Archaeology:
Just Add Water

volume II

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Archaeology:
Just Add Water
Underwater Research at the University of Warsaw

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Preface

Dear Colleagues,

It is our great pleasure to present to you the second volume of the U Supplement Series of the "Światowit" periodical. To a large extent it is based on the papers presented during the *3rd Warsaw Seminar on Underwater Archaeology*, which took place at the University of Warsaw on the 17th and 18th of January 2019.

An efficient and prompt process of editing we owe to the funding from the Ministry of Science and Higher Education, grant no. 959/P-DUN/2018.

Organization of the Seminar and publication of the hereby volume was possible thanks to the co-operation with the Polish Chapter of the Explorers Club, in particular its President, Professor Mariusz Ziółkowski, and the Vice-President, Marcin Jamkowski, to whom we are deeply grateful.

We would also like to acknowledge and appreciate the support of the University of Warsaw, namely the Vice-Rector Ph.D. habil. Maciej Duszczyk, the Dean of the Faculty of History, Ph.D. habil. Małgorzata Karpińska, Professor UW, as well as the Director's Board of the Institute of Archaeology: Ph.D. habil. Krzysztof Jakubiak, Ph.D. Michał Starski, and Ph.D. Marta Żuchowska.

The special thank you we traditionally owe to the Diving Museum by the Warsaw Diving Club, especially the Museum's Curator, Karina Kowalska, and the Club's President, D.Sc. Grzegorz Kowalski, who have been supporting our activities for many years, and constantly guide and help us in numerous enterprises.

We would like to extend our gratitude to all the Authors and Reviewers, who have been extremely diligent and punctual to keep up with our strict deadlines.

During the editing of the volume we have received invaluable consultations in the matter of ancient languages by Tomasz Płóciennik and Ph.D. Joanna Wegner, who we would also like to thank with all our hearts. The post-editing process was successful due to the the kind assistance of Ph.D. Rafał Dmowski, who we owe enormous gratitude.

The whole book was once again skilfully supervised and managed by the one and only irreplaceable Ph.D. habil. Bartosz Kontny, Professor UW. Him we would like to thank for all the advice and help with difficult choices, as well as the dedication to the organizational matters, even though the really tight schedule.

Last but not least, we would like to thank all the Readers who have reached for the hereby volume. We sincerely hope you will enjoy the outcome of our efforts and wish you pleasant reading!

Aleksandra Chołuj

Małgorzata Mileszczyk

Magdalena Nowakowska

3rd Warsaw Seminar on Underwater Archaeology

3rd Warsaw Seminar on Underwater Archaeology held on 17th-18th of January 2019
at the University of Warsaw
(photos by: M. Sugalska)

Foreword

The volume, which we hereby present to our esteemed Readers, is the vivid proof that underwater archaeology at the University of Warsaw is doing more than well. It is the second publication in the ***"Światowit" Supplement Series U: Underwater Archaeology***, issued for now (and we hope this pace will be sustained!) with a frequency of a periodical. Within the book one might find i.a. the texts being an outcome of the international ***3rd Warsaw Seminar on Underwater Archaeology***, organized in the Institute of Archaeology, University of Warsaw. The Readers will discover here the articles presenting broad chronological and geographical range of issues: from the Prehistory until the Second World War, from Guatemala and Peru to Poland and Slovakia. We are trying to reflect this diversified character also by the choice of photographs on the cover.

The leitmotif of all this vast range of archaeological issues is **water**: realm bearing a magnificent symbolic character. Changing its colour (even during the day – from the blackness, through greyness, then blue, until the bloody-red at the sunset, turning again into black) and visibility, it has manifested also other features, which can be contemplated as signs of its animation, such as movement: horizontal (currents, waves, tides) and vertical (fluctuations of the surface). It was also the source of life quite literally, providing food and dihydrogen monoxide, essential for living.

Along with its whole mystery and dangerousness, water may also serve as a refuge (lake settlements from the early Iron Age) and a trade route, at the end of which there is a (hopefully) safe harbour. That is how underwater archaeology marches onto the land... Although, it is neither place nor time for the deliberation about the definitions of archaeology related to water environment; the discussion in this matter has lasted for many years, abound in more and more new terminological propositions, still being far from any resolutions. Whichever position we assume in the aforementioned debate, it is impossible not to notice that the symbolism, the rituals, and everyday casual activities essential for life and connected with water pass through each other, which is well-exemplified by the hereby volume. Objects lost during transportation and other kinds of exploitation of water basins, items put in the water as a matter of rituals, military aspects connected with watery environment, lake settlements, harbours, and trade – all of that and even more you can discover in *Just Add Water 2*. To all the Readers, who are going to immerse themselves into this topic, I wish a pleasant intellectual adventure and... good dives!

Bartosz Kontny

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Underwater Relic of the Battle of the Oder River – Wreck of a Frontal Semi-Pontoon from the Soviet N2P Pontoon-Bridge Park

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Przemysław Krajewski[***]

Abstract:

On the right bank of the Oder River, over a dozen kilometres downstream of Kostrzyn nad Odrą (Lubusz Land, Poland), lies the 'Porzecze' Landscape-Nature Protected Complex (West Pomerania, Poland). It encompasses floodplains, marshes, meadows, riparian forests, and sandy dunes inhabited by rare species of plants and animals. At the beginning of the previous decade the divers penetrating one of the local oxbow lakes had discovered a wreck of a flat-bottomed, iron vessel, about five metres long. The find had been interpreted as a German cargo boat from the first half of the 20th century and had not attracted any major attention of neither museum curators nor scientists.

In 2016 scholars and students from the University of Szczecin (West Pomerania, Poland), together with a diving expert from the NUREK–TECHNIKA Company have thoroughly reinvestigated the wreck, taking side-scan sonar images and measurements. It has become possible to correctly identify the wreck as a frontal semi-pontoon of the Soviet N2P heavy pontoon-bridge park (Russian: тяжёлый понтонный парк Н2П*). It was a mobile set of military engineering equipment designed for construction of ferries and floating bridges, introduced to the Red Army service in 1932. The watercraft has sunk or has been sunken during the fights along the Oder River, clashes between the Red Army and the armed forces of Nazi Germany in winter and spring of 1945. The wreckis preserved in a good condition (hull framing is complete, and the plating has negligible losses), though all removable parts are missing.*

The wreck, now examined and documented, is currently the only known specimen of this type of a semi--pontoon in Poland. It remains an interesting, yet hardly accessible element of cultural heritage of the Oder Valley, enriching natural assets of the 'Porzecze' Landscape-Nature Protected Complex.

