



RESEARCH ARTICLE

Traces of disappearing heritage: upcycling of wooden vessels preserved in the vernacular architecture of a large river valley in Central Europe

Dariusz Brykała^{1,*} , Paweł Marek Pogodziński^{2,3}  and Robert Piotrowski^{1,4} 

¹Department of Environmental Resources and Geohazards, Institute of Geography and Spatial Organization of the Polish Academy of Sciences, Toruń, Poland, ²Institute of Archaeology and Ethnology, Faculty of History, University of Gdańsk, Gdańsk, Poland, ³Archaeological Museum in Gdańsk, Gdańsk, Poland and ⁴Faculty of Humanities, Nicolaus Copernicus University in Toruń, Toruń, Poland

*Corresponding author. Email: darek@geopan.torun.pl

Abstract

The article presents a trend in rural and small-town architecture, in central Poland, consisting in the reuse of material from river-going vessels. As part of the research, twenty objects (existing and non-extant) were identified that had been constructed using material from wooden vessels that had navigated the Vistula River in the past (nineteenth and twentieth centuries). There was also a reinterpretation of the origin of construction material from a farm building that had been moved in the 1980s from near the Vistula to one of Polish open-air museums. The results indicate that these are probably the last material traces of a boat mill that operated on the Vistula in the late nineteenth century. Also, many preserved millstones embedded in buildings located near the Vistula seem to confirm this conclusion.

Introduction

Material cultural heritage includes not only spectacular buildings, or works of art under the protection of museums, but also objects related to local industry and crafts. They have a great cognitive potential and are carriers of values defining local identity. However, they are sometimes regarded as less important, depreciated in bottom-up evaluation, because the significance of things/objects depends on human judgement (Hall, 1997: 61). Thus the status of individual objects changes depending on the economic, social, and historical context (Ashworth and Graham, 2018: 375). A negative attitude of the local community to vernacular architecture may result from, for example, a lack of awareness of the value of such objects. They are not taken into account when creating a local brand and their potential is not used in tourism, for example. However, as elements of old heritage, they can become assets of local communities (Ashworth and Kavaratzis, 2011). Undoubtedly, the group of undervalues objects still includes the ships, rafts and boat mills that have for centuries constituted an important part of the cultural landscape of river valleys (Chętnik, 1935; Oliver, 2013; Fajer, 2014; Hognogi et al., 2021). Unfortunately, few traces of such objects remain today. Single examples of old wooden watercrafts can be found today in Europe mainly in regular and open-air museums.

The local communities that for centuries operated on the major navigable river developed a specific model of coexistence with nature. On the one hand, the river was a threat during floods and ice jams, but on the other, it provided work, both permanent (fishing, ferry crossings) and seasonal (rafting), provided convenient transport and facilitated trade. To transport passengers



Figure 1. An example of reuse of a former boat as a latrine in the Netherlands.

Source: Fragment of a painting by Hendrick Avercamp, c. 1608, entitled *Winter Landscape with Skaters*, from the collection of the Rijksmuseum in Amsterdam, shelfmark: SK-A-1718.

and goods, many types of river-going vessels were used (McGrail, 2002; Ossowski, 2010; Reszka, 2012). They differed in size (tonnage) and load type. Apart from typical commercial vessels, some special vessels were designed for single use (Šádova, 1960). The most scant information and data are those relating to floating mills (Gräf, 2006). Only in historical and ethnographic sources can a little information be found for the area of Poland (Szurowa, 2002; Brykała and Prarat, 2018). They have become ‘phantom objects’¹ of sorts – wiped from the cultural landscape.

Although wooden vessels played an important role in the economy of the state and were significant components of cultural landscape, their material remnants are very rare. Only a few examples of former vessels (mainly smaller ones) have survived to present times.² Most of the identified objects are not entered into the register of immovable monuments and may be completely destroyed in the near future. It happens that we can identify fragments of old boats that have been reused in architecture, in a completely new functional context (for example, see a fragment of a seventeenth-century painting from the Netherlands, Figure 1). So far, reused material from vessels has most frequently been identified in harbour quay structures, floors, pavements, latrines, and much less frequently in traditional vernacular architecture (Marsden, 1994: 11, 153–4; Goodburn and Thomas, 1997; Ford, 2013; Pogodziński, 2016; 2019). They represent a few, but extremely important traces of the old heritage and pragmatic behaviour of local communities, tending to use many times the earlier used items and materials, which resulted from frugality but also respect for possessed things (Strasser, 2013: 517–18). The local/traditional recycling has some characteristics of the idea of sustainability (unknowingly), and preceded or even inspired the current architecture trends (Kiaček, 2021). This practice is at a border between a phenomenon of symbolic significance – *spolia* (Kalakoski and Huuhka, 2018: 193) – and actions characterised by pragmatism and economic rationalism (Frangipane, 2016).

This study aimed at compiling an inventory of the last material, non-archaeological traces of wooden vessels, which were dismantled after exploitation, and the material was reused during construction of farm buildings or houses in villages and small towns in the area around the middle section of the Vistula in Mazowsze Płockie (central Poland). We also attempted to identify the type of vessels from which these materials originated and determine if in the architecture of villages and small towns any other material (not wooden) remains of river-going vessels have been preserved.



Figure 2. Location of research area.

Notes: (Legend): (1) location of group of boat mills featuring the most floating mills in the nineteenth century; (2) location of churches with millstones embedded into their walls; (3) location of architectural structures built using material from disassembled vessels (accompanying numbering corresponds to ordinal numbers in Table 1); (4) translocation of wooden barn to open-air museum in Sierpc; (5) major towns.

The Vistula: a cultural and culture-forming space

Mazowsze Płockie is an ethnographic and historical subregion on the northern outskirts of the Vistula's right bank (Baraniuk, 1999: 22; Kasprzyk, 2008: 20–32). The southern border of Mazowsze Płockie is Poland's largest river, the Vistula (Figure 2), whose proximity was of great importance in the region's history. Beginning in the fourteenth century, as the role of the Teutonic Order was growing to the north, the Vistula was one of the main trade routes connecting Mazowsze (Mazovia) with the Order. The main goods transported by this river to the State of the Teutonic Order in the Middle Ages included wood, ash and tars. At the turn of the sixteenth century, the importance of grain transport by rafting increased. The growing export of grain transformed cities such as Płock, Zakroczym and Warsaw into important trade centres on the Vistula (Samsonowicz, 1994: 252–9). Until the end of the nineteenth century, the Vistula was Mazowsze's main transport route. The economic activity of inhabitants of Vistulian villages was connected with the river. Thus, over the centuries, the specific cultural landscape (Enache and Craciun, 2013: 310) shaped the identity of local communities (Selwyn, 1995: 119; Guo, 2003: 193). Many inhabitants of riverside towns and villages of Mazowsze Płockie were engaged in boatbuilding or worked on vessels navigating the Vistula.

From the sixteenth to the nineteenth centuries, the Vistula was mainly navigated by such vessels as the *szkuta*, *dubas*, *koza*, *łyżwa*, *jadwiga* and *bat*. The *szkuta*, *dubas* and *koza* were flat-bottomed, spindle-shaped vessels with a transom stern and a slender bow, and were equipped with a mast with a square sail and rudders of up to two-fifths of the hull length (Reszka, 2012: 59–60). Additionally, there were raft ships: the *byk*, *galar* and *komiega*, which upon reaching Gdańsk were dismantled and sold as construction material or for fuel (Bogucka, 1978; Gierszewski, 1982: 104; Reszka, 2012: 129–30).

The *szkuta* was a very popular vessel on the rivers of northern Europe (Ossowski, 2010: 10). It was the largest vessel on the Vistula from the fifteenth to the eighteenth centuries. It was almost 38 m in length, 9 m wide, and had sides of approximately 1 m high (Smolarek, 1986). Currently, one wreck of such a vessel exists in Poland, which was discovered in Czersk on the Vistula in 2009 (Ossowski, 2010: 99–111). Its load capacity is estimated at 87 tonnes. It was in service for sixty years and dates to the sixteenth century. Having been documented, this single complete wreck of

the Vistulian vessel was reburied, as no cultural institution had undertaken to extract, conserve and exhibit it.

