe), which could be linked directly with the defensive nature of the area. Most of them were located on the main waterway, which enabled them to have easy contact with other areas. Therefore, in the late Linear Pottery culture, **there were two main factors determining the location of settlements: direct access to water and the fertility of soils (black earth)**. The other elements were taken into consideration only in the case of the presence of the first two (*Szydłowski 2009*).

The great settlement expansion of the Funnel Beaker culture in comparison to earlier cultures proves that environmental preferences expanded and were unified. However, it is more difficult to point at a gradation of the most important features of the area where settlement was intensified. Settlement was spread to new territories to such an extent that one can notice internal differentiation of the gradation of desired components of the biosphere. However, an invariable component as far as the location of sites is concerned was the hydrological system i.e. the accessibility of water. The high quality of soils also remained an important factor in the process of choosing a place for settlement. In most cases, areas with the best soils were settled. However, this situation was not as unambiguous as it would be by the time of the late Linear Pottery culture community. One can encounter violations of this rule. Indeed, some enclaves are established in sandy areas; however, they still constitute a clear minority. The biggest recorded settlements are mainly on slopes and at the foot of hills (Kielczewo) which are near the river in the neighbourhood of fertile soils (Dakowy). Locations which facilitated the defence of a site in a natural way were used to a insignificant extent. A more important factor was the accessibility of resources such as stone (the elbow of the Samica river near Mosina) or amber (Bonikowo). With the present state of research, possible regularities relating the location of settlements to flora are barely distinguishable. Research conducted at the macro-regional level gives little chance of reaching firm conclusions in this area. Nevertheless, one should assume that mosaic arrangements of flora with great variability of species including enclaves of bright oak forest and xerothermic turf were preferred. This would give the opportunity to obtain varied forest fruits, convenient areas for the pasturing of animals, and a place for settlement which did not require clearance. Micro-regions started to be founded at some distance from the main waterways. The significance of internal regional connections and the circulation of goods among respective enclaves in the system of the central Obra River started to increase and led to the creation of more extensive systems of cultural exchange. This is shown by the maximal use of local outcrops, even of poor quality stone (Poznań clay, moraine stone), and a decrease in imports at the same time. The importance of such features as natural defences and strategic position (location along the waterways) is evident. This means that a strategic element also played an important role in the more complicated organization of settlement structures, which was noticed foremost at the micro-regional stage. A micro-region which was "oriented" to the strategic position of this area was isolated, and it was significant from the point of view of the whole reception basin of the central Obra River (*Szydłowski 2009*).

The gradation of environmental features as in the case of the Globular Amphora culture is the same as in the Funnel Beaker culture. It is recorded that (beside the superior role of the hydrographical arrangement of the area) there is still high level of dependency on fertile soil. A substantial majority of Globular Amphora culture sites are in the valley of the central Obra River and Kościan Plain, concentrated along the river on the edge of areas with black soil. The loca-

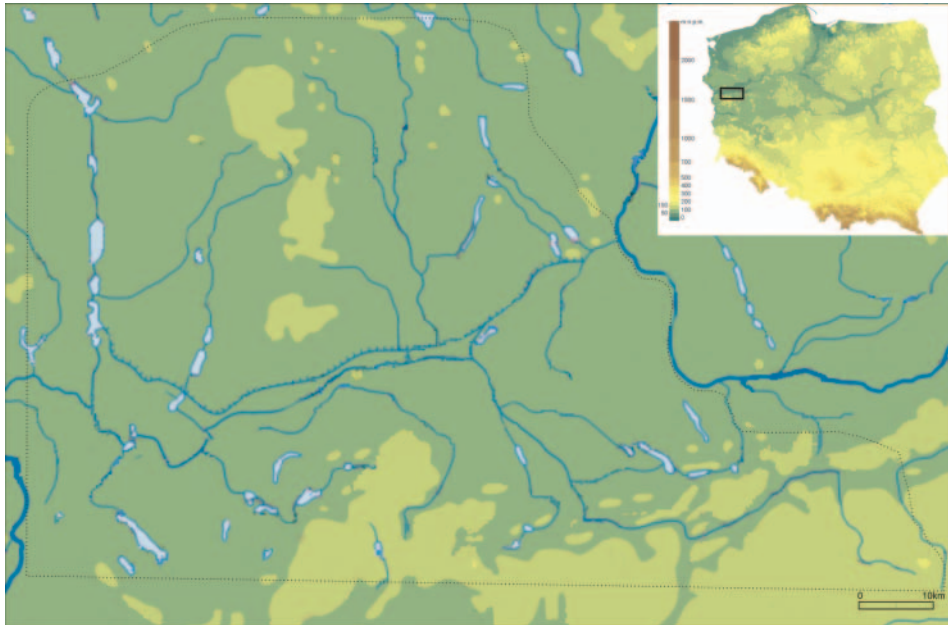


Fig. 1. Temperate Greater Poland showing the area discussed in this article.

