

In Poseidons Reich XIX

Vorträge / Lectures

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Underwater archeological research at the prehistoric Janice - Pakoštane site

Underwater archaeological research of the roman port at Janice bay was conducted in 2004, 2011 and 2012. Although firstly began as research of an early roman port, archaeological interest shifted towards the nearby prehistoric site, discovered by Marko Meštrov. The submerged prehistoric settlement is located at a depth of about 4.5 m between Janice beach and the islet Sveta Juština. At beginning of our research positions were identified following an intensive surface survey of the area with a greater concentration of prehistoric ceramic material and flint tools. Two 2 by 1 m archaeological trenches were set based on these positions. Wooden elements were discovered in the first trench at a depth of 10 cm. A large quantity of potsherds and flint tools were collected at these positions. The pottery is for the most part of coarse texture with a large quantity of temper in the form of small pebbles and quartzite, while the flint tools represented are scrapers, blades, bladelets and end scrapers.

A large number of cores and flakes bear witness to tool manufacture in situ. All of these objects date the site to the Neolithic period or slightly later. The large quantity of flint tools, pottery and organic material and the developed layering of the site bear witness to the long-term settlement of this area. It is still not clear what kind of the settlement Janice were, but it is possible it was a pile dwelling in shallow sea waters. In any case, to date only a small number of prehistoric habitation sites have been found in Croatia that have been submerged as a result of changes in sea level, and research conducted at these locations is very rare. Research at the Janice Cove site is, therefore, a major step forward for underwater archaeology in Croatia.

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Die limnische Kulturlandschaft Nordostdeutschlands in prähistorischer und historischer Zeit

Tausende Binnengewässer charakterisieren die norddeutsche Landschaft. Ihre Nutzung und ihre Funktionen entwickelten sich auf der Basis der Vorstellungen und Zwänge regionaler Siedlungsgemeinschaften und überregionaler Traditionen. In der Summe lässt sich feststellen, dass diese Binnengewässer die prähistorische und historische Kulturlandschaft in ihrem ganzen Facettenreichtum spiegeln und eine bedeutende Rolle bei ihrer Entwicklung spielten.

Im Vergleich zu den theoretischen Überlegungen Christer Westerdahls und dem auf ihn zurückgehenden Begriff der maritimen Kulturlandschaft soll in diesem Vortrag der Frage nachgegangen werden, ob die Binnengewässerlandschaft Norddeutschlands im Sinne der Kulturlandschaftsforschung auch als „limnische Kulturlandschaft“ verstanden werden kann.

Bloier, Mario

Brioni – Insel der Glücklichen

Auf dem Brionischen Archipel finden sich Spuren unterschiedlichster Kulturen. Heute sind Castellieri, Strandsiedlungen sowie Gräber vom Neolithikum bis in die Bronzezeit bekannt. Die römische und spätantike Besiedlung stellt aufgrund der überlieferten Bodendenkmäler den reichsten Schatz der Insel dar. In der Bucht von Val Catena, auf Veli Brioni, liegt die größte bekannte villa maritima der Adria; an der Val Madonna liegt das bekannte ›byzantinische Castrum‹. Ab der Mitte des 1. Jahrhunderts v. Chr. entstanden auf Brioni die ersten villae rusticae. Sechs kleine Einheiten, die über den gesamten Inselarchipel verteilt lagen. Die auffälligsten Befunde liegen in der Verige-Bucht. Zu Beginn der römischen Besiedlung werden hier zwei zeitgleiche Villen vermutet. In spätaugusteisch/tiberischer Zeit wurden sie zu einer villa maritima zusammengefasst. Als Besitzer werden die Laecanii vermutet, denen auf dem Festland neben einer figlina in Fažana weitere Besitzungen zugerechnet werden.

Sie gehörten wohl zur ersten Kolonistenwelle der späten Republik und erlangten in der Forschung durch die ›Laecanius-Amphoren‹ Bekanntheit. Der letzte Umbau der Anlage, wie er ab 1900 durch Anton Gnirs freigelegt wurde, wird in claudische Zeit datiert und steht vermutlich mit dem Aufstieg der Familie in den Senatorenstand und dem wirtschaftlichen Erfolg in Verbindung. Mit dem Tod des C. Laecanius Bassus d. Ä. um 78/79 n. Chr. gingen die Familienbesitzungen in kaiserlichen Besitz über. Amphoren-, als auch Olivenöl- und Weinproduktion gingen jedoch unvermindert weiter. Stützte sich die frühe Forschung noch auf Landgrabungen, so fanden seit den 1990er Jahren in der Val Catena-Bucht unterwasserarchäologische Sondagen und Grabungen statt. Den vorläufigen Abschluss bildeten zwei Grabungskampagnen in den Jahren 1996/97. In deren Rahmen erfolgten auch malakologische sowie archäobotanische Untersuchungen.