From the eighteenth century onwards, new types of ships with spritsails began appearing on the Vistula, such as the *berlinka-odrzak* ('szpicberlinka'), the *berlinka-finówka* ('kafówka'), the *kajlak*, the *krypa* and the *gabiar* raft (Reszka, 2012: 59). Vessels of the *Szpicberlinka* type (German: *Oder-Spitzkahn*) appeared on the Vistula after the 1773 opening of the Bydgoszcz Canal connecting the Vistula and Oder river systems (Reszka, 2012: 94). This vessel ranged from 30 to 40 metres in length. It was narrower than the *szkuta*, measuring from 3 to 4 m, which allowed it to navigate canals (Reszka, 2012: 96). The loading capacity of these vessels was from 60 to 100 tonnes. The *kafówka* differed from the *berlinka* mainly in its elongated, forward-protruding prow, or *kafa* (Reszka, 2012: 103). Such vessels were usually built of oak, and sometimes of high-quality pine (Reszka, 1992: 46–7; Ossowski, 2010: 140–1).³

In the latter nineteenth century, *kajlaks*, which originated from the *cyla*, appeared on the Vistula. *Cylas*, known in Prussia as *Zille*, were built on the upper Vltava River, mainly as single-use ships to Magdeburg, Berlin and Hamburg (Šádova, 1960: 48). The name *Zille* as a river rafting vessel has a long tradition of use dating back to the fifteenth century (Ossowski, 2010: 138). The hull was made of 6–7 cm-thick spruce or fir planks. The joints were sealed with moss (Reszka, 2012: 114). Because of the type of wood used, the joints – made of pegs or nails – would not hold, and service life was around three years on average (Ossowski, 2010: 138). Annually, about four hundred such vessels type sailed the Elbe. After reaching their destination port, most were dismantled (Mielcarek, 1986: 28). Only a few, which had a superior, steel-reinforced structure, were converted into freight ships (Reszka, 2012: 114). For this reason, specialised shipyards were created to handle both the dismantling and conversion of these ships (Ossowski, 2010: 114). The name *kajlak* endured longest in the Mazowsze Płockie region, and mainly in Wyszogród, where many skippers operated such vessels. They were even referred to as 'Wyszogród barges' (*barki Wyszogrodzkie*) (Ossowski, 2010: 114–16).

The number of vessels on the Vistula is evidenced by, for example, the numbers in the registers of Gdańsk port, which was the destination port for Vistula rafting and the most important seaport on the Baltic Sea. In 1555, there were 2,100, in 1576 – 2,300, and in 1784 – 2,500 (Gierszewski, 1982: 108). By comparison, from 30th March to 30th April 1876 alone, around 101 *berlinkas*, 14 *galars*, 1 barge and 172 rafts sailed on the Wyszogród–Płock/Płock–Wyszogród section (Figure 2).⁴

Wooden river vessels began gradually to disappear from the Vistulian landscape in the mid-nineteenth century, when tugs began to be used, and wooden vessels were replaced by steel barges. Despite these changes, *berlinkas* continued to sail in the vicinity of Płock, Wyszogród and Czerwińsk into the 1950s.

The least studied group of vessels navigating the Vistula is that of floating mills, whose parts could be reused as building materials after disassembly. They were referred to as: *młyny okrętowe* (ship mills), *młyny na promach* (mills on ferries), *młyny łodne* (*łodziaste*, *na łodziach*) (boat mills), or more commonly *plywaki* (from the Polish verb *plywać*, 'to swim or travel on water'). In Polish, Vistulian boat mills also had their own name, *bździel* (Klonowic, 1862: L. 314). However, in the eighteenth and nineteenth centuries it was used only sporadically.

Floating mills operated mainly on larger navigable rivers, such as the Vistula (Szurowa, 2002: 98–9; Brykała and Prarat, 2018; Brykała and Podgórski, 2020: 6). Such facilities were very common in cities, where they were usually located close to the centre – closest to the potential consumers of their products (Żurawski, 1970; Rzepkowski, 2015: 239). Certified information about boat mills operating on European rivers dates to the early Middle Ages (Gräf, 2006: 15). Boat mills were mentioned for the territory of Poland in sources from as early as the thirteenth century (using the Latin term *super naves*). The oldest source mentioning a watermill on the Vistula is considered to be the 1286 charter document of the city of Sandomierz (Dembińska, 1973: 122–8). They were

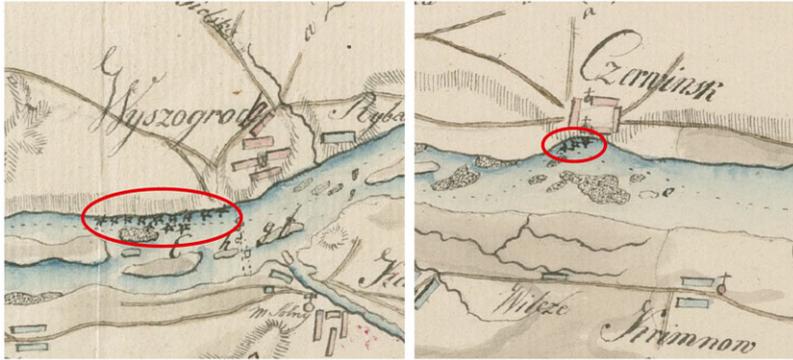


Figure 3. Examples of a large number of boat mills operating in one location on the Vistula.

Source: Plan du course de la Vistule: *Góra Kalwaria-Toruń* (1809–12), original scale 1:85 000, stored in Central Archives of Historical Records in Warsaw, Collection: Zbiór Kartograficzny, shelfmark: 73-6 planche 2.

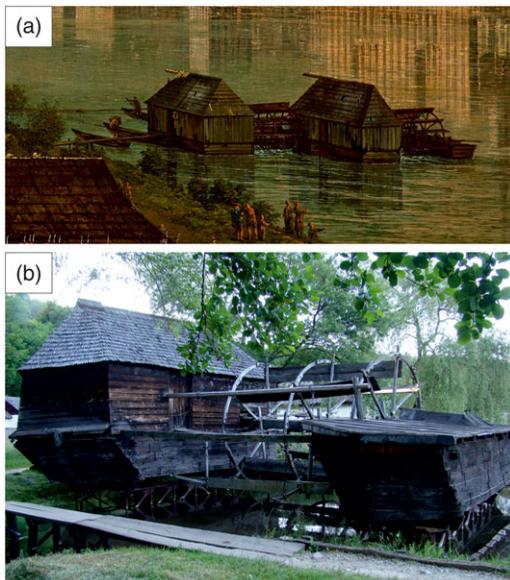


Figure 4. Types of boat mills operating on the Vistula. (a) boat mills on the Vistula in Warsaw, in the 1770 painting by Bernardo Bellotto (Canaletto) *View of Warsaw from the Praga Side* (excerpt shown: painting held in the Canaletto Hall in the Zamek Królewski w Warszawie – Muzeum, inv. No. ZKW/438, photo by A. Ring, L. Sandzewicz); (b) boat mill exhibited in the ASTRA open-air museum in Sibiu (Romania) (photo: D. Brykata).

usually used to grind grain, with one undershot water wheel driving a set of millstones (Rivals, 1993).⁵ They had little energetic capacity, so often functioned side by side in groups numbering in the low double digits (Sabján, 2005).

The oldest mention of a floating mill in the study area dates to 1453. Jan the miller, of a Wyszogród *pływak*, was mentioned in the records (Wolff and Borkiewicz-Celińska, 1971: 63). As early as in the sixteenth century, there were eleven floating mills in Wyszogród. A larger group of such mills (Figure 3) also ground grain to meet the needs of the inhabitants of Zakroczym, Czerwińsk and Płock (Gieysztor and Żaboklicka, 1967: 142; Chlebowski et al., 1900, vol. 15: 374; Żebrowski, 2000: 78, 112). In addition, individual mills were located in smaller villages, mainly on the right bank of the Vistula. Until the mid-nineteenth century, such mills continued to be numerous. In Wyszogród itself, fifteen boat mills were still in operation in 1823 (Gawarecki, 1823: 22).

The design of the boat mills was similar to that of modern asymmetric catamarans (Figure 4). It consisted of two interconnected boats, a larger one that held the mill and its main grinding equipment, and a smaller one that acted as a float and supported the shaft of the water wheel (Gräf, 2006). Foreigners visiting Poland compared them to such objects in their own countries. Such information can be found in, for example, a report by Fryderyk Schultz concerning his stay in Warsaw in 1791 and 1793. He states that the Warsaw boat mills are ‘similar in structure’ to the mills at a bridge on the Elbe near Magdeburg (Schultz, 1956: 55). Based on analysis of images and preserved technical sections of floating mills, it can be concluded that such objects were fitted on flat-bottomed boats, with which they constituted an integral whole (Szurowa, 2002: 117). They measured 15–15.3 m in length, 3–7 m in width and 7.5 m in height. The water wheel shaft was up to 12 m long, and the wheel itself was 4 to 6 m in diameter and 6–8 m in length. The water wheel had up to ten blades and made 3.5 turns per minute (Kitzerman, 1948: 10; Sabján, 2005: 242).