Keywords:

ethnology, underwater archaeology, ethnoarchaeology, wreck, Second World War, Red Army, military engineering, pontoon-bridge park, Oder River, West Pomerania

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Introduction

At the beginning of 1945 at the Eastern Front of the Second World War the Red Army accompanied by the Polish Army troops stationed along the Vistula River preparing to strike the final blow upon the armed forces of Nazi Germany. On the 12th of January the units of the 1st Belorussian Front and the 1st Ukrainian Front have moved from their positions toward west, beginning the gigantic offensive military operation which was recorded by history as the Vistula–Oder Offensive (Rydłowski and Safjan 1960: 7; Kazakov 1974: 10–14). In the plans of the Soviet General Headquarters, a key issue was the march toward the Third Reich capital city of Berlin (Brandenburg, Germany). The Oder River was the last large aquatic obstacle on which the Germans could arrange the line of defence to stop the attack (Tieke 2015: 58).

In the early morning of the 31st of January 1945 the selected armoured-motorized squad of the Soviet 5th Shock Army arrived, low on fuel, at the riverside of the Oder, over a dozen kilometres north of Küstrin (Neumark, Germany; after 1945 Kostrzyn nad Odrą, Lubusz Land, Poland). The Red Army troops have passed the frozen river over the ice (leaving all tanks and most of the artillery on the right bank) and captured the village of Kienitz (Brandenburg, Germany) by surprise, forming a bridgehead situated barely 69 km from the centre of Berlin. The military and propaganda importance of this feat should be stressed by the fact that the deputy of the supreme leader Joseph Stalin and a commander of the 1st Belorussian Front – Marshal Georgy Zhukov himself – – has extensively described it in his war memoirs (Zhukov 1985: 322–324).

Though some researchers dispute the details regarding the circumstances of capturing Kienitz described there, it is certain that on the last day of Januray the village was under Russian control, and hard fights erupted over the bridgehead (Bokov 1979: 80; Le Tissier 1996: 34–36; Beevor 2002: 69). A week later, the ice cover on the Oder began to crack, significantly hindering the Red Army's deployment of forces, armament, and supplies to the western bank of the river (Antonow 1980: 304–305). It was not until the ice floe has drifted down the river, have the Soviest sappers constructed the floating bridge with the load-bearing capacity of 16 tons near Kienitz.[1] Both the presented events as well as later struggles along this section of the front during the Battle of Berlin are quite accurately described in the memoirs of the participants and scientific publications of military historians (Worobjow *et al.* 1971: 132; Sawicki [ed.] 1977: 290–293; Bokow 1977: 310–313; Kohlase 1993: 47–48; Toczewski 2010: 154–156; Tieke 2015: 86). However, after that bloody fighting another kind of souvenir remained, almost totally unknown until the recent time.

[1] The bridge is visible on a map showing sectors of action of Soviet 47th Army and 3rd Shock Army on the 16th of April 1945, in the beginning of Battle of Berlin (Le Tissier 1996: 165, Map 19).

It is a wreck of watercraft which has sunken during the military operations in one of the oxbows at the eastern side of the Oder River. This article aims to present the history of this discovery, its (re)interpretation and identification.[2] The results of the following are elaborated in the text:

- ethnological research (structured qualitative interviews and informal conversations) as well as museum, library, archive, and the Internet queries, accomplished by ethnologist Piotr Maliński in the time period of 2015–2018;[3]
- fieldwork using side-scan sonar and diving reconnaissance, executed in July 2016 by the authors of this paper;
- accurate measurements of the wreck performed in August 2016, where archaeology students from the University of Szczecin (Magdalena Drozd and Kamila Skowrońska) participated under the supervision of Piotr Maliński.

The use of ethnological methodology and ethnological research techniques to localize an object of archaeological heritage, in order to perform its prospection and complete the documentation, can be regarded as an action in the scope of ethnoarchaeology – or even 'underwater ethnoarchaeology', considering the location of the wreck (being underwater). The concept of 'underwater ethnoarchaeology' (which may seem controversial at first glance) is more fully explained in another text, which has been published in this volume (Maliński, forthcoming).

Apart from the results of the interdisciplinary field research this article contains as well the detailed technical data of the described watercraft, along with several practical remarks that could prove useful considering the recovery of the wreck in the future.

The Discovery and Verification of the Find

After the end of the Second World War the Oder became a border river between Poland and Germany. At the end of the 20th century the Polish authorities paid special attention to the area placed on the east bank of the river near Kienitz, because of its natural and landscape assets. Indeed, the landscape there is extraordinarily diversified, unusual for the surroundings of the Oder. On the floodplains, among the oxbows, vast marshes, meadows, and riparian forests, there are sand dunes, highest in the entire valley of the river (**Fig. 1**).

[2] It is a revised, completed, and edited version of a text that has been recently published in Polish (Maliński *et al.* 2018).

[3] Among others, as part of the project *Ethnoarchaeology of the Lower Oder. Preliminary Research of the Wrecks in the Selected Sections of the River*, funded by the National Science Centre, Poland (grant no. 2018/02/X/HS3/00475) and carried by the University of Szczecin, Poland. The text dedicated to the project has been published in this volume (Maliński, forthcoming).

It is overgrown by shrubs and both deciduous and evergreen tree stands, in which atypical, decumbent forms of trees can be spotted. Many endangered and protected plants can be found in the area, which is also inhabited by some rare animal species. In 1992 the area was covered by wildlife protection, forming the 'Porzecze' Landscape-Nature Protected Complex[4] (West Pomerania, Poland), spanning 142 ha in total area (Jermaczek *et al.* 1999: 57; Chara 2012: 9).