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The archaeology of the ancient Danube Delta. Modeling environmental and Historical change: a new interdisciplinary project

The general research perspective that I promote is that of a discipline which intertwines methods and principles pertaining to the previously mentioned subjects, which is called *limnoarchaeology*. My approach is to develop a new holistic viewpoint concerning the human habitat from the neighboring area of the deltaic and lagoony complex of the Danube Delta, by implying methods specific to the limnological archaeology. In spite of the fact that this area has been intensely inhabited during the envisaged historical periods only few archaeological sites have been identified up to the present and they are affected by the permanent extension and mobility of the Danube Delta. Among them are the Greek cities of Istros-Histria and Orgame-Argamum, colonies established by Miletus.

This study proposes a brief review of the main evolution stages of the deltaic area, according to the most recent discoveries in the field, as well as an emphasis on the new delimitating criteria for the hinterland in the ancient time. This model takes into account the physico-geographical realities of the surrounding field, and mostly that of the Razim-Sinoie lagoon complex. This model can also be applied for other settlements, which may lead to comparisons and to drawing certain conclusions regarding the way harbour settlements were chosen.

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Waterlands: The Eco-Historical Landscape of the Stella River

Water is definitely the first and most significant resource of the Friuli plain, in particular the resurgent water that spurts from the soil.

In this region water is actually the main element, because it has encouraged the biodiversity and the human settlements. Historically it has been also an important obligation to the anthropization, permitting to preserve such naturalistic areas, that are very important for their peculiar habitat and environment. The hydrographic system on the surface is extremely diverse (in addition to the river there are also streams, peat-bogs, small lakes, etc.) and permits the sprouting of riparian zone woods, humid fields and stable fields. These are repositories of a priceless patrimony characterized by a varied vegetation and many different species of aquatic and terrestrial animals. Such treasures along the Stella River are the basis for which humans decided to settle in this area, dating back to the Neolithic times.

In the case of the Stella River, the eco-historical scenery is dominated by a shrubby and arboreal vegetation, that is present along riversides. Through it, it is still possible to catch a glimpse of the water castles, built during the Medieval era, in hopes of gaining control over the trades. Just below the water surface we can find Roman shipwrecks, like the Stella 1, and the ruins of the Via Annia bridge.

On behalf of DEGUWA, we would like to present the results from the historical and archaeological research that we have been conducting along the river since 2011, within the Anaxum Project (University of Udine, Texas A&M, INA: <http://nauticalarch.org/blogs/anaxum-project/>). It is an interdisciplinary project based on the study of the Stella River archaeological landscape through the analysis of the historical documentation, the interpretation of the buildings situated near the riversides, the geomorphological investigation and through the targeted archaeological excavation, both in underwater and wetland sites.

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Sea connecting, sea dividing. Sea life-giving, sea lethal. Role of sea in life of the people of Crimean Cherson in late Antiquity/the early Byzantine period

Located at the edge of the classical world, sea always played a significant role in the lives of the people of Cherson. The sea separated Cherson from the Empire; Crimea was considered as a distant territory, suitable for exiling inconvenient people. On the other hand, concerning an enemy attack, the distance from Crimea to Constantinople was uncomfortably short and Cherson itself was a few times threatened from the sea. To be safe, mighty walls were built around the city.

Furthermore, the sea provided people of Cherson with food, which helped to develop the city and so the position at the sea supported local economy. Nor the social aspect of living on the other (“barbarian”) coast of the Black Sea should be missed.

In my paper I will summarize how the sea influenced policy, economy and social life of the people of Cherson and I will describe certain peculiarity of the city given by the specific “overseas” location of Cherson in relation to the Byzantine Empire.

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A First Season of Excavation at Ashdod-Yam on the Israeli Mediterranean Coast

Ashdod-Yam (Asdudimmu in the Neo-Assyrian sources) is located on the coast of Israel, ca. 5 km north-west of Tel Ashdod, serving as its main coastal settlement during the Iron Age. Following the uprising of Yamani, the rebel king of Ashdod against the Assyrians in 711 BCE, Ashdod was destroyed (mentioned in the Assyrian sources and in Isaiah 20:1), and the power shifted to the coastal site of Ashdod-Yam, where the current excavations of Tel Aviv University take place.

