

Introduction: Neolithic and Bronze Age pile dwellings in Europe. An outstanding archaeological resource with a long research tradition and broad perspectives

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Introduction

Research on prehistoric lakeside settlements began more than 150 years ago in Switzerland. Today, comparable settlements all over Europe belong to the best-known archaeological sites of the continent. The special conditions of the lake dwelling sites under water or waterlogged conditions in lakes and bogs led to an excellent preservation of organic materials, and settlement structures from long ago are discovered in an extraordinarily good state of preservation. Substantially preserved wooden architecture, overwhelming amounts of pottery, numerous organic implements made of wood, bark, antler and bone, textile as well as extensive plant and faunal remains made the pile dwellings welcome archaeological sources. From the 1980s onwards, high-precision dating of wooden structures by dendrochronology or a combination of dendrochronology and radiocarbon dating allowed reconstructing the architectural evolution of buildings and settlements in many cases. Precisely-dated archaeological layers help to follow the stylistic evolution of pottery and tools. The investigation of botanical and animal remains from these layers provides detailed insights into the economic conditions and long-distance relations of ancient societies. Prehistoric lakeside settlements show an extraordinarily vivid picture of the past, a glimpse into everyday life as well as reactions to and coping with climate-induced years of crisis.

Pioneering research of the 19th century

In the area around the Alps, this research has the longest history. The oldest mapping of a prehistoric lakeside settlement originates from Nidau on Lake Biel in western Switzerland. In 1811, Captain Schlatter drew a map of the town on which the Late Bronze Age site "Steinberg" was recorded. As early as 1840, the first Bronze Age objects from Mörigen were handed over to the archaeologist Albert Jahn from Bern, after fishermen had found them in the lake. However, the pile field of Nidau was interpreted as a Roman bank fortification and the finds of Mörigen remained largely unnoticed. Isolated references in written sources from the 18th century can be traced back to observations by fishermen who tore their nets at old poles without raising historical questions. In western Switzerland, attention was drawn to the phenomenon of the submerged settlements in lakes at an early stage, albeit without being able to interpret it conclusively. Only the Zurich archaeologist Ferdinand Keller was able to provide a convincing explanation for this. In 1854, he introduced the popular term "pile dwellings" to research. A few months earlier, in the winter of 1853/54, he had first seen piles and strange objects with his own eyes, which he undoubtedly regarded as very old. Johannes Äpli – a teacher from Obermeilen on Lake Zurich – had writ-