First mentions regarding the wreck stranded in the area of the 'Porzecze' Complex have reached Piotr Maliński in 2015. At this time the ethnological qualitative research on fluvial cultural heritage of West Pomerania has been conducted. During the structured interviews and informal conversations the data regarding ships and boats that had sunk in the Oder River and its distributaries has been gathered.[5] The information about 'the wreck from Porzecze' has been brought independently by three individuals, who have encountered the sunken watercraft during recreational diving in the period of 2001–2009.[6] The divers suspected that it might have been a wreck of a German transport boat, used in the pre-war period. During interviews and conversations with Piotr Maliński, the informants used phrases like 'steel boat', 'tub boat', 'cargo boat', and 'small barge'.[7] They stressed that it is 'without cargo', 'entirely empty'[8], which indirectly indicated their conviction that the vessel has been designed to transport cargo. The divers, however, found traces of evidence suggesting that the boat has been sunken during war operations: an artillery shell case has been discovered inside the wreck, as well as the irregular cavities in the hull, which were interpreted as bullet holes. The discoverers claim that the news about the wreck has been relayed to the nearest museum, the local institution governing the water resource management, as well as the regional heritage protection services. The underwater discovery, however, did not arouse any interest.

Willing to verify the gathered verbal information regarding the wreck, Piotr Maliński decided to perform a more detailed field investigation using non-invasive methods. They have come to fruition in 2016 thanks to the favourable attitude of both the administrator of the area

[4] The name of the Complex is derived from a small village named Porzecze (West Pomerania, Poland; until 1945: Hälse, Neumark, Germany) located nearby (Dittmann 1996: 281).
[5] The interview schedule has been applied, which listed the wording and sequencing of questions about wrecks. The questions referred to location of sunken watercrafts, as well as respondents' convictions of their types and provenience. However, not all informants agreed to be interviewed, some of them preferred rather less formal talks.
[6] First of them was a person with professional connections to inland navigation on the Oder River, who withheld its identity, explaining that he does not seek publicity. The second informant was Mirosław Wójcik, the founder and director of the Regional Museum (Polish: *Muzeum Regionalne*) in Kierzków (West Pomerania, Poland; Maliński 2017b: 29–32). The third person was a historian and archaeologist Aleksander Ostasz, director of the Museum of Polish Arms (Polish: *Muzeum Oręża Polskiego*) in Kołobrzeg (West Pomerania, Poland), an active and accomplished researcher of underwater archaeological heritage of West Pomerania (Maliński 2017a: 71–72).
[7] Polish: '*stalowa łódź*', '*krypa*', '*łódź towarowa*', and '*mała barka*'.
[8] Polish: '*bez ładunku*', '*całkiem pusta*'.

and the local authorities for protection of cultural heritage, which have issued permissions to carry the fieldwork in the area of 'Porzecze' Landscape-Nature Protected Complex (where restricted laws regarding wildlife conservation are in effect).[9] To perform the research, Piotr Maliński invited the co-authors of this text: a commercial diver Sławomir Radaszewski, and an archaeologist Przemysław Krajewski, experienced in research at underwater archaeological sites (Maliński, Krajewski *et al.* 2016; Maliński 2017a: 72). The team included two aforementioned students of archaeology, who had earlier participated in underwater reconnaissance and research as members of the Scientific Club 'Floating Research Station' at the University of Szczecin, Poland (Maliński 2016).

The assorted team has performed fieldwork using side-scan sonar, thanks to which the wreck has been found resting at a small depth (0.6–1.3 m) in an oxbow of the Oder River (**Fig. 2**). Analysing the sonar images and basic measurements has allowed Piotr Maliński to identify the type of a sunken watercraft. It happened to be a frontal semi-pontoon, an element of N2P pontoon-bridge park, produced in USSR in the 1930s. During further works, the geographical coordinates of the wreck have been determined and more detailed measurements have been taken, which served to develop the drawing documentation.

Technical Data and Structure of the Watercraft

The N2P heavy pontoon-bridge park (Russian: *тяжёлый понтонный парк Н2П*) has been designed by a team of military engineers: I.G. Popov, S.V. Zavackij, B.N. Korčemkin, N.A. Trenke, and A.I. Ugličiničev.[10] It was a mobile set of engineering equipment destined to organize landing, ferry, and bridge crossings. Ferries and floating bridges constructed from its elements had load-bearing capacity from 16 to 60 tons. N2P parks have been first deployed as an equipment of Red Army pontoon-bridge battalions in 1932. It seems that until 1942 they were the only pontoon-bridge parks in the world allowing constructing ferries and bridges with load-bearing capacity reaching 60 tons (Veremeev 2017).

Every N2P park consisted of 48 steel semi-pontoons (16 frontal and 32 middle ones) as well as bridge spans and supports, access ramps, auxiliary equipment, and engines: either outboard

[9] The authors are very thankful for the chief forester Cezary Augustyniak (State Forests – National Forest Holding 'Nadleśnictwo Dębno') for issuing the permit for fieldwork and for detailed information regarding law in force in the area of 'Porzecze' Complex. The authors also wish to thank the Head of the West Pomeranian Voivodeship Heritage Office, Ewa Stanecka, for quick and free permission to search for the wreck.

[10] Unfortunately, the known sources mention the names of only one of the constructors, Sergej Vladimirovič Zavackij (Čistjakov 2017).

motors, type SZ-20 or MW-72, or BMK-70 motor boats. The entire park used to be transported on 86 specially adapted ZiS-5 trucks (Veremeev 2017).

The mentioned semi-pontoons could have been connected serially (by two or three) in sets, called single pontoons and one-and-a-half-pontoons (Hovratovič 1950: 191–192; Viničenko 1999: 37).[11] Those pontoons were connected to each other in parallel (by two, three or six) using a bridge span, to construct a ferry or a section of floating bridge. The load--bearing capacity of the ferry or bridge segment depended on the number of semi-pontoons used for its construction. Besides the above purposes, single pontoons and one-and-a-half--pontoons were also used as standalone vessels functioning as landing boats (**Fig. 3**).