The only archaeological work done previously at Ashdod-Yam was a series of trial tests, led by late Jacob Kaplan between 1965 and 1968. Kaplan believed the Ashdod rebels built the fortifications at the coastal site of Ashdod-Yam in anticipation of an Assyrian attack. Following the first season of renewed excavations, the remains of massive ancient fortifications have been discovered. The construction, however, appears too impressive to have been done in hurry and the fortifications were probably built in order to protect an artificial harbor, created either before the rebellion or slightly afterwards. The port and emporion at Ashdod-Yam, it seems, became a place of interaction between different peoples (Philistines, Phoenicians, Judeans, Cypriots, Egyptians and Iranian deportees), under imperial umbrella of the Assyrian ruling regime.

More recent ruins from the Hellenistic period (4th-2nd centuries BCE) were also discovered. These buildings were apparently built after the fortifications from the Iron Age were abandoned and probably destroyed by an earthquake in the second half of the second century BCE.

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Harbor Activities depicted in Roman Mosaics from the Mediterranean

Mosaic surfaces are the most durable and well preserved art form. The variety of themes depicted in such surfaces, are evidence of many aspects of daily life of people true to the period when the mosaics were produced. Depictions of ships and harbors in mosaics were not used as decorative motifs to embellish such surfaces rather they provide evidence of ancient ships, cargoes carried on board, different harbor activities and/or symbols of the owner's occupation.

Mosaics depicting ships and harbor activities are found in large estates, e. g. Villa Diotalevi at Rimini, or Villa del Casale at Piazza Armerina, Sicily, in the shippers and traders offices at Ostia, or in ecclesiastic edifices, such as the Church of Sts. Lot and Procopius at Mt. Nebo, or the Church of St. Stephen at Umm al-Rasas, Jordan.

Not many physical remains of ancient harbors survived, besides their general construction. How activities were carried out in harbors in antiquity survived through similar depictions in mosaics dated from the late 2nd century BCE to the 8th century CE. Only the main features of harbor activities depicted in mosaics will be brought into discussion along with the attempt to classify the type of vessels employed in such activities.

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Submerged Neolithic settlements off the Carmel coast and the emergence of the separated burial ground in the Levant

Submerged settlements off the Israeli Carmel coast demonstrate important aspects of the Neolithic cultures. These sites (9200 to 8000 cal BP) were exposed underwater as a result of anthropogenic erosion. The Pre-Pottery Neolithic site of Atlit-Yam included rectangular stone buildings, megalithic structures, stone-built water wells and human burials. The economy was based on agro-pastoral and marine resources. Herding of domesticated ungulates was accompanied by hunting. Water wells enabled permanent coastal habitation for the first time in this area. Later Pottery Neolithic culture included water wells constructed of wood and stone as well as installations for extracting olive oil. At Neve-Yam PN site, human skeletons were interned in stone cist graves. The PN sites revealed a fully agricultural subsistence economy. The sites exhibit the emergence of the Mediterranean fishing village on the Levant coast and the initialization of extracting olive oil, a major component of the Mediterranean subsistence.

These sites demonstrate changing burial practices and contribute to understanding the evolution of such practices in the Levant. The transition to farming modified land-uses, including changes in burial practices. Among other causes, ongoing soil-disturbing activities associated with sedentarism and agriculture provoked friction between sub-surface for burials and other daily uses. The force motivating separation between the dead and the living was the need to resolve a territorial conflict between the two groups over the use of the sub-surface. The final stage of this separation was identified in Neve Yam late PN site. It became a common practice during the Chalcolithic period.

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Four Different Kinds of Water Dwellings

During centuries, if not millennia, all over the world people tried to escape from oppression, slavery, violence and wars. Where possible, whole tribes would often escape onto lakes, lagoons and bights. This was the case of the inhabitants of Lake Nokoué in Benin, Lake Titicaca and others. But there are also cases, when people choose to inhabit lakes or lagoons because of rich fishing, for example in Cambodia on Tonlé Sap Lake.

Slave trade in Africa started about in the 17th century. The well organized tribe inhabiting the south coast of Dahomey, today Benin, escaped onto the lagoon knowing that the king's soldiers are not experienced to fight in water. They built in the lagoon some 40 villages, the biggest being Ganvié, today with 25.000 inhabitants. Their dwellings of two to three floors are built on irregular, as-cut, wooden stakes. Their main occupation is fishing and growing fish. The only means of transportation are canoes.

Similar was the destiny of the people on Titicaca Lake, who escaped the Incas to floating islands built from totora- reed, on which they based their entire life. The totora- reed serves many more purposes, as building huts, boats and it is also part of their food.

In Cambodia the Tonlé Sap lake was inhabited because of the abundant and variety of fish. The dwellings are constructed on rafts, to enable the houses to rise with the water level, which can fluctuate 8 m. The villages are well organized, including shops, cafés and schools.