Boat mills were undoubtedly more susceptible to damage than stationary mills. On the rapid wear to the material that boat mills were prone, the lustrator of the Stężyca county wrote in 1789: ‘floating mills are subject to replacement and ruin sooner than terrestrial mills’ (Madurowicz-Urbańska, 1965: 270). From the preserved archival materials concerning boat mills on the Vistula River in Płock in 1851, we know that the nine facilities in existence at the time operated for eight to forty-five years (and usually ten to twenty).⁶

However, natural causes were not the main reason for the reduction in number of boat mills. One of the basic factors determining their disappearance from the Vistula and its tributaries was administrative restrictions designed to completely eliminate boat mills. Technical progress in milling ongoing since the mid-nineteenth century should also be mentioned here. Increasingly efficient watermills and, later, steam mills successfully competed with floating mills (Szurowa, 2002: 126).

The *De libertate in fluviis Regiis* decree of 1447 (known as the Piotrków statutes of King Kazimierz Jagiellończyk) is considered to mark the beginning of the process of improving the navigability of the river system of Poland, which effectively meant eliminating floating mills (Ohryzko, 1859: 69). The document prohibited the creation of obstacles that would hinder transport on navigable rivers, while also allowing dams and weirs to continue operating if they allowed free passage to transport vessels. This regulation mainly concerned named rivers, including the Vistula.

After the collapse of the Polish state at the end of the eighteenth century, the partitioning powers (Prussia, Russia and Austria) initiated intensive efforts to remove boat mills from navigable rivers, and from the Vistula in particular. Decrees were issued specifying new conditions for the construction of mills and their accompanying hydro-engineering structures (permanent weirs and dams). On 30th May 1818, the Royal Governor issued a decree prohibiting the construction of boat mills on navigable rivers.⁷ All mills were to be removed within three months of that date, except for those that received special permission and that did not interfere with the transport of goods down the Vistula.

However, preserved archival documentation shows that boat mills continued to exist on the Vistula for a long time. Although millers were prevented from building new mills, old ones could continue to operate. In April 1871 it was announced that boat mills were to be removed from the Vistula channel within a five-year period (‘Zniesienie młynów na Wiśle’, 1876: 1). On the passing of this deadline in 1876, the Board of District 11 of the Ministry of Communications sent a request to the governor’s offices to issue regulations ‘abolishing all floating mills on the Vistula’ so that in 1877 there were none at all on the river (*Gazeta Handlowa* 1876, No. 238: 3). It is worth noting that sixty-nine such facilities were in operation on the section from Zakroczym to the border with Prussia at the time (‘Pływaki na Wiśle’, 1876: 2). Such mills were to be officially closed down in the presence of state officials. Did this happen? Evidently not, as another decision (No. 2778) was issued by the Warsaw thoroughfares district (*Okręg Dróg Komunikacyjnych*) in 1886, ordering that all floating mills on the Vistula were to end operations by the end of 1886.⁸

The final piece of information on floating mills on the studied section of the Vistula River that is confirmed by sources is from the twentieth century. In 1914–15, three boat mills operating on the left bank of the Vistula River near the village of Tokary near Płock were to be liquidated (Dzik, 1928: 9). Surviving even longer, a boat mill operated near Dobrzyń nad Wisłą until the 1930s (Gorzechowska, 1982: 87).

Reuse of boatbuilding materials in architecture along the Vistula river in Mazowsze Płockie

Based on the available data, it can be concluded that boatbuilding wood was being reused in Poland from at least the early Middle Ages until the first half of the twentieth century (Znamierowska-Prüfferowa, 1988: 137–40; Litwin, 2004; Ossowski, 2010: 55; Reszka, 2012: 112–13; Misiuk, 2013: 343; Filipowiak and Stanisławski, 2013: 97, 99 pic. 49, 101 pic. 53). Boatbuilding material was used in the construction of both residential and farm buildings. In addition to this material being used in carpentry, it was also used in new watercraft and as fuel (Litwin, 1995: 44; Ossowski, 2010: 121, 156, 171; Reszka, 2012: 130; Pogodziński, 2016; 2019). Similar situations have also been noted in other parts of Europe (Marsden, 1994: 11, 153–4; Goodburn and Thomas, 1997; Ford, 2013).

The available data reveals two areas in which such objects occurred. The first is in northern Poland – a strip of the Baltic coast where boatbuilding material obtained from wrecks was used (Filipowiak, 2014). The second is the middle-Vistula area, and particularly around Płock, where timber was obtained from river-going crafts.

The oldest structure made of boatbuilding materials in the area of Mazowsze Płockie is considered to be a well casing made of oak planks from the hull casing of a *szkuta* (Trzeciński, 2000: 115). It was discovered during archaeological research in the Old Town in Płock, which played an important role in trade on the Vistula.

Identification work in 2017–19 in Mazowsze Płockie, supported by archival inquiries and analysis of published mentions in previous scientific papers, identified a total of twenty objects that had been built using wood from Vistula vessels (Table 1, Figure 2). Unfortunately, most of these constructions have not survived to 2022, including one residential building in Czerwińsk, six residential buildings in Maszewo – the last of which was pulled down in the 1990s⁹ – and one farm building each in Czerwińsk and Murzynowo that were either demolished or burned down. The vast majority of existing buildings are in a very poor technical condition and may be demolished in the near future (Figure 5). Of the entire set, most numerous are residential buildings (14), followed by barns (4), and an item of equipment – a mangle – has also been identified, as well as a well. The largest group of architectural objects built of boatbuilding components that has survived to our times is in Czerwińsk¹⁰ and the vicinity of Wyszogród (including a residential building in Ciuckowo).

It is worth noting that, in the late nineteenth and early twentieth centuries, Czerwińsk and Wyszogród played an important role in transport on the Vistula. They had harbours, small ports and shipyards (Ossowski, 2010: 145), and the life of their inhabitants was inextricably tied to the Vistula. River-going craft were also dismantled in these places. The last certified cases of the disassembly and sale of boatbuilding material date to 1954 and 1955 (Reszka, 2012: 112). An eyewitness to the demolition emphasised that the wood was healthy, and the best preserved were *brety*, that is, oaken planks of the hull casing (Reszka, 2012: 112).

There is also information about the reuse of material obtained from boat mills. The best example is a barn in Murzynowo near Płock that was built of material from a disassembled floating mill (Olędzki, 2016: 79, 311). Photographs of the building have survived. The boards used in the construction have numerous characteristic holes for the pegs that fixed the floating mill's component parts. Information about the origin of the material was passed down from generation

Table 1. Structures built using wooden materials reclaimed from disassembled Vistulian vessels

No.	Location	Year created	Item type	Boat-making material identified in a	Source of boat-making material	State of preservation of item	Source of information on boat-making origins
1.	Ciućkowo	First half of twentieth century	Residential building	Wall	<i>Berlinka</i>	Good, used	Field inventory
2.	Czerwińsk, ul. Kościuszki 3	1860	Residential building	Wall	<i>Berlinka</i>	Poor, delapidated	Field inventory
3.	Czerwińsk, ul. Kościuszki 1	Turn of nineteenth century	Industrial building – mangle	Wall	<i>Berlinka</i>	Very good, used	Field inventory
4.	Czerwińsk, ul. Kościuszki	Turn of nineteenth century	Residential building	Wall	<i>Berlinka</i>	Non-extant – demolished in 1970s	Verbal report of resident/owner
5.	Czerwińsk, Plac Batorego	Turn of nineteenth century	Residential building	Flooring	<i>Berlinka</i> (hull side planks)	Very good, used	Field inventory
6.	Czerwińsk, ul. Świętokrzyska	1950s	Residential building	Roof structure	<i>Berlinka</i> (rafters from hull planks cut lengthwise)	Very good, used	Field inventory
7.	Czerwińsk, by cemetery	nineteenth/ twentieth centuries	Farm building – shed	Wall	<i>Berlinka</i>	Non-extant – burned down in the 1990s	Verbal report of resident/owner, and published material
8.	Czerwińsk, ul. Klasztorna	nineteenth/ twentieth centuries	Residential building	Wall	<i>Berlinka</i> (hull casing)	Good	Field inventory
9.	Czerwińsk	nineteenth/ twentieth centuries	Residential building	Wall. Unable to identify – wall covered with siding	<i>Berlinka</i>	Unable to evaluate	Verbal report of resident/owner
10.	Czerwińsk	nineteenth/ twentieth centuries	Residential building	Wall. Unable to identify – wall covered with siding	<i>Berlinka</i>	Unable to evaluate	Verbal report of resident/owner
11.	Maszewo	nineteenth/ twentieth centuries	Residential building	Wall	Probable <i>berlinka</i>	Non-extant	Verbal report by Maszewo resident 1990s. Info. from MWM Archives in Sierpc

(Continued)

Table 1. (Continued)