The frontal semi-pontoon from N2P heavy pontoon-bridge park was a steel vessel with a welded framing construction, being flat-bottomed, with an ovoid bow (containing small bow half-decks) and a stern with a vertical transom (**Fig. 4**). Its dimensions were 5.30 × 2.20 × 1.05 m (length overall × width × height). It had a nominal weight of 950 kg and a load-bearing capacity of 6.1 tons. The framing of the semi-pontoon consisted of six frames, three panting stringers, four side stringers, two pillars, and a deck-beam, connected by several reinforcements and bends (horizontal and vertical). Almost entire hull plating have been constructed of one to one-and-a--half-millimetre-thick steel plate sheets, except connections between boards and bottom plating, where two-and-a-half-millimetre-thick plate was used. On the bow half-decks there were two vertical sockets for embedding the cathead with lifting capacity of 400 kg. Between the half--decks, a manual driven anchor winch was mounted. The anchor rope was placed on the bitts welded to pillars. The railing stringers had series of vertical holes for fastening railing poles, rowlocks, and horizontal structural elements of ferries and bridges (Hovratovič 1950: 191–192).

The semi-pontoon was also equipped with five oars (the crew consisted of four oarsmen and a helmsman-motorman) and wooden gratings arranged on the bottom. At the stern ends of panting stringers, at the bottom edge of the transom, there were two fastenings enabling to connect the watercraft with other N2P park semi-pontoons.

Condition of the Wreck

As mentioned earlier, the semi-pontoon is stuck on a small depth, dependent on actual water level in the oxbow. In favourable conditions it can be even seen below the surface

[11] However, Polish soldiers called single pontoon colloquially '*dwojak'* (literally: 'double') and one-and-a-half--pontoon '*trojak'* (literally: 'triple') (Sowiński and Tyszyński 1949: 73; Dideńko 1978: 99).

of the water (**Fig. 5**). The wreck orientation is 85°, so that its bow is pointed eastward. The hull of the semi-pontoon rests submerged in the bottom sediments at the depth of ca. 0.3 m, tilted toward the starboard and trimmed to the stern. The tilt and trim are caused by wreck being located on the slope of the bottom that piles eastward, forming shallow (**Fig. 6**).

The measurements performed have shown that the tilt and trim angles are higher on the stern side of the watercraft (both being 7°) than on the bow (where tilt is 3° and trim 5°). The differences in degree values indicate that the hull structure is slightly distorted. In spite of this, the hull is preserved in relatively good condition: the framing is complete, and the plating of the boards and the bow side has only minor losses. All preserved elements are covered by a layer of oxides. The corrosion has especially strained the thin plating, which has now little mechanical durability. The right half-deck has been completely destroyed, and the left one has been damaged (**Fig. 7**).

All the removable equipment of the half-pontoon is missing, including the anchor, anchor line, the cathead, capstan, railing poles, rowlocks, oars, and gratings. During the diving reconnaissance on the bottom of the basin, near the bow of the wreck, Sławomir Radaszewski has found only a fragment of the arm of a steel anchor (of Admiralty Pattern) along with its bill and fluke (**Fig. 8**).[12] The reconnaissance has also demonstrated that the hull of the semi-pontoon is entangled in fishing strings and ropes with double hooks, and artificial fishing baits (lures, rippers etc.). The area where the wreck is submerged is overgrown by yellow water-lily (*Nuphar lutea*).

Summary

The type and purpose of the watercraft unambiguously indicate that its presence on the bottom of the basin is linked to the battles alongside the Oder River, which were fought between the Red Army and Nazi Germany forces in winter and spring of 1945. Basing on collected data, it cannot be ascertained if the found semi-pontoon was functioning in the landing, ferry or bridge crossing of the river. It can be only assumed that it has been sunken because of the enemy fire, which left marks visible as irregular holes in board plating. It is possible that the crew had tried to direct the sinking vessel and either reach the eastern bank of the Oder (then turgid and widely distributed over the floodplains) or embed it on the shallows. The broken fragment of the anchor found near the bow of the wreck can

[12] After completing the drawings and photographic documentation, the artefact has been deposited in the exact place where it was found.

indicate that an attempt has been made to surface the wreck, with the use of anchor equipment from the other vessels, or to haul it through the bottom to the shore. Anyway, to ascertain the date, circumstances, and causes of sinking of the semi-pontoon, further research would be needed, especially querying the Russian military archives. It can be hypothesized that the analysis of German sources could also yield interesting results.[13]

The 'wreck from Porzecze' seems to be a valuable discovery, because currently it is the only known specimen of N2P bridge park semi-pontoon in Poland. In the collections of Polish museums only the elements of modernized version of this park (designated N2P-41) can be found,[14] which was used by the Polish Armed Forces during and after the Second World War (Malczewski and Polkowski 1970: 107–108; Herrmann 2006: 52). The semi--pontoons of the N2P-41 park differ from their N2P counterparts by the shape of the bow and type of stern mountings, as well as slightly in dimensions (**Fig. 9**).[15]

Considering the unique character of the wreck and its historical and scientific value it has been decided to withhold its exact location to protect it from devastation or theft. In West Pomerania certain groups can be encountered, called '*mafia wydobywcza*' (literally: 'excavation mafia'), that illegally explore underwater archaeological heritage and excavate the artefacts for commercial purposes.[16] In order not to facilitate their criminal activity, this text does not include any map. The coordinates of the find were only provided within a report handed over to the West Pomeranian Voivodeship Heritage Office and to the State Forests – – National Forest Holding 'Nadleśnictwo Dębno' (Maliński, Radaszewski *et al.* 2016). Additionally, actions were taken to determine the possible ways and costs of recovery of the semi-pontoon and hand it to the museum. For now, however, the wreck remains underwater – as an interesting, though hardly accessible element of cultural heritage of the Oder Valley, diversifying and enriching the numerous natural assets of 'Porzecze' Landscape-Nature Protected Complex.

[13] Valuable information could possibly be found in a book containing memories of inhabitants of Kienitz, from the period of battles of the Oder bridgehead in 1945 (Rambusch 2010). Unfortunately, despite long searching, the publication could not be found in any of the Polish libraries or private collections.

[14] Specimens of frontal semi-pontoons of N2P-41 park are exhibited in the Museum of Engineering and Chemical Defence Troops (Polish: *Muzeum Wojsk Inżynieryjnych i Chemicznych*) in Wrocław (Lower Silesia, Poland) – a division of Land Forces Museum (Polish: *Muzeum Wojsk Lądowych*) in Bydgoszcz (Kuyavia, Poland), and in the Museum of 1st Polish Army Memorabilia and History of Mieszkowice Land (Polish: *Muzeum Pamiątek 1. Armii Wojska Polskiego oraz Dziejów Ziemi Mieszkowickiej*) in Mieszkowice (West Pomerania, Poland) – a division in Gozdowice (West Pomerania, Poland).