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Pfahlbau auf der Baggerschaufel - Eine neu entdeckte Horgener Kulturschicht in Moos-Iznang am Bodensee

Die Überwachung einer Baumaßnahme in Moos-Iznang, direkt am Ufer des Bodensees führte Ende September 2012 zu einer der wichtigsten Entdeckungen der Pfahlbauarchäologie in den letzten Jahren: Eine bis zu 50 cm dicke Kulturschicht der Horgener Kultur fand sich auf einem - im Vergleich zu anderen Seeufersiedlungen - ungewöhnlich hohen Niveau von 395.70 bis 396.10 m ü. NN. Die Schicht wurde bis Ende Februar 2013 abgegraben und in Sandsäcke verpackt. Sie wird zur Zeit gesiebt und auf kleine Fundstücke hin durchgesehen. Die Kartierung von Hüttenlehmbrocken in einer Brandschicht lässt Wandfluchten und damit ehemalige Hausstandorte erkennen. Dokumentiert wurden weiterhin mehrere Quadratmeter große Tonlagen, in denen verstürzte ehemalige Feuerstellen zu vermuten sind.

Im Fundmaterial belegen Netzsenker, Querangeln und sogar Fischwirbel die Bedeutung der Fischerei für die Ernährung. Ackerbau ist über verkohlte Reste der Getreidereinigung und Körner nachgewiesen. Spinnwirtel und Webgewichte weisen auf die Verarbeitung von Flachs oder Wolle hin. Besonders häufig sind auch die Nachweise der Steinbeilherstellung wie Felsgesteinabschläge, grob zugehauene Rohlinge und Werkstücke mit Sägeschnitt.

Zahlreiche Pfähle, Pfahllöcher und die Mächtigkeit der Kulturschicht belegen eine länger andauernde Siedlungstätigkeit. Dendrochronologische Datierungen durch A. Billamboz ergaben als Schlagjahre 3275 und 3274 v. Chr. Damit liegt die Fundstelle in einem Zeitfenster, welches bisher am Bodensee und anderen Seen des Alpenvorlandes kaum belegt ist. Ursache könnten stark schwankende und damit auch erheblich höhere Wasserstände des Bodensees sein. An Hand der erstmals durch Pollenanalysen im Pioratal (Tessin) definierten Piora-Schwankung wird ein Klima mit allgemein kühleren und niederschlagreicheren Phasen angenommen. Mit der Fundstelle Iznang, am Ende der Piora II Schwankung, liegt nun ein weiterer direkter Beleg vom Bodenseeufer für diese möglicherweise abrupt veränderten Umweltbedingungen vor. Seekreidelagen als eindeutige Belege für eine größere Seeausdehnung konnten bis zu 400 m landeinwärts nachgewiesen werden. Damit muss die praktische Bodendenkmalpflege am Bodensee verstärkt auch Bauvorhaben in etwas vom Ufer entfernten Bereichen als mögliche Pfahlbaufundstellen intensiv überwachen.

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Kulturkontakte der Mykener mit dem Orient - Transfer von Motiven mythologischen Inhalts

Im Vortrag werden die Kulturkontakte der mykenischen Griechen mit den Hochkulturen des Vorderen Orients während der Spätbronzezeit behandelt. Dabei wird zum einen besonderen Wert auf das Bestimmen der genauen Orte gelegt, in denen die Kontakte erfolgten. Zum anderen werden unterschiedliche Motive mit wahrscheinlichem mythologischem Inhalt, die in der mykenischen Kunst erscheinen, sowie ihre vermutlichen nahöstlichen Vorbilder und den Zeitraum des Transfers berücksichtigt.

Im Hauptteil des Vortrages wird zunächst die Verbreitung der mykenischen Siedlungen im Mittelmeergebiet und damit das Leben der Mykener am Wasser besprochen. Ausgehend von der Anwesenheit mykenischer Griechen an der kleinasiatischen Küste und auf den unmittelbar benachbarten Inseln sowie den dadurch verursachten Handelsbeziehungen und Kulturkontakten werden vor allem die (mythologischen) Motive der Auseinandersetzungen gegen Löwen, die in der mykenischen Glyptik erscheinen, sowie gegen Vögel, die in der mykenischen Vasenmalerei begegnen – in beiden Fällen genau zur Zeit der intensiven Kontakte mit den Hochkulturen des Vorderen Orients – inhaltlich sowie nach ihrer vermutlichen nahöstlichen Herkunft analysiert; somit wird ein Teilbereich der Geisteswelt sowohl der Mykener als auch der nahöstlichen Völkerschaften während der Spätbronzezeit analysiert.