No.	Location	Year created	Item type	Boat-making material identified in a	Source of boat-making material	State of preservation of item	Source of information on boat-making origins
12.	Maszewo	nineteenth/ twentieth centuries	Residential building	Wall	Probable <i>berlinka</i>	Non-extant	Verbal report by Maszewo resident 1990s. Info. from MWM Archives in Sierpc
13.	Maszewo	nineteenth/ twentieth centuries	Residential building	Wall	Probable <i>berlinka</i>	Non-extant	Verbal report by Maszewo resident 1990s. Info. from MWM Archives in Sierpc
14.	Maszewo	nineteenth/ twentieth centuries	Residential building	Wall	Probable <i>berlinka</i>	Non-extant	Verbal report by Maszewo resident 1990s. Info. from MWM Archives in Sierpc
15.	Maszewo	nineteenth/ twentieth centuries	Residential building	Wall	Probable <i>berlinka</i>	Non-extant	Verbal report by Maszewo resident 1990s. Info. from MWM Archives in Sierpc
16.	Maszewo	nineteenth/ twentieth centuries	Residential building	Wall	Probable <i>berlinka</i>	Non-extant	Verbal report by Maszewo resident 1990s. Info. from MWM Archives in Sierpc
17.	Murzynowo		Farm building – barn	Wall	Boat mill	Non-extant – disassembled	Published materials and verbal report of owner
18.	Płock	sixteenth century	Well	Well-casing	<i>Szkuta</i>	Non-extant – archaeological object	Published material
19.	Praga/Zdziarka		Farm building – barn	Wall	No data	Not confirmed	Verbal report by Czerwińsk resident
20.	Rębowo (moved to Sierpc)	1895	Farm building – barn	Wall	Boat mill/ <i>berlinka</i>	Under museum protection – v. good	Archival sources and published material

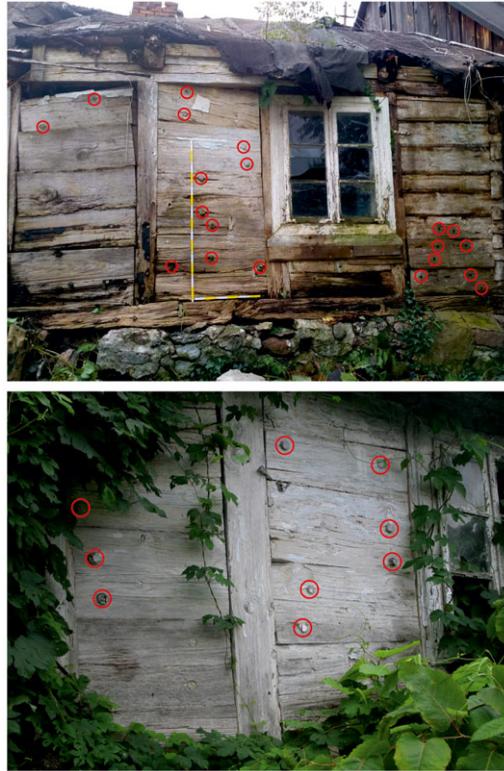


Figure 5. Residential buildings in Czerwińsk built using boatbuilding material – location of boatbuilding pegs marked (photo: P. M. Pogodziński and R. Piotrowski).

to generation in the family. Its veracity is attested by Jacek Olędzki – an ethnographer who has conducted research in Murzynowo for many years. Another example of material from a floating mill being reused was a building in Błotnowola in the upper reaches of the Vistula River. Due to administrative restrictions preventing the free operation of the boat mill, its owner decided to end the life of the *ptywak*. In 1820, he used the obtained wood to build another type of grain mill – a windmill (Szurowa, 2002: 105, fn. 39). There have also been instances of floating mills being adapted to entirely new functions. This was the case, for example, in the village of Nakieł nad Bugiem. Before 1820, two floating mills were retired, and an inn was established in one of them (Chlebowski et al., 1885, vol. 6: 884).

In summary, the architecture of Mazowsze Płockie was for centuries dominated by wooden buildings. However, deforestation and its resulting problems forced residents to seek alternative sources of traditional building material or to use other materials (Fischer, 1934: 166–7; Czerwiński, 1995: 60). Early twentieth-century data confirm the paucity of forest cover in the Płock county (Kozicki, 1905: 265). Despite insufficient forest resources, wooden architecture predominated in what was then the Warsaw voivodeship (Ciołek, 1952: 245–6). According to the findings of M. Kacprzak, after the First World War, the most numerous group of buildings in rural Płock were wooden structures (59.5 per cent), which was in line with the nationwide trends in rural construction at the turn of the twentieth century (Kacprzak, 1937: 58–9; Ciołek, 1984: 110). This predilection may have resulted from both the peasantry's conservative attitudes towards construction, or an innate aversion to change (Ciołek, 1984: 119). In light of the difficulty in obtaining suitable carpentry material, the use of boatbuilding wood in Mazowsze Płockie's rural and small-town construction should be considered one of the remedies to the situation. It is also

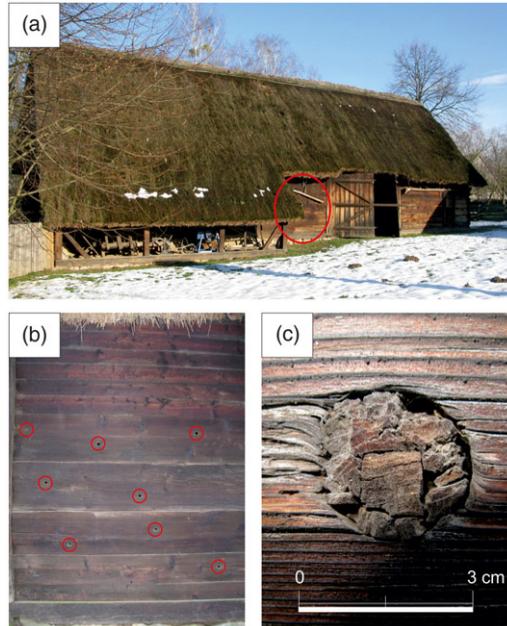


Figure 6. Barn from Rębowo exhibited in the open-air museum in Sierpc. (a) general view with southern wall marked; (b) arrangement of boatbuilding peg holes in southern wall; (c) example of surviving boatbuilding peg, with wedge inserted (photo: R. Piotrowski).

a perfect example of unconsciously environment-friendly activity, consisting in recycling of still useful and highly valuable boatbuilding material for building construction.

The barn from Rębowo at the Museum of the Mazovian Countryside in Sierpc as an example of an ‘architectural palimpsest’

In the Museum of the Mazovian Countryside in Sierpc (*Muzeum Wsi Mazowieckiej w Sierpcu*) there is a unique item of wooden architecture – a barn from Rębowo, a village less than 3 km from Wyszogród. Boatbuilding wood from a dismantled Vistulian craft was used in its construction (Figure 6). According to archival information,¹¹ the wood comes from a *berlinka* dismantled in Wyszogród.

The barn was built in 1895 from pine wood. It belonged to the Woje family. The object, on a rectangular plan of 19.60 m by 7.60 m. The sole plate was laid on a foundation of fieldstones. The posts were made of oak and pine wood. The interior of the building consists of a large haymow, a ride-through main hall and a separate granary. One element of a roof truss has the inscription ‘F Józef i Bregida IHS Woje Roka 1895’. The foundation inscription refers to the date of the barn’s construction and the name of its owners, while the monogram IHS is a symbol of Jesus Christ.

At the beginning of the 1980s, the barn was purchased by the open-air museum in Sierpc as a typical example of this type of building in the Mazowsze Płockie region. The barn was reconstructed as part of a homestead in the museum village. Structural elements of the barn have certain features that are convincing of the authenticity of the information displayed alongside the exhibit. These include dowel holes, and the shape of the dowels themselves, which have a circular cross-section and are wedged in with elongated pyramidal oak wedges. This is a typical solution in river boatbuilding (Ossowski, 2010: 101). Most of the components with dowel holes are found

in the building's southern wall, in which no planks were replaced during reconstruction apart from the sole plate. In the western wall, the sole plate and three log beams were replaced, and seven log beams in the northern wall.¹² Based on information in archival documents, after analysis of the building's individual structural elements, and based on field data confirming the frequent use of recovered boatbuilding material in Mazowsze Płockie, it was hypothesised that the building material originated from a dismantled *berlinka* (Piasecki et al., 2017). This hypothesis is evidenced and probable. However, some of the construction details that can be recreated from the elements preserved in the barn walls do not have characteristic features of construction material from *berlinkas*. In the known flat-bottomed vessels, the hull-bottom planks were fixed with pairs of pegs. The holes for the pegs were offset against each other by about 45 degrees (Figure 6b). In the planks of the front wall of the barn from Rębowo, a series of peg holes at two heights was identified. The distances between successive holes range from 71 cm to 76 cm. In the gable and rear wall of the building there are planks with pairs of holes arranged 'one on top of another' or in series, and perpendicular to the longitudinal edges of the boards. The vertically placed holes are 24 cm apart. Meanwhile, the distances between pairs of holes (longitudinal distances) range from 188 cm to 224 cm. Planks of the gable wall have also been identified that feature other combinations of holes that form, for example, an isosceles triangle. The distances between the holes are 12, 12 and 14 cm (Figure 6b). Another feature that does not fit the design solutions used in *berlinkas* is the diameter of the pegs. Most of the holes have a diameter of 2.5 cm to 3 cm (Figure 6c). Vessels on the Vistula usually had pegs with a diameter of 3 cm to 3.7 cm. Also, the thickness of the planks is not indicative of the hull casing's bottom planks (even taking into account shrinkage of the wood). In most cases, these boards are approximately 4 cm thick. Only one of them has a thickness of 7 cm. These types of dimensions are found in smaller vessels, such as *bats*. The hull-bottom planks used in *bats* were up to 5 cm thick, while the sides were approximately 4 cm thick (Reszka, 2012: 78). The width of the planks is also too small to be interpreted as *berlinka* hull-bottom planking.