tion of the most close-knit micro-region of this culture in Bonikowo, “closed” between watercourses and longitudinal eskers, reveals an interest in using places with a higher defensive ratio and located in strategic places, especially in the neighbourhood of fertile soils and places where there were resources (amber). Moreover, the area near Mosina which was settled by communities of this culture (a much higher number of sites) confirms conclusions drawn for the Funnel Beaker culture as far as the nature of this settlement region is concerned. It was also noted that new areas were settled and the spheres of settling were broader (the area around Gostyń).

The stage of disintegration connected with the period of development of the Corded Ware culture brings some changes also in the domain of the gradation of environmental conditions influencing the place of settlement (*Szydłowski 2009*). Invariably, being in the direct neighbourhood of water remains the main factor which generated the settlement. However, in the case of soils, one can observe some violations of the rules which used to be quite rigid. In the case of soil, one cannot determine any unambiguous regularity. Micro-regions are placed both on the edge of areas with black soils (Łęki Małe, Dalabuszki) as well as on sand (Kargowa Valley, Mosina), or even on marshy areas and flood waters (the area around Trzciel). Similarly, in the case of the internal organization of micro-regions, the Corded Ware culture, and the macro-regional view, one can notice that the choice of defined ecological niche for the localization of a settlement runs in two directions. Apart from the identical gradation of environmental

features for the Corded Ware culture and the Funnel Beaker/Globular Amphora culture groups, one can observe for certain groups of sites from the end of the Neolithic and the beginning of Bronze Age (a portion of the sites of the Corded Ware culture) completely different characteristics. Sandy soils in the context of pine forests and mixed forests start to dominate over fertile areas of black soils and Middle-European wet ground forests.

The development of settlement structures in the Bronze Age brings further changes in the preferences for certain features of the environment in the process of making a decision concerning settlement. The most desired element is still access to water. However, the gradation of further conditions differs. Soils play quite an important role but the defensive nature of the area and its strategic location on trade routes starts to become more important, which was an obvious consequence of economic transformations connected with the popularization of bronze and the development of transactions over long distances. This could be the reason to search for places which had certain natural features (i.e. geomorphologic, location in relation to hydrological system) and supported defensive needs (Bonikowo, Kielczewo, Łęki Małe, Bruszczewo). Moreover location in strategic places such as crossing waterways became equally important (the areas around Gostyń, Mosina, Łęki Małe). These were places which connected the river systems in the best way (micro-regions near Gostyń at the meeting point of the reception basins of the Obra and the Barycz, near Mosina at the estuary of the Obra to the Warta). The neighbourhood of fertile soils was desired; however, these soils were at a greater distance from the main settlement, which was the cost of locating the central settlement in a place which guaranteed the most effective defensive position in a given micro-region.

It is worth referring to later periods with respect to the discussed area, which have been the subject of similar studies (*Kurnatowski 1963; 1966; 1968; Hilczarówna 1967*). It was stated that lower terrace levels along waterways, on the promontory, and on hills in marshy areas were favoured, and the upland areas were nearly without any settlement remains. The recorded sites were foremost near black soils too (*Kurnatowski 1963*). It was not until late phases of the Early Middle Ages that a change in settlement strategy was noted. This was demonstrated by different preferences concerning the location of settlements – instead of settling in the valleys of rivers, they chose uplands (*Kurnatowski 1963, 199*). This is supported by the attached cartograms from the work of Kurnatowski (*1963*), which show that the central part of the Obra River was mainly settled, and that in the uplands placed between valleys there were no spheres utilized intensively by people, or even penetrated (*Kurnatowski 1968*). Surface research around the Bruszczewo settlement of the Early Bronze Age also supported these assumptions (*Czebreszuk – Szydłowski 2010*). Within 5 km of the site there are about 500 sites from the Early Neolithic up to the Late Middle Ages. Their concentration was changing at respective chronological levels; however, they are in the same places all the time. The upland zone was not settled until the Late Middle Ages, and the settlement was concentrated in the valleys of watercourses

and around areas of black soil. The invariability of favoured ecological niches in the period of a few epochs and many cultural systems proves that, in the macro-region of the central Odra, cultural factors determined to a much smaller extent strategy with respect to settlement. The main determining factors were environmental conditions.