Dabei wird auch der (eventuelle) mykenische Einfluss auf die orientalischen Kulturen und ihre Denkmäler berücksichtigt. Darauf folgt der Versuch, die narrativen Szenen mit Vögeln in der mykenischen Vasenkunst mit bekannten Mythen in Zusammenhang zu bringen.

Schließlich werden die Ergebnisse der Analyse zusammengefasst und es wird betont, dass mit dem Vortrag vor allem sowohl eine Diskussion als auch künftige Forschungen der behandelten Fragestellungen erzielt werden.

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Structure from Motion als Methode für das Monitoring unterwasserarchäologischer Fundstellen

Um archäologische Fundstellen effektiv schützen zu können, sind Informationen über das zu erwartende Gefährdungspotential von grundlegender Bedeutung. Diese Informationen wiederum sind nur durch langfristige vorherige Beobachtungen zu erhalten. Diesen Vorgang nennt man Monitoring. Während Monitoring bisher hauptsächlich durch visuelle Beobachtungen und manuelle Vermessungen (Erosionsmarker etc.) durchgeführt wurde, haben in den letzten Jahren auch fortschrittlichere Methoden in die Archäologie Einzug gehalten. Eine dieser Methoden ist Structure from Motion, das Generieren von photogrammetrischen 3D-Modellen aus Fotos.

Grundlage dieser Technologie ist die Tatsache, dass bei Bildern desselben Objektes von verschiedenen Standpunkten eine dreidimensionale Abbildung der Szene möglich ist, wie es auch beim menschlichen Sehen passiert. Dementsprechend wird das Forschungsgebiet, das sich mit Structure from Motion beschäftigt, auch Computer Vision (maschinelles Sehen) genannt. Dabei wird die oben genannte Tatsache gemeinsam mit den Möglichkeiten, die moderne Computer bieten, genutzt, um hochauflösende, georeferenzierte dreidimensionale Modelle beliebiger Gegenstände oder Landschaften zu erstellen, die wiederum als Basis mittel- und langfristiger Beobachtungen genutzt werden können. Im Bereich der Unterwasserarchäologie, speziell im Süßwasserbereich oder anderen Regionen mit eingeschränkter Sichtweite, ist diese Methode allerdings schwierig anzuwenden.

Inhalt des Vortrages soll im Wesentlichen das Diplomprojekt des Verfassers sein, im Zuge dessen ein funktionierender Workflow für die Anwendung dieser Technologie am Beispiel des UNESCO Weltkulturerbes Pfahlbauten erarbeitet wurde,¹ und zwar sowohl betreffend die Feldarbeit als auch die zur Prozessierung der gewonnenen Rohdaten erforderlichen Schritte, basierend auf freier (und frei/gratis verfügbarer) Software.

¹ Jansa, Viktor: Probleme und Lösungsansätze beim Monitoring unterwasserarchäologischer Fundstellen am Beispiel des UNESCO-Weltkulturerbes Pfahlbauten, Diplomarbeit, Universität Wien, 2013

Mainberger, Martin

Across the lake and atop the Main European Watershed - Logboats of the Federsee bog / South West Germany

In the Federsee Bog 55 logboats have been discovered so far – a figure that underlines the paramount archaeological prominence of the prehistoric Federsee lake as settlement area and communication junction. The earliest dated vessels were used in the Neolithic, followed by Bronze Age and medieval objects. Most of the boats have remained undated, so the accumulation of Early Bronze Age boats – seven in total – may be due to the state of research.

Hydrological and geographical considerations suggest that at least a part of the known vessels were not only used for local transport and fishing, but also for regional traffic purposes. The Federsee bog is situated on top of the Main European Watershed and constitutes a potential interface between Rhine and Danube River systems.

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Die neolithische Pfahlstation von Kempfenhausen im Starnberger See – Fortführung der unterwasserarchäologischen Untersuchungen

Die einzig „echte Pfahlbausiedlung“ auf heutzutage bayerischem Boden auf einer ehemaligen Insel vor dem Ostufer des Sees wartete seit Beginn ihrer Erforschung in den 1980er Jahren mit spannenden Funden und Befunden auf. Trotz oberflächlich starker Zerstörung durch Erosion haben sich auf dem ehemaligen Inselrücken Pfähle und Funde erhalten. Darüber hinaus ließen sich in den ehemaligen Uferbereichen der Insel noch Kulturschichtreste antreffen. Offensichtlich existierte die Inselfiedlung nur über eine sehr kurze Zeit. Alle jahrgenaue Fälldaten der entnommenen Holzproben weisen schwerpunktmäßig in die Zeit zwischen 3723 und 3719 v. Chr. Anhand des Formenspektrums der Keramik- und Kupferfunde kann ein wirtschaftliches Beziehungsgeflecht entlang des Alpenhauptkamms mit Kontakt nach Westen in Richtung der Pfyn-Altheimer-Kultur Oberschwabens als auch in Richtung Osten ins Salzkammergut zur Mondsee-Gruppe erahnt werden. Der Fund eines charakteristischen Spaltholzes in den 1990er Jahren legt die Erbauung der Siedlung als „echten Stelzbau“ nahe. Nach einer über 10jährigen Unterbrechung werden die Untersuchungen seit 2012 fortgeführt.