At this point, it should be asked whether there are any indications that the material used to build the barn can be identified as parts of a floating mill. It is likely, given the design of these mills. First of all, some boards have a series of single peg holes: these are unlike *berlinkas*, in which peg holes appeared in pairs, often angled at 45 degrees to each other. This material can be considered to derive from the asymmetric, smaller float on which the mill wheel shaft rested. The density of pinning would indicate joining to the frames of a flat-bottomed vessel. Importantly, taking into account the graphical materials relating to boat mills – the smaller boat of a boat mill is structurally reminiscent of a 'simpler' river vessel – the aforementioned *bat* (Miholek, 2013: 131–2). This would explain the dimensions of the boards and the distribution of peg holes. There is also a good chance that the material used to build the barn from Rębowo is from the side planks of a boat mill (Kulich, 2002: 13; Gräf, 2006: 88, 143, 188). These boards may also come from the mill house itself of the floating mill. Taking into account the framing construction of the 'superstructure', this is likely. The more so because the distances between frame posts in sections of mill walls often ranged between 0.7 m and 1.2 m (Streza, 2014: plate I. 13.2).

An interesting research thread in the context of our considerations is a rosette identified on one of the barn planks (Figure 7). It is 24 cm across, with an isosceles cross inscribed in its circle. For such objects as, for example, *berlinkas*, no woodworking ornaments have been found, and no pertinent information has survived. Similar decorations, including hexapental rosettes, have been found on vessels of older provenance, for example, *szkutas* (Ossowski, 2010: 112–14). Taking into account the specific status of the mills, it can be assumed that apotropaic signs were popular on floating mills. Decorations identified in the interiors of watermills and windmills, including the presence of hexapental rosettes (stars), are *per analogiam* evidence supporting this hypothesis (Wesołowska, 1969: Fig. 6; Adamczewski, 2001: 99–100). Further confirmation may be the rich woodcarving of the interior of the watermill shown by Daniela Gräf (2006: 192, Fig. 328). However, the rosette found on the plank from the Rębowo barn is not a hexapental star but an isosceles cross inscribed in a circle. Is it a carpenter's mark, an apotropeion in the form of

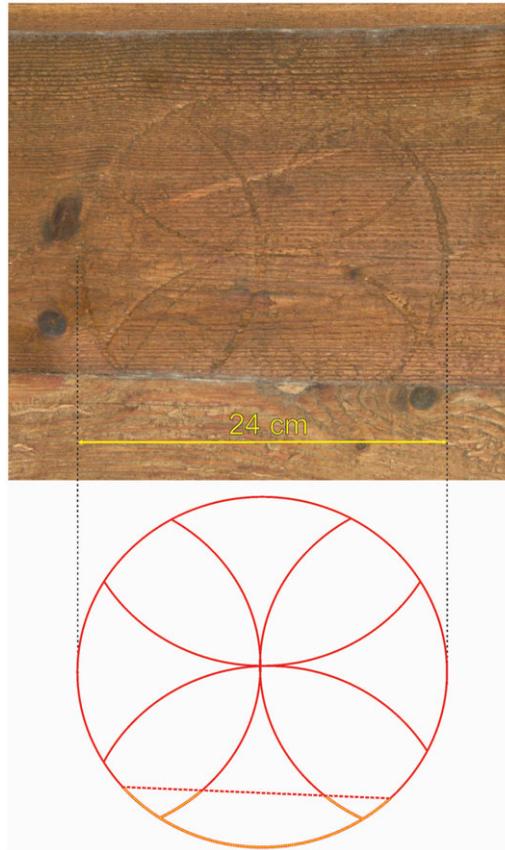


Figure 7. Rosette identified on inner part of southern wall of barn from Rębowo (photo: R. Piotrowski).

a cross, an ideogram of a four-leaf clover (Wyrwa, 2018: 41), or, in the end, an ideogram of a water wheel (Irimie and Bucur, 1969: 429–31)? These questions cannot be answered unequivocally. However, it should be remembered that mills had a specific symbolic status that generated many beliefs. Boat mills probably did not differ from stationary mills in this respect (Kulich, 2002: 101, 116–17). Thus, this rosette need not have fulfilled a purely aesthetic function, but may also have been symbolic, and perhaps apotropaic.

Taking into account the year the barn was built (1895) and the information contained in the building's inventory card concerning the material's provenance from a dismantled *berlinka*, it can be assumed that the family of owners (heirs) preserved the information about the alleged source of the building material. However, due to the time lapse between the construction of the barn and its purchase by the Museum of the Mazovian Countryside in Sierpc (over eighty years), as well as the distance from the Vistula River and the lack of direct contact with the traditions of inhabitants of riverside settlements, the account of the 'informant' (who was not a witness to the purchase) may be erroneous in its identification of the building. As a consequence, the name of the object was changed. The boat mill (*młyn łodny*), often referred to as a floating mill (*plywak*), could be 'transformed' in family accounts into a river-going vessel, especially since in Polish the *młyn-plywak* (floating mill) derives from the verb *plywać* that indicates sailing or swimming (a *berlinka* also sails). Information on the material having come from a *berlinka* may be the result of the common occurrence of these vessels, and from their use in the 1950s on the Vistula near Czerwińsk and Wyszogród. Therefore, the idea that this material comes from boat mills operating in Wyszogród



Figure 8. Examples of reuse of millstones identified in Vistula-valley towns and villages. (a) Millstone embedded in wall of church in Zakroczym; (b) in wall of residential building in Włocławek; (c) exposed with an anchor at the roadside cross in Czerwińsk; (d) fragments of millstones used to build driveway to property in Wyszogród (photo: D. Brykała and R. Piotrowski).

should not be unequivocally rejected. The reuse of material from such objects is confirmed by the aforementioned examples from Murzynowo near Płock and Błotnowola.

The phenomenon of reusing material in vernacular architecture was quite common in the past.¹³ However, in this case we are dealing with an unprecedented phenomenon, when vessels were the source of reused material. Thus, the function of a new structure was radically different from the function of the structure from which the material was obtained (Kalakoski and Huuhka, 2018: 193).

Millstones in the space of villages and towns along the Vistula

Pieces of evidence suggesting the possibility of wood origin from boat mills can be supported by other material elements identified in the architecture of villages and towns along the Vistula. This applies also to millstones. Unfortunately those used in floating mills did not differ remarkably from the millstones used in other mill types (windmills, watermills). That is why it is difficult to attribute them to this mill type unambiguously without the context of other archaeological findings (see e.g., Dumont, 2015; Joziassé et al., 2019). However, considering that boat mills were for centuries the most numerously represented mill type in villages and towns along the Vistula, this is highly probable.

In the study area we surveyed eleven localities where millstones were identified. Most of them are embedded in church walls (seven cases) and one in a residential building (Figures 8 a,b). Fragments of millstones were also found in a pavement of a driveway to a property in Wyszogród (Figure 8d), in a pavement near the main entrance to the church in Czerwińsk, and two millstones were exposed near a roadside cross in Czerwińsk (Figure 8c). A similar phenomenon of reuse and exposure of millstones from windmills and watermills, near the places where they were operated in the past, is known from many examples (Święch, 2005: 148;

Piotrowski, 2021: 90–2; Piotrowski, 2022: 26–7). The millstones identified in the study area are semi-finished or damaged, with traces of use (either whole or fragmented).

Most intriguing are the millstones exposed in the outer walls of Christian temples. Most of them are found in walls of Gothic churches (six cases). In the study area, they are buildings dating back from the fifteenth and sixteenth centuries, that is, from the period when in this section of the Vistula valley the first boat mills appeared, which is confirmed by historical sources. Even more interestingly, the cases of incorporating of millstones in the walls of churches in Mazowsze Płockie are found nearly exclusively in towns and villages located in the vicinity of large navigable rivers. In other regions, also similar examples of churches with embedded quern-stones or millstones are recorded (Herzberg, 1994: 24–33; Jędryka, 1994), but without such an association of their location with hydrography. Some authors indicated a possibility of a symbolic meaning of such artifacts in a sacral space (Peacock, 2013: 169–72; Watts, 2014: 40–2; Brykała and Lamparski, 2021).