Throughout the analyzed epochs and depending on the cultural system and region, preferences concerning the choice of environmental conditions for the location of settlements underwent changes (they were more visible at the micro-regional level). These changes were dictated by both economic and social changes. Changes in the attitudes of contemporary communities towards the selection of locations for settlement micro-regions in the Neolithic Age and at the beginning of the Bronze Age, although visible, were not of a dramatic nature. On the basis of conducted analyses, one can sketch an outline of the ecological niche of the most desirable locations, fulfilling the most important requirements of society.

It had to be a location directly on a medium-size river, particularly in a place where another river with reversed circulation had its estuary. This local hydrographical system should have been connected by possible confluence with neighbouring river basins, which were at the same time part of a broader system of long-distance waterways. The most desirable was an area which was slightly elevated and had mild slopes and several meters of height difference. Within this area there should have been some patch of black soil. However, heavy soils were not desired over the whole area of the enclave. The biggest settlements were placed on sand. A mosaic arrangement of flora was preferred, as it provided a greater variety of species of forest fruit and allowed animals to graze on areas covered with grass and in Sessile Oak glades.

In the area included in the research, there are areas which meet the most important conditions characterizing the most desired ecological niche for location of settlements. At Łęki Małe, intensified settlement was recorded in a full sequence starting from the horizon of the Linear Pottery culture. Generally, the best areas for settlements within the boundaries of the examined area were in the central part of the Odra Valley and on the Kościan Plain. Their environmental characteristics were close to the above-outlined ideal ecological niche. This is demonstrated by the constant intensified rate of settlement. However, different elements which determine settlement also caused communities to want to settle there. The unique position of this river in the web of long-distance trade routes – resulting from the fact that there is a natural connection between the Odra and Warta Rivers – is not the only reason why it was such an attractive place for settlers. The Odra did not have a regular bed, which caused annual floods. Their destructive force was not great thanks to the presence of dense riverine forests. After every flood, the forests were irrigated and received a layer of fertile silt (cf. *HilczeroŹna* 1967, 39), which fertilized the soil. Thanks to this, the black soils did not become impoverished and maintained a high level of fertility, despite the fact that they had been cultivated since the horizon of the Linear Pottery culture. This situation allowed

a stable rate of settlement to be maintained, which did not require a troublesome rotational system.

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ŚRODOWISKOWE UWARUNKOWANIA OSADNICTWA W DORZECZU GÓRNEJ I ŚRODKOWEJ OBRY

Model preferowanej niszy ekologicznej w neolicie i początkach epoki brązu w Wielkopolsce

Na terenie objętym opracowaniem zarejestrowano obszary, które spełniają najważniejsze warunki charakteryzujące najbardziej pożądaną niszę ekologiczną dla lokalizacji osadnictwa. Przede wszystkim były to okolice Łęk Małych, gdzie zarejestrowano zintensyfikowane osadnictwo w pełnej sekwencji począwszy od horyzontu kultur wstęgowych. Generalnie w środkowym odcinku Doliny Środkowej Obry oraz na Równinie Kościańskiej znajdowały się najdogodniejsze tereny

dla sytuowania osadnictwa w obrębie rozpatrywanego obszaru. Ich charakterystyka środowiskowa była najbardziej zbliżona do wyżej zarysowanej, wyidealizowanej niszy ekologicznej. Dowodzi tego stały, zintensyfikowany poziom zasiedlenia. Jednakże o wyjątkowym zainteresowaniu tym rejonem zdecydowały także inne elementy determinujące osadnictwo. Obok wyjątkowej pozycji tej rzeki w siatce dalekosiężnych szlaków wymiany, co wynika z faktu, że jest to naturalny łącznik Odry i Warty. Dodatkowo Obra praktycznie nie posiadała stałego koryta, co powodowało rokroczne wylewy. Ich siła destrukcyjna nie była duża dzięki gęstej roślinności łąkowej, za to zostawały każdorazowo warstwy żyznego namułu, który w ogromnym stopniu użyźniał i nawadniał gleby. Dzięki temu tutejsze czarne ziemie nie jałowiały, utrzymując wysoką żyzność, mimo ich uprawiania począwszy od horyzontu kultur wstęgowych. Sytuacja ta pozwalała utrzymać stałe osadnictwo, co nie wymagało uciążliwego system rotacyjnego.

Ryc. 1. Obszar objęty opracowaniem.