Ziel ist eine komplette Dokumentation des noch bestehenden Pfahlfeldes. Bereits die ersten dendrochronologischen Ergebnisse (durchgeführt durch Franz Herzig/BLfD) konnten die Zeitspanne der Fälldaten in beide Richtungen erweitern. Zusätzliche Daten bestehen nun einerseits für das Jahr 3718 v. Chr. sowie für die Zeit zwischen 3746 und 3737 v. Chr. Damit scheint sich die – wenn auch nur kurze – Besiedlungsdauer zu verlängern. Auffällig zeigte sich auch der relativ hohe Anteil an verzierten Keramikfragmenten (23%). Letztlich sei der Fund einer großen Randscherbe mit Stichzier, vertikal durchstochener Knubbe und charakteristischem Sonnensymbol erwähnt, das in der neolithischen Mondsee-Gruppe Entsprechungen findet.

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Fishery activities in the The Ilawa Lake District (northern Poland) as an example of long term structures in archaeology

An interaction between humans and the aquatic environment is one of the main theoretical questions of maritime archaeology. This relation leads to a creation of structures that sometimes may last for a very significant period of time. The waterish landscape of lake districts in the northern Poland is a wonderful localization for an establishment of these kind of constructions. During a project called: *Non-destructive evaluation of archaeological potential of selected lakes of the Ilawa Lake District* a team of underwater archaeologists of the Department of Underwater Archaeology, Institute of Archaeology of the Nicolaus Copernicus University, Poland came across several interesting sites where the discovered remains of structures might be interpreted as connected with fishery. Besides the constructions some interesting artifacts were found. These are net weights that are dated from medieval period to 90's of 20th century.

Moreover, some of the researched sites after the interdisciplinary studies of ground-penetrating radar, echo sounding, sonar, sub-bottom profiler and underwater prospections seem to be in need for a new interpretation of previous studies. Therefore at one of the sites, the so called submerged settlements might have been a fish trap system that was used and reused since Neolithic times.

Based on finds, wooden constructions and their localizations reconstruction of fishery methods can be suggested. The paper will present fishery remains as a long term structures that continue from prehistoric times until medieval and post-medieval period or even modern days.

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New aspects in the interpretation of lake dwellings in the south-eastern Baltic Sea Region during Early Metal period

For a long time lake dwellings were considered to be a specific feature of the Alpine region. The lake dwellings found in the North Eastern Europe – South Eastern Baltic Sea Region – expanded the boundaries of lake dwellings phenomenon quite considerably. In North Eastern Europe, the existence of lake dwellings dated to the transitional Late Bronze – Early Iron Period was based on the dwellings found only in the territory of Poland (Masuria). Since 2000 Lake Luokesa (Lithuania) dwellings have been found and investigated using various interdisciplinary (natural science) methods. The investigations of the Lake Luokesa (Lithuania) dwellings complement the material of the period in various ways. The main conclusions are based on the corollary models of interdisciplinary investigations which provide data for a well-grounded interpretation and reconstruction of the dwellings of the period under discussion.

This paper seeks to evaluate Early Metal Period Luokesa Lake (Lithuania) dwellings in the context of the lake dwellings of the South Eastern Baltic Sea region. Making reference to investigations and interpretations of the region's dwellings, the aim has been made to establish the features of the Lake Luokesa dwellings and to ascertain how these dwellings differ and how they compare. The paper also attempts to verify and check the already presented hypotheses and interpretations of the origins, and the development and usage of the region's lake dwellings.

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Crossing the dark waters – bridges and other wooden structures from lakes of the Ilawa Lake District and new methods of their documentation.

Research on the Early Medieval bridges are well established in Poland. The best examples of them are the bridges from the Lednica Lake. These bridges connected one of the most important strongholds of the Early Polish state with functioning communication networks. At the same time we know dozens of Slavonic bridges from other parts of Poland.

Current project *Non-destructive evaluation of archaeological potential of selected lakes of the Ilawa Lake District* funded by National Heritage Board of Poland provided opportunity to survey a number of lakes in north-eastern Poland. The region is archaeologically very interesting, as it was recognized as border zone between Slavonic and Prussians tribes. A development of the Teutonic Order had also a very significant impact on this area.