Conclusions

The use of boatbuilding material in rural and small-town architecture in Mazowsze Płockie should be considered a specific and significant element of the region's cultural heritage. It resulted from both the high-quality wood used to build river ships and, mostly, to the local shortage of wood material in the nineteenth century. Importantly, the rationality and pragmatism of the inhabitants of Mazowsze Płockie produced an unconsciously ecological activity. The use of reclaimed material that is at hand (timber from building demolitions, but also materials such as clay or stone) is a kind of rural architectural *bricolage* (Piotrowski, 2020). We should also bear in mind the question of sentimental and emotional value, which is difficult to verify. The interviewees from Czerwińsk emphasised that building a house made of boatbuilding components was an affirmation of the professional affiliation of their ancestors and their relationship with the Vistula, as well as being emblematic of local Vistulian identity. Objects of this type, when promoted appropriately, could become tourist attractions, strengthening the local brand and positively shaping the social and cultural identity of places (Ashworth, 1994). This confirms the thesis about the importance of *spolia* as bridges connecting the past with the present (Kalakoski and Huuhka, 2018: 209).

The barn from Rębowo at the Museum of the Mazovian Countryside in Sierpc should be considered the only object under the protection of a museum in the Mazovian voivodeship to represent the reuse of boatbuilding material – probably from a boat mill – in the rural architecture of Mazowsze Płockie. It constitutes an 'architectural palimpsest' of sorts – a building with a 'double identity' responsible for preserving the material of now-defunct Vistulian vessels that were for centuries associated with Mazowsze Płockie. This happened by chance. The barn is under museum protection not because of the origin of the material, but because its construction is typical for the region. Thus, thanks to a combination of events, this barn bore a memory of a no-longer-extant or dematerialised item of the region's cultural heritage. Thus the value of this object does not derive from their aesthetic or structural values, but mnemonic ones – referring to the culture of earlier human communities that inhabited the Vistula valley and its vicinity (Ashworth and Poria, 2009: 523).

In European open-air museums, we still see several preserved or reconstructed boat mills (Rușdea, 1986; Jüngel, 1987: 96; Juhász and Krivošová, 1996: 16). Unfortunately, no open-air museums in Poland have managed to preserve objects of this type. It has only been attempted to reconstruct such an object. In 2013, a copy of a boat mill was exhibited at the Museum of the Kielce Countryside in Tokarnia. Unfortunately, the project came to an end after four years (Mosakowski et al., 2020: 54). Another example is the idea of reconstructing a Vistula floating mill in the ethnographic park in the Kampinoski National Park in Granica, on a specially widened section of the Olszowiec Canal (Szatygin, 2005: 382).

Considering the above, the barn from Rębowo has an important, but not fully realised, value. It is our material heritage, not only of vernacular architecture in Mazowsze Płockie, but also of traditional boatbuilding in the Vistula valley. The barn structure is very likely to preserve some elements of a boat mill. Thus in the open-air Museum of the Mazovian Countryside in Sierpc, an exceptional object of remarkable cognitive value is located. It can be classified as a unique example of architectonic recycling and a specific instance of the idea of sustainability, resulting from local pragmatism and economic realism.

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Source materials. Archive of the Museum of the Mazovian Countryside in Sierpc, shelfmark 16/29 B and 21/304 A.

Central Archives of Historical Records in Warsaw, Collection: Generalne Dyrektorium Finansów, Wojny i Domen, Departament Prus Nowowschodnich, shelfmark 2/307.

Central Archives of Historical Records in Warsaw, Collection: Zbiór Kartograficzny, shelfmark 73–6.

State Archive in Płock, Collection: Akta Miasta Płocka, shelfmark, 311.

State Archive in Toruń Branch in Włocławek, Collection: Zarząd Powiatowy Włocławski, shelfmark 6313 and 6718.

Notes

1 We use the term 'phantom object' to refer to an object that does not materially exist in the field, but whose memory has been preserved in local records – either in societal and individual memory or in source materials. A 'phantom object' generates memorates that may be inspired by empty spaces, photographs or maps.

2 The largest collection of such vessels in Poland is held by the Vistula Museum in Tczew – a branch of the National Maritime Museum in Gdańsk.

3 The wreck is held by the Museum of the Mazovian Countryside in Sierpc.

4 Based on data from the newspaper *Korespondent Płocki*, issues 27–34 (1876).

5 One of the last functioning boat mills in Europe was the Kukljin mill in the Kruševac district in Serbia on the West Morava River. Initiated by C. Rivals, a film was made in 1993 documenting the work of this mill. The film can be viewed at: <<https://www.canal-u.tv/chaines/universite-toulouse-jean-jaures/le-dernier-moulin-a-nef-vodenica-camac-claude-rivals>>.

6 State Archive in Płock, Collection: Akta Miasta Płocka, shelfmark 311, p. 84v.

7 State Archive in Toruń Branch in Włocławek, Collection: Zarząd Powiatowy Włocławski, shelfmark 6313, p. 1r.

8 State Archive in Toruń Branch in Włocławek, Collection: Zarząd Powiatowy Włocławski, shelfmark 6718, pp. 5–6.

9 Archive of the Museum of the Mazovian Countryside in Sierpc, shelfmark 21/304 A.

10 A small town with an urban layout that has changed little between the Middle Ages and the early twentieth century. A distinguishing feature of this layout is the preserved wooden buildings typical of late nineteenth-century and mid-twentieth-century small towns.

11 Archive of the Museum of the Mazovian Countryside in Sierpc, shelfmark 16/29 B.

12 Archive of the Museum of the Mazovian Countryside in Sierpc, shelfmark 16/29 B.

13 Archival sources contain, for example, information on a sale (in 1802) of wood and iron components from a damaged mill in Kidule (Central Archives of Historical Records in Warsaw, Collection: Generalne Dyrektorium Finansów, Wojny i Domen, Departament Prus Nowowschodnich, shelfmark 2/307).