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ten to him that workers had come across “remnants of human activity” during the excavation of a harbour, which “were suitable to spread unexpected light over the earliest state of the inhabitants of our region”. As was usual at that time, he and his contemporaries still considered all relics from the time before the Romans to be “Celtic”. Although he was already known as a scientific luminary and connoisseur of the local “Alterthümer” (antiquities), his archaeological knowledge was mainly based on the study of burial mounds. Keller’s great achievement was to interpret the dark deposits and wood pieces from the bottom of Lake Zurich as settlement remains. It is undisputed today that he was inspired by ethnographic reports from the South Seas. He supported his written ideas with graphic reconstructions almost certainly based on travelogues by the French navigator Jules-Sébastien-César Dumont d’Urville (1790-1842). It can be assumed that Keller knew the German edition of the travelogue Dumont d’Urville, “Entdeckungs-Reise der französischen Corvette Astrolabe”, which was published in 1836 in neighbouring Schaffhausen. Keller had already founded the “Antiquarische Gesellschaft Zürich” (Antiquarian Society of Zurich) in 1832 and since then he corresponded with archaeologically-interested people in Switzerland and abroad. Keller had spent some years as a private secretary in England and was aware of the discussions at the European level concerning the questions raised by Charles Darwin regarding the evolution of species. His large network and the knowledge acquired through it probably brought him decisive advantages in the interpretation of the first findings and later helped to spread the news of the newly-discovered European pile dwellings. The finds from 1853/54 triggered a feverish search for other pile-dwelling sites at practically all lakes around the Alps. The information was spread by Ferdinand Keller’s “Pfahlbauberichte” (pile-dwelling reports), which were disseminated in the “Mittheilungen der Antiquarischen Gesellschaft Zürich” and appeared twelve times until 1930. In south-western Germany, the farmer and council writer Kaspar Löhle from Wangen in Baden discovered the lake dwellings on Lake Constance in 1856 and he was naturally in active contact with Ferdinand Keller. Jakob Messikommer worked with both of them and “exploited” the pile dwellings in Robenhausen-Ried in Zurich from 1858 onwards. Later, in 1875, peat cutters in Steinhauser Ried near Bad Schussenried in Upper Swabia came across pieces of broken wooden floors and implements, which were immediately recognised as pile-dwelling finds: the first excavations in Riedschachen and Aichbühl took place in the year of the discovery in 1875 and 1877. Around the same time, in the summer of 1873, a pile field was recorded by a diver in Lake Starnberg in Bavaria. In the French-speaking part of Switzerland, with the first lowering of Jura waters in 1878, the lake level of the three large lakes Neuchâtel, Biel and Murten was lowered by more than 2m and numerous settlements were uncovered in the following years. Already since 1854, the pioneers of pile-dwelling research on Lake Biel – notary Eduard Müller from Nidau and colonel Friedrich Schwab from Biel – had maintained intensive contacts with Ferdinand Keller. However, the “exploitation” of the sites found reached unimagined levels after the lowering of the Jura waters.

Keller’s findings also attracted attention in other parts of Europe and drew scientific interest to similar local phenomena. The very first lake dwellings in the Circum-Baltic region were discovered and investigated in the second half of the 19th century. The first stage of dwellings’ investigations in the present-day territory of Poland can be related to one of the main

researchers, Johannes Heydeck. This determined the further historical situation of the area, in which investigations and surveys were carried out by East Prussian researchers until the 20th century. They were inspired by the settlements found in present-day Switzerland and German territories. The 1930s to 1960s are marked by an intensive accumulation of information about lake dwellings arising from conducting land-reclamation works. New examinations of prior investigations and the localisation of recent and already-known dwellings began in the 1970s. In Estonia, central European pile dwellings were discussed in the 'Learned Estonian Society'. In Russia, peat-bog sites located in the Middle Trans Urals were found in the 19th century when gold deposits were uncovered on the eastern slope of the Middle Ural Mountains. Ancient artefacts made from bones, antler, stone and pottery were found there in layers of the Shigir (Shigirsky) and Gorbunovsky peat-bog sites in the Sverdlovsk province from 1879 onwards. Some of the constructions found on these sites were interpreted as remains of platforms left on marshy areas. In 1919, the site of Modlona with dwellings on raised platforms was found in Northern Russia, and investigated in the 1930-1950s and 1970s. Since the 1960s, long term investigations have been conducted in north-western Russia, revealing the major part of Neolithic pile-dwelling sites in this area.

The evolution of excavation techniques in bog sites and under water

The first activities comprised lifting objects with primitive equipment from the lake bed or digging them at a low water level. For technical reasons, real excavations were not carried out first at the large pre-alpine lakes but rather in the bogs in the hinterland of Lake Zurich and in Upper Swabia, later also in the central Swiss Wauwilermoos bog. Here, excavation problems such as the penetration of water into the excavation sections could be more easily solved. The first large-scale excavations began in the 1920s and 1930s. In a second phase from the 1950s onwards, excavations in bog settlements were further intensified. The late-1970s brought the introduction of modern underwater archaeological methods. The invention of the regulator by J. Cousteau and technical improvements such as dry-suits allowed dives in the large pre-alpine lakes. In Switzerland as well as France and Germany, professionally-operating diving teams emerged for the first time in the following years, which were also able to carry out excavations that could meet all modern requirements for the documentation of the findings. In the 1980s, numerous large-scale excavations were carried out in connection with the expansion of the transport network and other infrastructure projects, particularly in Switzerland. In the same period, research in south-western Germany was started up again after a long break following the Second World War. Large excavations took place on Lake Constance in sites such as Hornstaad, Sipplingen, Ludwigshafen and Hagnau, as well as in the upper Swabian Federseemoor. At the same time, the breakthrough in dendrochronology took place, although the first attempts to date with tree rings date back to the period before 1940. Today, dendrochronology plays a key role in the investigation of pile dwellings, as wooden objects have been found in large numbers. More than 100,000 dendrochronological examinations have been carried out north of the Alps to date. This makes it by far the largest dendrochronological data network available for pile-dwelling research.