During the research project carried in 2013 a number of bridges from XI, XII, XIII and XIV centuries were discovered. These bridges connected not only strongholds on the isolated island (for example the Lodygowo Lake) but were also a part of well-organized communications networks (for example the Lake Jeziorak and Plaskie) that functioned on the Slavonic – Prussian border.

An essential part of the research included non-invasive methods that were implemented in areas with high archaeological potential. For the first time in Polish archaeology ground-penetrating radar was used to search for submerged prehistoric or medieval wooden constructions. The team has also a great opportunity to test hydro-acoustic and hydro-seismic methods in shallow water environment.

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„Der Mensch lebt nicht vom Brot allein“.

Fischfang, –handel und –konsum in der römischen Dobrudscha (Rumänien) am Beispiel der Siedlung Ibida (Slava Rusa).

Der Fischfang sicherte für die Bewohner der westlichen Schwarzmeerküste und ihres Hinterlands (der heutigen Dobrudscha) in der Antike die Grundlage ihrer Ernährung und war ökonomisch von höchster Bedeutung, wie etwa die Auseinandersetzung der Bewohner Histrias mit den römischen Publicani über die Fischereirechte in den umliegenden Gewässern zeigt, die von den römischen Behörden immer wieder geschlichtet werden musste (zugunsten einer fortwährenden Privilegierung der Histriener). Neben allgemeinen Aspekten des Fischfangs und –handels in der römischen Dobrudscha behandelt unser Beitrag v.a. die römische Siedlung Ibida, deren faunistische Überreste eingehend untersucht wurden. Für die Fischüberreste ergibt sich ein klares Bild, obwohl kleinste Fischarten aufgrund der Erhaltungsbedingungen kaum nachweisbar sind.

Anhand der NISP-Methode (Number of identified specimen) konnten Konsummengen für 11 Fischarten für die Zeit vom 4.-6. Jahrhundert berechnet werden. Die meisten Überreste lassen sich den Cypriniden zuordnen. Besonders wichtig für die Ernährung der Bewohner Ibidas waren der gemeine Karpfen, gefolgt von Wels, Zander und Hecht, die in der Donau, den umliegenden Gewässern, v.a. aber aus den vorgelagerten Lagunenseen „Razim“, „Sinoe“ und „Babadag“, stammten. Der Befund verweist darauf, dass Fischfang und –konsum für die spätrömische Siedlung Ibida, wie für die meisten Siedlungen an der Schwarzmeerküste und im Hinterland der großen Lagunenseen, eine wichtige Lebensgrundlage bildete.

Sciancalepore, A. & Severi, E.

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The Research Centre “Lake Bolsena Scuba School” is an Association of volunteers, coordinated and led by a highly qualified technical-scientific team and has the objective to become a reference for the scientific researches of the lake. All the operations and researches have been performed in collaboration with the Archaeological Superintendence for the Southern Etruria.

Gran Carro underwater settlement (Lake Bolsena, Italy)

Lake Bolsena, one of the lakes of volcanic origin in central Italy, appears almost like an inland sea thanks to its size, depth and to the presence of two small islands, Bisentina and Martana. The first underwater archaeological finds located in the inland waters of central Italy were found in this lake in 1959 with the discovery of the protohistoric settlement of *Gran Carro*.

Gran Carro is a wide-spread settlement dating from the beginning of the Early Iron Age (IXth century BC). The site is situated near the eastern shores of the lake basin, only 100 m from the present shore, at a depth of between 4 and 5 m; it has been the subject of only modest studies over the years. Thus the knowledge of the whole context is based, above all, on the analysis of surface data as well as topographical readings, which have identified over four hundred poles fixed in the lake bed in long lines, and also on the type-chronology study of the large amount of material found.

It has been possible to propose an initial reconstruction of the relationship between the water level of the lake and the settlement, which during the last phase of life adopted constructive solutions type of pile-dwelling.

In 2012 and 2013 the researches are restarted checking the state of the settlement preservation. Topographical positioning has been planned to make an archaeological complete GIS mapping of the site and a future 3D reconstruction of the pile-dwelling village. Furthermore, it has been effected small stratigraphic samples in two squares, implementing the graphic documentation of the underlying layers.

Schmidts, Thomas

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Auf der Suche nach den Häfen von Ainos

Ainos, heute Enez (Türkei), liegt in der Nordägäis, im Mündungsgebiet des Flusses Hebros (türk. Meriç, griech. Evros). Die Stadt stellte einen bedeutenden Knotenpunkt der Handelsschifffahrt in Antike und byzantinischer Zeit dar. Hier bestand die Möglichkeit der Umladung von Waren auf den bis mindestens nach Hadrianopolis-Edirne schiffbaren Fluss. Einen besonderen Schutz der Schiffe vor den in der Region teilweise starken Nordwinden gewähren zwei Lagunen, in denen die Hafenanlagen vermutet werden. Der Hebros mit seinen Sedimenten ist auch maßgeblich für den Verlandungsprozess verantwortlich, der für eine Verschiebung der Küstenlinie um mehrere Kilometer sorgte.