References

- Adamczewski, J. 2001. 'Antropologiczny wymiar przestrzeni młynarstwa', *Studia Etnologiczne i Antropologiczne*, 5: 93–106.
- Ashworth, G. 1994. 'From History to Heritage, from Heritage to Identity: In Search of Concepts and Models', in G. Ashworth and P. J. Larkham, eds, *Building A New Heritage* (London), pp. 13–30 <<https://doi.org/10.4324/9780203068564>>.
- Ashworth, G. and Graham, B. 2018. 'Senses of Place, Senses of Time and Heritage', in S. Watson, A. J. Barnes and K. Bunning, eds, *A Museum Studies Approach to Heritage* (London and New York, NY), pp. 374–80 <doi: 10.4324/9781315668505>.
- Ashworth, G. J. and Kavaratzis, M. 2011. 'Why Brand the Future with the Past? The Roles of Heritage in the Construction and Promotion of Place Brand Reputations', in by F. M. Go and R. Govers, eds, *International Place Branding Yearbook 2011* (London), pp. 25–38 <https://doi.org/10.1057/9780230343320_3>.
- Ashworth, G. and Poria, Y. 2009. 'Heritage tourism: current resource for conflict', *Annals of Tourism Research*, 36:3, 522–5 <doi: 10.1016/j.annals.2009.03.003>.
- Baraniuk, T. 1999. 'Rys etnograficzno-kulturowy Mazowsza', in J. Banaszek, ed., *Mazowsze* (Płock), pp. 20–42.
- Bedyński, W. 2019. 'Liminalność krajobrazu kulturowego', *Politeja*, 58: 31–45 <doi: 10.12797/Politeja.16.2019.58.03>.
- Bogucka, M. 1978. 'Transport i wymiana', in M. Dembińska, ed., *Historia kultury materialnej Polski w zarysie. Vol. 2. Od XVI do połowy XVII wieku* (Wrocław), pp. 324–48.
- Brykała D. and P. Lamparski, eds. 2021. 1st Annual millPOLstone Workshop 'Kamienie młyńskie w kościołach Pomorza Środkowego', Koszalin, 1–2 września 2021 r. (Warszawa) <<https://doi.org/10.7163/Konf.0003>>.
- Brykała, D. and Prarat, M. 2018. 'Reconstruction of boat mills distribution on the Drwęca river and Pomeranian part of the Vistula River in the early nineteenth century', *Dissertation of Cultural Landscape Commission*, 40: 71–89 <doi: 10.30450/201816>.
- Brykała, D. and Podgórski, Z. 2020. 'Evolution of landscapes influenced by watermills, based on examples from Northern Poland', *Landscape and Urban Planning*, 198:103798, 1–15 <doi: 10.1016/j.landurbplan.2020.103798>.
- Chętnik, A. 1935. *Splaw na Narwi: Traty-oryle-orylka* (Warszawa).
- Chlebowski, B., W. Walewski and F. Sulimierski, eds. 1881–1902. *Słownik geograficzny Królestwa Polskiego i innych krajów słowiańskich*, vols 1–15 (Warszawa).
- Ciołek, G. 1952. 'Wpływ środowiska geograficznego na formy osadnictwa i budownictwa wiejskiego w Polsce', *Lud*, 39: 228–52.
- Ciołek, G. 1984. *Regionalizm w budownictwie wiejskim w Polsce*, t. 1 (Kraków).
- Czerwiński, T. 1995. *Osadnictwo i budownictwo ludowe na Mazowszu północno-zachodnim w XIX i na początku XX wieku* (Sanok).
- Dembińska, M. 1973. *Przetwórstwo zbożowe w Polsce średniowiecznej (X–XIV wiek)* (Wrocław-Warszawa-Kraków-Gdańsk).
- Dumont, A. 2015. 'La prospection systématique d'un fond de rivière: l'exemple du Doubs', in P. J. Rey and A. Dumont, eds, *L'homme et son environnement: des lacs, des montagnes et des rivières*, *Revue Archéologique de l'Est*, 40: 429–50.
- Dzik, A. 1928. *Młynarstwo w Polsce* (Warszawa).
- Enache, C. and Craciun, C. 2013. 'The role of the landscape in the identity generation process', *Procedia – Social and Behavioral Sciences*, 92: 309–13 <doi: 10.1016/j.sbspro.2013.08.677>.
- Fajer, M. 2014. 'Watermills, a forgotten river valley heritage, selected examples from the Silesian voivodeship, Poland', *Environmental & Socio-economic Studies*, 2:2, 1–9 <doi: 10.1515/environ-2015-0032>.
- Filipowiak, W. 2014. 'Korabnictwo, port i żegluga wczesnośredniowiecznego Wolina', in B. Stanisławski and W. Filipowiak, eds, *Wolin wczesnośredniowieczny* (Warszawa), vol. 2, 350–85.
- Filipowiak, W. and Stanisławski, B. 2013. 'Przez most do przeszłości: badania wykopaliskowe w dzielnicy Ogrody', in W. Filipowiak and B. Stanisławski, eds, *Wolin wczesnośredniowieczny* (Warszawa), vol. 1.
- Fischer, A. 1934. *Etnografia słowiańska: Polacy* (Lwów–Warszawa).
- Ford, B. 2013. 'The reuse of vessels as harbor structures: a cross-cultural comparison', *Journal of Maritime Archaeology*, 8: 197–219 <doi: 10.1007/s11457-013-9116-2>.
- Frangipane, A. 2016. 'From spolia to recycling: the reuse of traditional construction materials in built heritage and its role in sustainability today: a review', *Geological Society, London, Special Publications*, 416:1, 23–33 <doi: 10.1144/SP416.12>.
- Gawarecki, W. H. 1823. *Opis topograficzno-historyczny ziemi wyszogrodzkiej na teraz w obwodzie i województwie płockiem położony* (Warszawa).
- Gazeta Handlowa*. 1876. No. 238: 3.
- Gierszewski, S. 1982. *Wisła w dziejach Polski* (Gdańsk).
- Gieysztor, I. and A. Żaboklicka, eds. 1967. *Lustracja województwa mazowieckiego 1565* (Warszawa), vol. 1.
- Goodburn, D. M. and Thomas, C. 1997. 'Reused medieval ship planks from Westminster, England, possibly derived from a vessel built in the cog style', *The International Journal of Nautical Archaeology*, 26:1, 26–38 <doi: 10.1111/j.1095-9270.1997.tb01311.x>.
- Gończowska, J. 1982. *Wisła i wodniacy płoccy* (Płock).
- Gräf, D. 2006. *Boat Mills in Europe from Early Medieval to Modern Times*. Series: Bibliotheca Molinologica, 19, trans. M. Harverson and L. van der Drift (Dresden).

- Guo, P. 2003. "Island Builders": Landscape and Historicity Among the Langalanga, Solomon Islands', in P. J. Stewart, ed., *Landscape: Memory and History: Anthropological Perspectives* (Strathern and London), pp. 189–209.
- Hall, S. 1997. 'The Work of Representation', in S. Hall, ed., *Representation: Cultural Representations and Signifying Practices* (London), pp. 13–64.
- Herzberg, H. 1994. *Die Mühle zwischen Religion und Aberglauben* (Berlin-München).
- Hognogi, G. G., Marian-Potra, A. C., Pop, A. M. and Mălăescu, S. 2021. 'Importance of watermills for the Romanian local community', *Journal of Rural Studies*, **86**: 198–207 <doi: [10.1016/j.jrurstud.2021.05.031](https://doi.org/10.1016/j.jrurstud.2021.05.031)>.
- Irimie, C. and Bucur, C. 1969. 'Typology, Distribution, and Frequency of Watermills in Romania in the First Half of the Twentieth Century', *Transactions of the 2nd TIMS Symposium* (Holte), pp. 421–34.
- Jędryka, W. Z. 1994. 'Tajemnicze kamienie', *Darłowskie Zeszyty Naukowe*, **1**: 72–82.
- Joziassse, R., de Ruiter, B. and Pouwels, P. 2019. 'Een schipmolen uit 1216? Opzienbarende vondsten aan de oevers van de Nederrijn bij Arnhem', *De nieuwe Molenwereld*, **3**: 4–11.
- Juhász, Á. and Krivošová, J. 1996. *Kolárovo: Vodný mlyn, Komárňanské tlačiarne a vydavateľstvo* (Komárno).
- Jünger, K. 1987. *Schiffmühlen: eine Flotte, die fast immer vor Anker lag*, Landschaftsmuseum der Dübener Heide (Bad Dübren).
- Kacprzak, M. 1937. *Wieś płocka: Warunki bytowania* (Warszawa).
- Kalakoski, I. and Huuhka, S. 2018. 'Spolia revisited and extended: the potential for contemporary architecture', *Journal of Material Culture*, **23**:2, 187–213 <doi: [10.1177/1359183517742946](https://doi.org/10.1177/1359183517742946)>.
- Kasprzyk, D. 2008. *Regionalizm płocki w II Rzeczypospolitej* (Płock).
- Kitzerman, A. 1948. *Technika młynarska* (Poznań).
- Kiaćek, M. 2021. 'Recycling as an inspiration for architecture', *Architecture Papers of the Faculty of Architecture and Design STU*, **26**:2, 14–23 <doi: [10.2478/alfa-2021-0009](https://doi.org/10.2478/alfa-2021-0009)>.
- Klonowicz, S. F. 1862. *Flis, to jest spuszczenie statków Wisłą i innymi rzekami do niej przypadającymi* (Chełmno).
- Kozicki, S. 1905. 'Rolnictwo', in by Z. Gloger and A. Janowski, eds, *Królestwo Polskie* (Warszawa).
- Kulich, R. 2002. *Zamúčené histórie o mlynoch i mlynaroch* (Budmerice).
- Litwin, J. 1995. *Polskie szkutnictwo ludowe XX wieku*, Seria: Prace Centralnego Muzeum Morskiego w Gdańsku, **10** (Gdańsk).
- Litwin, J. 2004. 'Ze studiów nad średniowiecznym szkutnictwem Gdańska i Elbląga', in R. Czaja, G. Nawrońska, M. Rębkowski and J. Mandęcki, eds, *Archeologia et Historia Urbana* (Elbląg), pp. 401–10.
- Madurowicz-Urbańska, H., ed. 1965. *Lustracja województwa sandomierskiego 1789* (Wrocław-Warszawa-Kraków), vol. 1.
- Marsden, P. 1994. *Ships of the Port of London First Eleventh Centuries AD* (London).
- McGrail, S. 2002. *Boats of the World: From the Stone Age to Medieval Times* (Oxford).
- Mielcarek, A. 1986. 'Statki odrzańskie w XIX i początkach XX wieku', *Nautologia*, **21**:1, 23–35.
- Miholek, V. 2013. 'Dravske vodenice i mlnovi potočari Durdevečke podravine od polovice 18. do polovice 20. stoljeća', *Podravina: časopis za multidisciplinarna istraživanja*, **12**: 120–40.
- Misiuk, Z. 2013. 'Wstępne wyniki badań archeologicznych prowadzonych na obszarze protomiasta gdańskiego pomiędzy dzisiejszymi ulicami Tartaczną i Panięską w Gdańsku w latach 2008–2010', in H. Paner and M. Fudziński, eds, *XVII Sesja Pomoroznawcza, Vol. 2: Od średniowiecza do czasów nowożytnych* (Gdańsk), pp. 337–70.
- Mosakowski, Z., Brykała, D., Prarat, M., Jagiełło, D., Podgórski, Z. and Lamparski, P. 2020. 'Watermills and windmills as monuments in Poland: protection of cultural heritage in situ and in open-air museums', *Muzeologia a kultúrne dedičstvo*, **8**:3, 41–62 <doi: [10.46284/mkd.2020.8.3.2](https://doi.org/10.46284/mkd.2020.8.3.2)>.
- Ohryzko, J. T. I. 1859. *Volumina Legum: Przedruk zbioru praw staraniem xx. Pijarów w Warszawie, od roku 1732 do roku 1782, wydane* (Petersburg).
- Olędzki, J. 2016. *Murzynowo: Znaki istnienia i tożsamości kulturalnej mieszkańców wioski nadwiślańskiej XVIII–XX wieku* (Warszawa).
- Oliver, S. 2013. 'Liquid materialities in the landscape of the Thames mills and weirs from the eighth century to the nineteenth century', *Area*, **45**:2, 223–9 <doi: [10.1111/area.12018](https://doi.org/10.1111/area.12018)>.
- Ossowski, W. 2010. *Przemiany w szkutnictwie rzeczonym w Polsce: Studium archeologiczne* (Gdańsk).
- Peacock, D. 2013. *The Stone of Life: Querns, Mills and Flour Production in Europe up to c. AD 500* (Southampton, UK).
- Piasecki, A., Piotrowski, R. and Pogodziński, M. P. 2017. 'Stodoła z Rębowa, gm: Wyszogród z II połowy XIX wieku jako przykład budownictwa z wtórnie wykorzystanych elementów szkodliwych', *Rocznik Muzeum Wsi Mazowieckiej w Sierpcu*, **8**: 85–93.
- Piotrowski, R. 2020. 'Between necessity and pragmatism: stone, clay and bog ore in rural architecture in the borderland of the Mazovian Region and the Dobrzyń Region', *Journal of Heritage Conservation*, **63**: 137–51 <doi: [10.48234/WK63CLAY](https://doi.org/10.48234/WK63CLAY)>.
- Piotrowski, R. 2021. 'Jednemu się zmiele, drugiemu się skrupi': *Młynarze i młyny w pamięci zbiorowej mieszkańców pogranicza mazowiecko-dobrzyńskiego* (Toruń).
- Piotrowski, R. 2022. 'Wiatrak w narracjach wspomnieniowych', in M. Parat, ed., *Wiatrak koźlak w Chrośnie z końca lat 60. XVIII w. Jego dzieje i problematyka konserwatorska* (Toruń), pp. 23–36.
- 'Pływaki na Wiśle'. 1876. *Korespondent Płocki*, **1**:97, **2**.