[15] Differences between the structure and dimensions of semi-pontoons from both parks are explained in detail in Soviet military instruction manual (Tamakulova [ed.] 1945: 41–53).

[16] Information collected by Piotr Maliński during ethnological research in 2018.

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Fig. 1 – 'Porzecze' Landscape-Nature Protected Complex from the bird's eye view. Sand dunes in the foreground, oxbows, marshlands, and the Oder River in the background. Beyond the river, to the left, village of Kienitz is visible (photo by: P. Maliński)

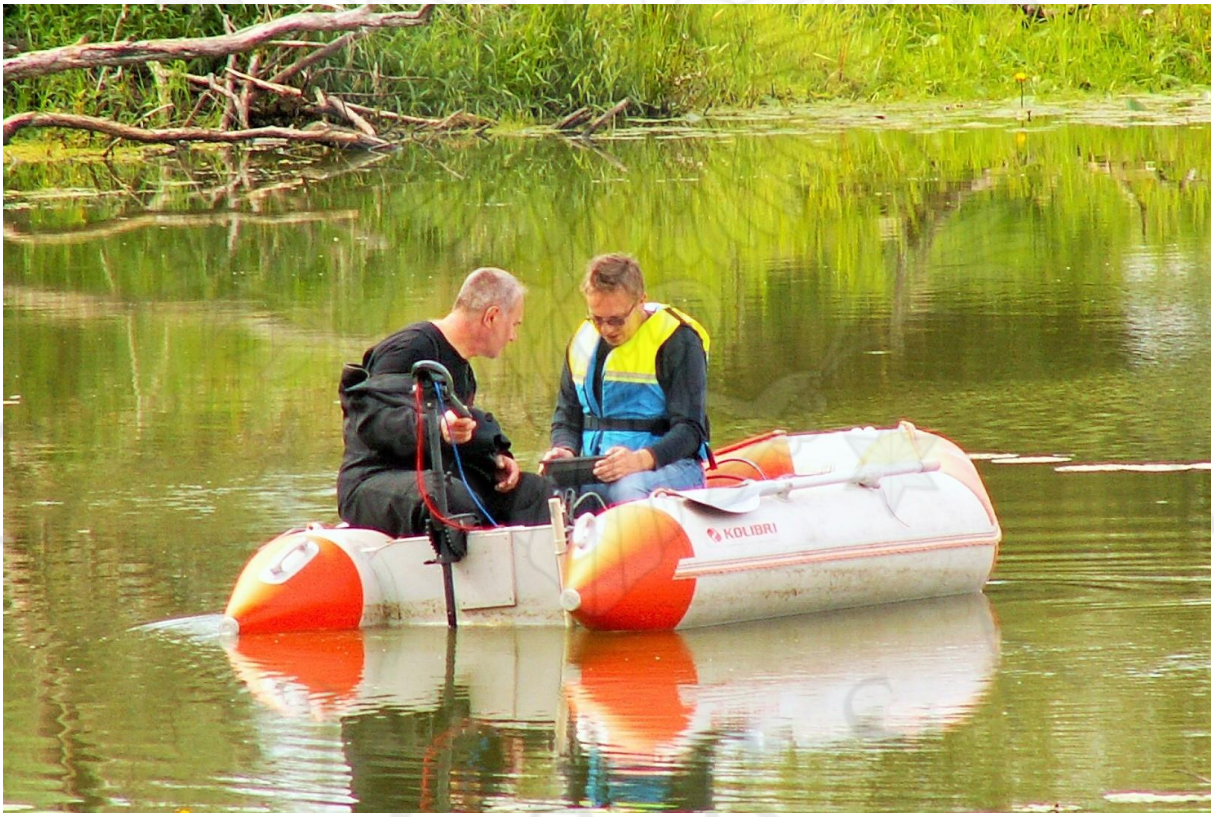

Fig. 2 – Sławomir Radaszewski (to the left) and Piotr Maliński during search for the wreck (photo by: P. Krajewski)

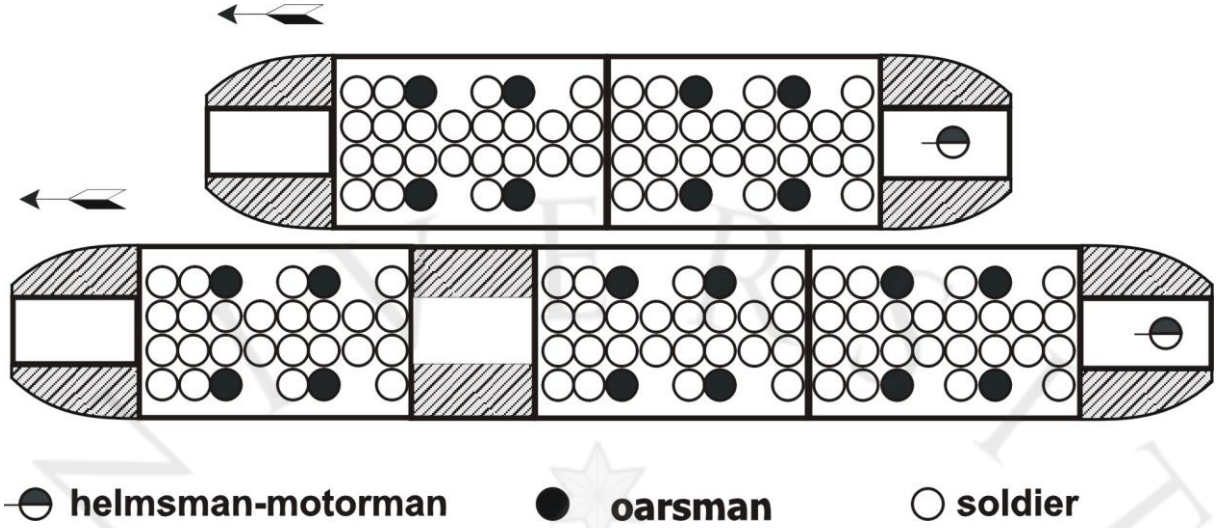

Fig. 3 – Schematic plan of placement of the crew and passengers (soldiers) in single pontoon (top) and one-and-a-half-pontoon (bottom) from N2P park (elaborated by: S. Radaszewski, basing on Hovratovič 1950: 192, Fig. 148v, translated and completed by P. Maliński)