UNESCO World Heritage: Pile dwellings around the Alps

As part of the "Prehistoric pile dwellings around the Alps" UNESCO World Heritage nomination that succeeded in 2011, a comprehensive and uniform inventory of all known sites was compiled. Nearly 1,000 Neolithic and Bronze Age pile-dwelling sites have been inventoried and mapped in the six participating countries of Switzerland, Austria, France, Germany, Italy and Slovenia. Approximately 450 references are to be found in Switzerland. Particularly dense concentrations of settlement areas can be observed in western Switzerland in the area of the three lakes (Neuenburgersee, Bielersee and Murtensee), in the Lake Zurich area, as well as on the Swiss-German and Swiss-French border waters of Lake Constance and Lake Geneva. Together with the northern foothills of the Alps, these two of central Europe's largest inland waters form the core zone of the "pile-dwellings" phenomenon. This continues to the north with the numerous moor settlements in Upper Swabia in Baden-Württemberg, especially around the Federsee and to the east, the sites at the lakes of the Bavarian and Upper Austrian foothills of the Alps. A special geographic location is occupied by the sites on the Jura mountains, which are located far into alpine valleys at the French lakes. Comparable small regions are also known in northern Italy. However, most of the sites found here are located in the lower part of Lake Garda. In Slovenia, pile dwellings are concentrated in the extensive moorland area of Ljubljansko Barje.

However, it is clear that the phenomenon of pile-dwelling is not limited to this Circum-Alpine area, but rather it extends far beyond it. Intensive research in the east and west of the continent has come together in recent years and now makes it possible to advance the inquiry on a pan-European basis. This volume – which is intended as a cooperative project and covers in equal parts the area of the Circum-Alpine pile-dwelling horizon and contrasts it with the rich findings from Estonia, Belarus, Russia, Macedonia and Greece – is not least dedicated to this task. Thereby, the individual contributions encompass a wide variety of facets in terms of investigating pile dwellings.

In this book

In the opening, *Maija Roio* introduces the situation at Lake Valgjärv of Koorküla, as well as posing the question of whether the finds of piles at lakes Kunda and Tamula should not be placed in the same context as the Lake Valgjärv finds that are commonly referred to as pile dwellings. With the two contributions of author teams around *Andrej Mazurkevich*, we turn to the Russian situation. The first article presents the site Serteya II in the Lovat-Dvina basin. Based on the finds and features, he succeeds in drawing a dynamic seasonal picture of the activities, which can be achieved almost exclusively by wetland archaeology. The second contribution deals with the underwater investigations in Dubokray, as well as the geophysical prospections in Lake Sennitsa. Thanks to a combination of magnetometric surveys and the use of sonar and georadars, it was possible to locate a large number of potential excavation sites and obtain a precise overview of the distribution of wooden and stone constructions. The project presented by *Henny Piezonka et al.* is a German-Russian cooperation and it investigates the rich legacy of the northern bank of River

Vologda, the Veksa site. The complex picture that this site offers and the interpretation of the wooden constructions can certainly only be disentangled by means of the close integration of scientific investigation methods, as is also the case in this research project. In the following, *Maxim Charniauski* presents the Kryvina peat bog, which – with its 4000-year settlement history – represents a unique window into the Neolithic and the Bronze Age in the Belarusian Lake District.