- Pogodziński, P. M.** 2016. 'Domy z wraków: zapomniany element krajobrazu Kaszub Nordowych', *Zapiski Puckie*, **16**: 48–54.
- Pogodziński, P. M.** 2019. 'Reuse of boat structural elements in the wooden buildings along the Vistula River', *Journal of Heritage Conservation*, **59**: 106–14 <doi: [10.17425/WK59VISTULA](https://doi.org/10.17425/WK59VISTULA)>.
- Reszka, A.** 1992. 'Statek z Dębego odnaleziony w korycie rzeki Narwi', *Nautologia*, **27**:3–4, 46–7.
- Reszka, A. W.** 2012. *Wiślane statki i techniki nawigacyjne od XVI do XX wieku* (Gdańsk).
- Rivals, C.** 1993. 'Film: Vodenica Camar (The Last Boat Mill)', in Transactions of the 8th TIMS Symposium in 1993 (Aberystwyth), pp. 197–8 and associated film: <<https://www.canal-u.tv/chaines/universite-toulouse-jean-jaures/le-dernier-moulin-a-nef-vodenica-camac-claude-rivals>>.
- Ruşdea, H.** 1986. 'Schiffsmühle von Lucăceşti und Schiffsmühle von Munteni', in C. Bucur, ed., *Museum der bäuerlichen Technik* (Sibiu), pp. 133–8.
- Rzepakowski, K.** 2015. *Złoty kciuk: Młyn i młynarz w kulturze Zachodu* (Warszawa-Toruń).
- Sabján, T.** 2005. 'Ship mills in historical Hungary', in J. Klápšte, ed., *Water Management in Medieval Rural Economy* (Prague), pp. 242–50.
- Šádova, V.** 1960. 'Eksport czeskiego zboża do Niemiec a rozwój produkcji towarowej w Czechach w okresie przedbiłogórskim', *Rocznik Dziejów Społecznych i Gospodarczych*, **22**: 31–52.
- Samsonowicz, H.** 1994. 'Gospodarka i społeczeństwo (XIII–początek XVI w.)', in A. Gieysztor and H. Samsonowicz, eds, *Dzieje Mazowsza do 1526 roku* (Warszawa), pp. 249–93.
- Schultz, F.** 1956. *Podróże Inflanctyżka z Rygi do Warszawy i po Polsce w latach 1791–1793*, trans. J. I. Kraszewski (Warszawa).
- Selwyn, T.** 1995. 'Landscapes of Liberation and Imprisonment: Towards an Anthropology of the Israeli Landscape', in E. Hirsh and M. O'Hanlon, eds, *The Anthropology of Landscape: Perspectives on Place and Space* (Oxford), pp. 114–34.
- Smolarek, P.** 1986. 'Statki żeglugi spławowej z drugiej połowy XVIII wieku', *Nautologia*, **21**:1, 5–22.
- Stewart, P. J. and Stratherm, A.** 2003. 'Introduction', in P. J. Stewart and A. Stratherm, eds, *Landscape Memory and History: Anthropological Perspectives* (London, Sterling, Virginia), pp. 1–15.
- Streza, M. F.**, ed. 2014. *Patrimoniul tehnic: Instalații de măcinat cereale (mori)*. Caiet I (Sibiu).
- Strasser, S.** 2013. 'Complications and complexities: reflections on twentieth-century European recycling', *Contemporary European History*, **22**:3, 517–26 <doi: [10.1017/S096077731300026X](https://doi.org/10.1017/S096077731300026X)>.
- Szałygin, J.** 2005. 'Skansen osadnictwa puszczańskiego w Granicy k. Kampinosu', in L. Mróz, M. Zowczak and K. Waszczyńska, eds, *Regiony, granice, rubieże: Tom w darze dla Profesora Mariana Pokropka* (Warszawa), pp. 369–84.
- Szurowa, B.** 2002. 'Młyny pływające na Nidzie i Wiśle w XVIII i XIX wieku w Kieleckiem', *Kielecka Teka Skansenowska*, **2**: 97–130.
- Świąch, J.** 2005. *Tajemniczy świat wiatraków* (Łódź).
- Trzeciecki, M.** 2000. 'Kultura materialna średniowiecznego Płocka', in A. Gołębniak, ed., *Historia Płocka w ziemi zapisana. Podsumowanie dotychczasowych badań archeologicznych* (Płock), pp. 87–114.
- Watts, S. R.** 2014. *The Life and Death of Querns: The Deposition and Use-Contexts of Querns in South-Western England from the Neolithic to the Iron Age*, Southampton Monographs in Archaeology. New Series 3 (Southampton, UK).
- Wesołowska, H.** 1969. *Młynarstwo wiejskie Opolszczyzny od XVIII do XX wieku* (Opole).
- Wolff, A. and A. Borkiewicz-Celińska**, eds. 1971. *Słownik historyczno-geograficzny ziemi wyszogrodzkiej w średniowieczu* (Wrocław).
- Wyřwa, A. M.** 2018. 'Dzieło człowieka pod opieką Boga: Wiatrak z Gryżyny: najstarszy zachowany młyn wietrzny w Polsce i jego symboliczne przesłanie. Wprowadzenie do szerszych rozważań', *Studia Lednickie*, **17**: 27–62.
- Znamierowska-Prüfferowa, M.** 1988. *Tradycyjne rybołówstwo ludowe w Polsce na tle zbiorów i badań terenowych Muzeum Etnograficznego w Toruniu* (Toruń).
- 'Zniesienie młynów na Wiśle'. 1876. *Korespondent Płocki*, **1**:84, 1.
- Żebrowski, T.** 2000. 'Stolica ksiąg mazowieckich i płockich (1138–1495)', in M. Kallas, ed., *Dzieje Płocka, Vol. 1. Historia miasta do 1793 roku* (Płock), pp. 43–96.
- Żurawski, W.** 1970. 'Wykaz młynów i wiatraków warszawskich w latach 1808–1831', *Studia i Materiały z Historii Kultury Materialnej: Studia z Dziejów Gospodarstwa Wiejskiego*, **12**:1, 311–19.