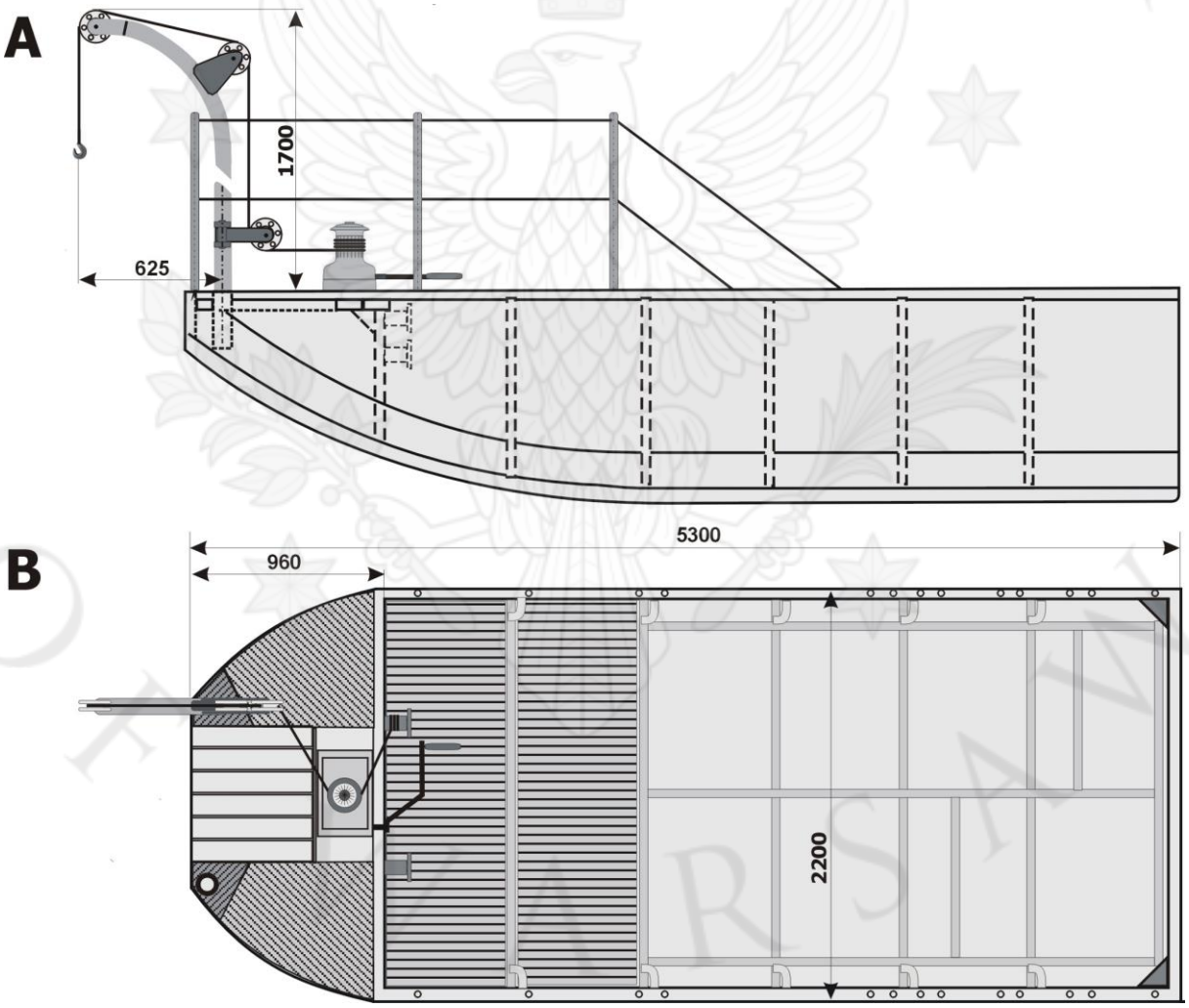

Fig. 4 – Technical drawing of N2P park frontal semi-pontoon. A – side view, B – top view (elaborated by: S. Radaszewski, basing on Hovratovič 1950: 191, Fig. 147a)