With the following two contributions, we move into the Balkan region. *Goce Naumov* offers an overview of the situation in general and faces apparent difficulties that arise when departing from the 'classical' area of the pile-dwelling research. He places wet soil archaeology next to 'dry-land' archaeology, and postulates that one must assume more of a network between settlements in both domains and perceive these two together to truly understand the Neolithic situation in the Balkans. *Tryfon Giagkoulis* deals with a specific case study in his analysis of the situation of the lakeside settlement Anarghiri IXb in western Macedonia. The structural wooden elements found here represent a unique situation for Greek archaeology. Together with further archaeological analyses, they allow making statements about the settlement structure and woodland management for the first time, and – in the long run – they form the starting point for establishing a dendrochronology of the southern Balkan region.

Of course, one of the great opportunities of wetland archaeology is organic conservation. In their contribution to plant economics at the site of Zürich-Parkhaus Opéra, *Ferran Antolín et al.* prove that archaeobotanical research can still lead to new insights even where this potential has already been used for a long time. Particularly regarding a quantitative reconstruction of the diet, new possibilities are opening up that can contribute to a better understanding of the embedding of lake inhabitants in their environment. Together, the three following contributions refer to the "Beyond lake villages" project (2015-2019), which tries to better understand the background of the lake shore settlements by focusing on the sites beyond the direct lake shores. This project has a trinational structure, whereby Swiss, German and Austrian scientists cooperate to achieve the common goal. *Albert Hafner et al.* introduces the joint project and describes the research around the Swiss Burgäschisee, as well as the interconnected archaeological and paleoecological investigations there. By combining proxies for vegetation and fire dynamics (pollen data) with a modelling of population density and land use, the archaeological information obtained from the lakeshore settlements can be integrated into an overall picture of settlement activities. *Mainberger et al.* investigate the situation in the south-west German alpine foreland. Here, again onsite and offsite studies are closely interwoven, with palaeobotany more strongly in the foreground. In the context of geomorphological and palaeohydrological studies, the economic situation on the lake shores can be assessed and the integration of the working area into the exchange networks with the neighbouring regions can be demonstrated, which suggests a key position within the central European distribution system. Finally, as Austrian project partners, *Kowarik et al.* explore the Attersee-Mondsee region in the context of the common goals of land use and human-environmental relations. As in the previous contribution, the mobility of Neolithic communities plays an important role. GIS methods are used to investigate the accessibility of the terrain and the reconstructed catchments of the set-

tlement sites, as well as modelling their viewsheds. The applied methods form important tools for the interpretation of past patterns of action and choices. The volume is rounded off by *Drieu et al.*, with their contribution to pottery use in Clairvaux XIV, in which the use of vessels is investigated by means of multiple approaches and the economy thus appears in high resolution at a microscopic level. This allows drawing conclusions about the use of natural resources at the site, which would otherwise remain closed. The authors can diachronically demonstrate a highly diverse use of different resource areas and thus demonstrate that the inhabitants of the lakeside settlement may have possessed a high adaptation potential to changing environmental conditions.

Despite the rich finds and the spectacular results of the excavations of the last 25 years in all parts of Europe – to which this volume also testifies – it should not be forgotten that the pile dwellings are extremely fragile monuments that need to be specially protected. In practically all pile-dwelling regions, the erosion of the shallow water zone at the large lakes leads to a permanent loss of archaeological substance. Conversely, for years sites found in bogs have been subject to a phenomenon that can be observed everywhere, which results from the lowering of groundwater levels by agriculture. The conservation efforts to preserve the lake dwellings in the long term are a challenge for present and future generations of archaeologists. By publishing the results of our work in this volume, we hope that we can contribute to raising awareness of the uniqueness of pile dwellings as a source of archaeological knowledge that must be protected and preserved.