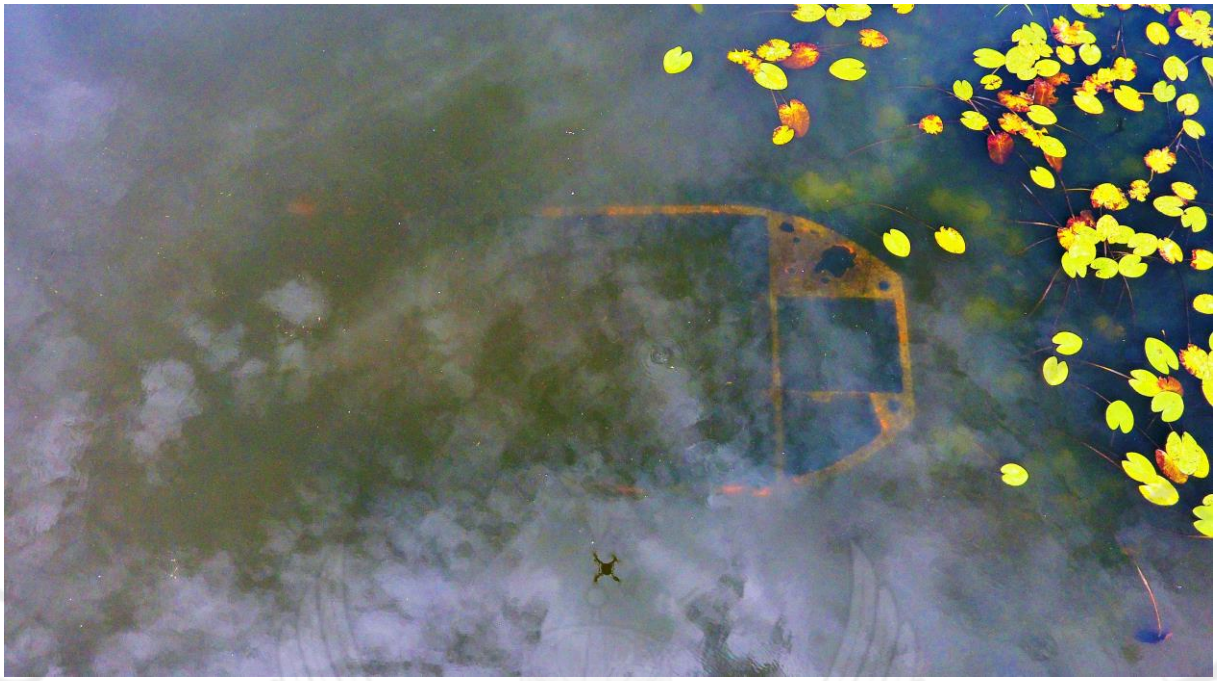

Fig. 5 – Bow section of the wreck visible underwater beneath the leaves of yellow water-lily (*Nuphar lutea*) (photo by: P. Maliński)

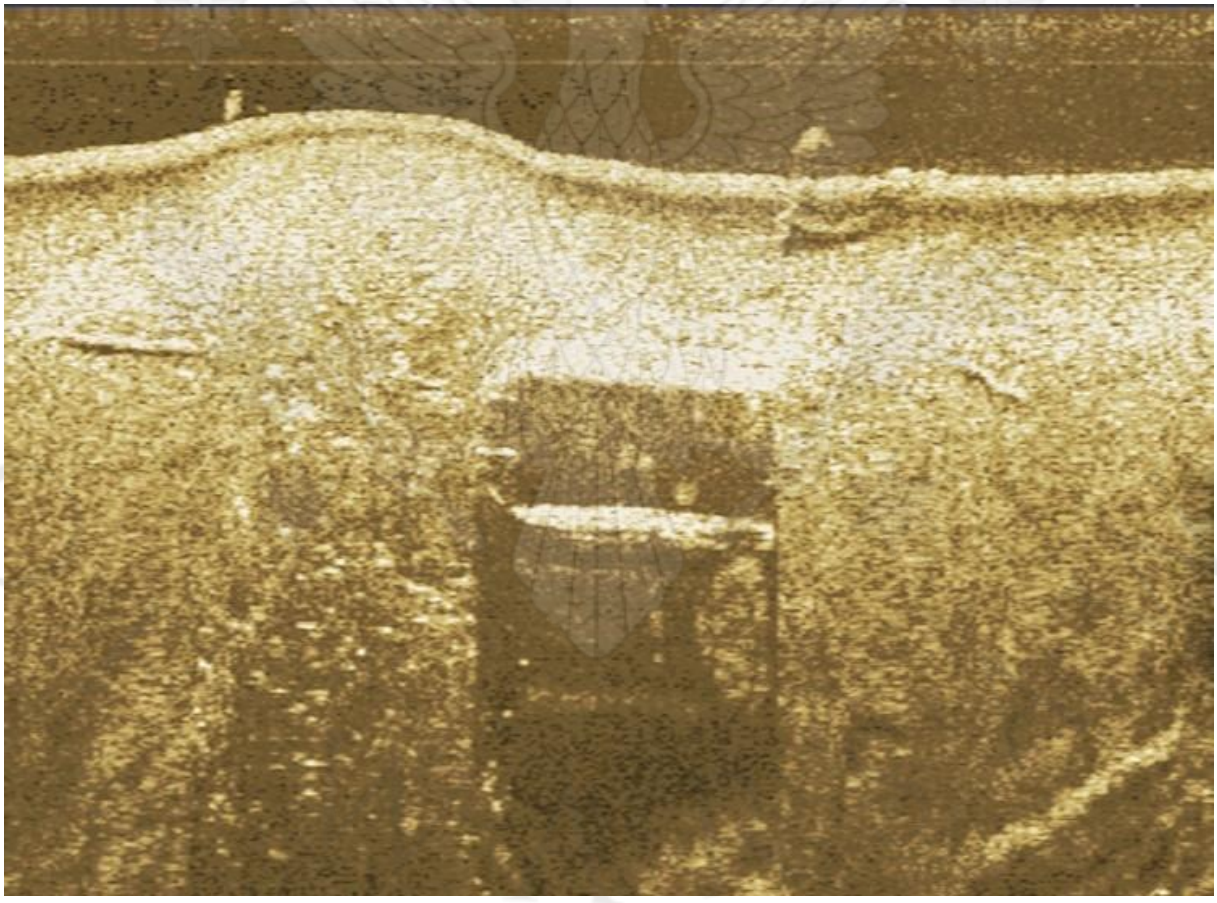

Fig. 6 – The wreck as seen on side-scan sonar image (image by: P. Maliński)

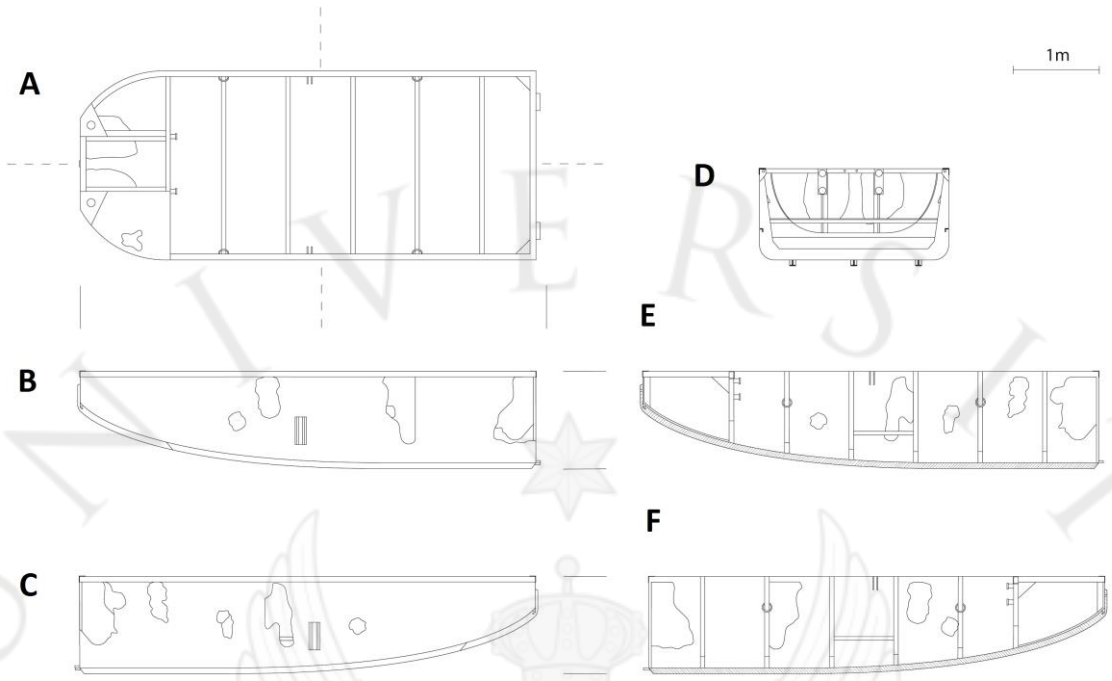

Fig. 7 – Drawing of the wreck based on measurements and archival photographs of frontal semi-pontoons of N2P park; A – top view, B – port side view, C – starboard side view, D – transverse section (viewed from the stern), E – longitudinal section (viewed from port), F – longitudinal section (viewed from the starboard) (elaborated by: M. Drozd)

Fig. 8 – A fragment of anchor found near the bow of the wreck (elaborated by: M. Drozd)

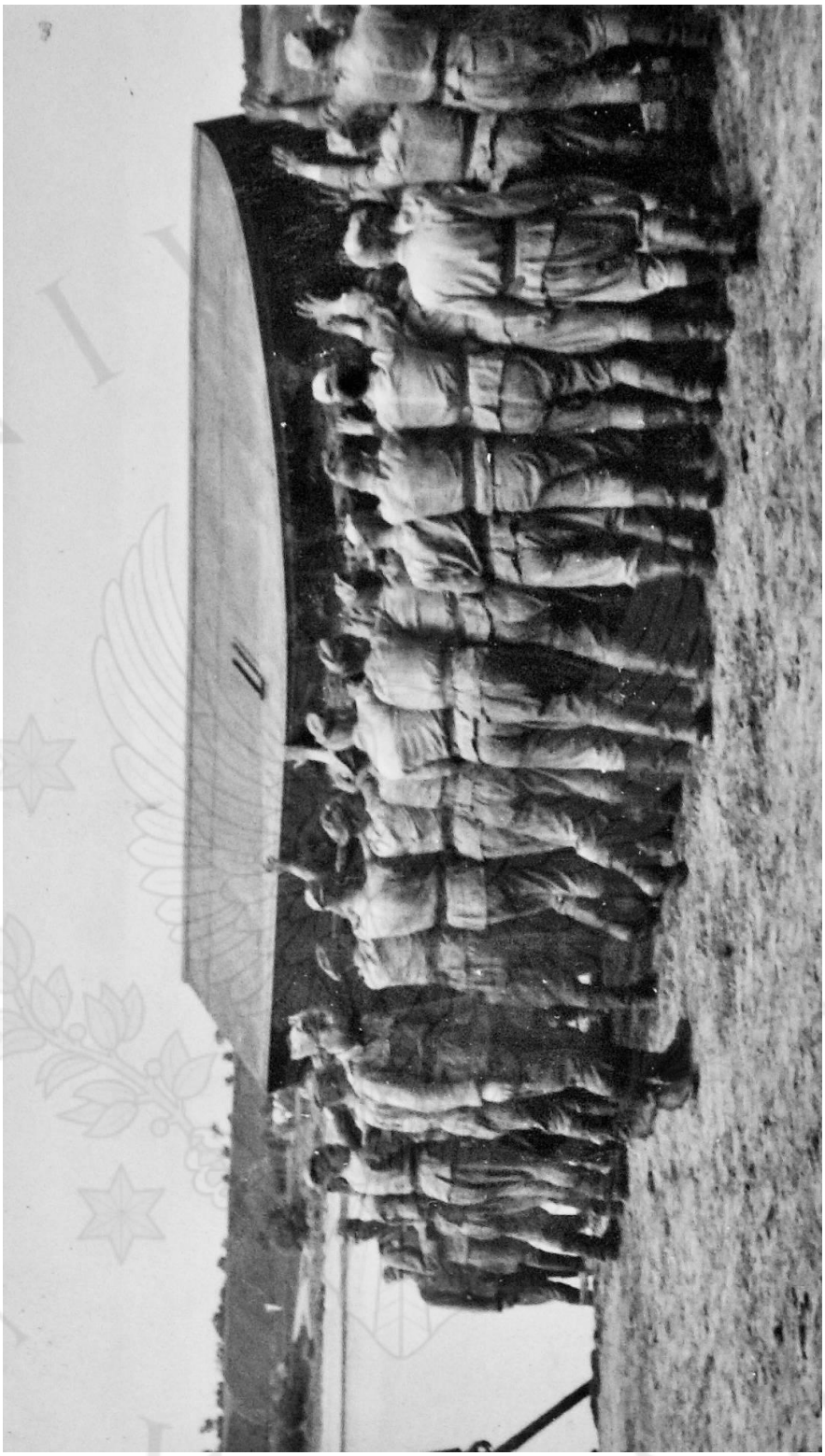

Fig. 9 – Soldiers of the Polish Armed Forces during military exercise, flipping the N2P-41 park frontal semi-pontoon to the board; as seen, its hull has the same width from the bow to the stern, unlike N2P park frontal semi-pontoon, in which hull is narrower toward the bow. Photograph made in 1949 at the Vistula River, place and author unknown; archival photograph from collection of the Museum of Engineering and Chemical Defence Troops (*Muzeum Wojsk Inżynieryjnych i Chemicznych*) in Wrocław (Lower Silesia, Poland) – a division of Land Forces Museum (*Muzeum Wojsk Lądowych*) in Bydgoszcz (Kuyavia, Poland), signed 27/12, inv. no. 2116/05 (reproduction by: P. Maliński)

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