Im Rahmen eines interdisziplinären, von der Deutschen Forschungsgemeinschaft geförderten Projektes werden geoarchäologische, geophysikalische und archäologische Methoden zur Lokalisierung und Datierung der Hafenanlagen eingesetzt. Darüber hinaus sollen der raumzeitliche Verlauf des Verlandungsprozesses ermittelt und die Veränderung der Siedlungstopographie durch den Landschaftswandel analysiert werden. Der Vortrag möchte einen Einblick in die laufenden Forschungen bieten sowie Möglichkeiten und Grenzen moderner Prospektionsmethoden für die Untersuchung von Hafenanlagen aufzeigen.

Schöbel, Gunter

Pfahlbaumuseumm Unteruhldingen

Pfahlbauarchäologie unter und über Wasser – Die Museumsaufgabe des Sichtbar-Machens eines Unterwasser UNESCO Weltkulturerbes.

Es ist die Aufgabe von Museen, Unsichtbares sichtbar zu machen. Diese Aussage trifft ganz besonders auf das geschützt unter Wasser liegende, nicht zugängliche kulturelle Erbe zu. Untergegangene Schiffe, Hafenanlagen, submarine prähistorische Siedlungen oder steinzeitliche Pfahlbauerdörfer haben in den Augen der Öffentlichkeit ein sehr großes Problem. Sie sind nur für wenige ausgebildete Forschungstaucher im Original sichtbar, können meist nur mittels Fotografien, Film oder nach aufwendiger Restaurierung des Befundes, manchmal in ausgewählten Teilen oder mit pars pro toto geborgenen archäologischen Funden in Museen ausgestellt werden. Man darf dieses Erbe nicht anfassen, es ist sehr fragil, man kann es nicht wie die Freiheitsstatue, den Tower, die Pyramiden oder den Kölner Dom besuchen und direkt erleben. Aus diesem Grund braucht es Inszenierungen, Modelle und eine ganze Palette von ausgewählten Methoden, um der UNESCO-Beauftragung nach „Dissemination“, „Verbreitung von Informationen“ zum geschützten Erbe an das Publikum gerecht zu werden.

In 160 Jahren Auseinandersetzung mit dem Thema gab es viele darstellende Verfahren innerhalb der Pfahlbauforschung an den Seen Europas, um diese Aufgabe zu erfüllen. Die Museologie kennt die Präsentation von Originalfunden in Vitrinen, Ölgemälde, Lebensbilder, Dorfmodelle, aber auch die Transformation von wissenschaftlichen Inhalten in Gedichten, Theaterinszenierungen oder Experimentalfilmen. So wurde gerade im Bereich der Pfahlbauarchäologie aus der Not eine Tugend gemacht. Kaum ein archäologischer Forschungsbereich verfügt über mehr Erfahrung, auch den „intangible cultural heritage“ Bereich nach außen zu tragen. Der Vortrag versucht, am Beispiel des Unterwassererbes der Pfahlbauten aufzuzeigen wie von den Anfängen in den 1850er Jahren in Europa beginnend heute diese Aufgabe zeitgemäß und nachhaltig gestaltet wird.

Tiboni, Francesco / Sanna, Laura

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Author 2: Dott. Laura Sanna – Specializzanda in Archeologia Preistorica – Scuola di Specializzazione in Archeologia (Post Graduate Level) – Università degli Studi di Genova

Man and Sea in Prehistoric Liguria: Impact of Maritime Activities up to the Neolithic Era

In this paper, the authors discuss different evidences concerning the relationship between man and sea in prehistoric Liguria. Starting from the analysis of the submerged and coastal environment of some of the most important ligurian sites, particularly of caves and coastal sites, evidences of trade and cultural interactions, the authors shed a light on the impact navigation and maritime activities had on the Neolithic cultures of the area.

Particularly, on the base of the combined evaluation of recent studies held on sea-level changes, on specific classes of artefacts, like obsidian or pumice tools, and ceramics, the study suggests a critical interpretation of the impact prehistoric navigation had on human activities in this area of the western Mediterranean sea. Further, the study takes into consideration some of the most important technical problems linked with the prehistoric archaeology of the submerged sites of Liguria, in order to propose a new archaeological approach to be used in future researches to be arranged on these sites.

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Rivers as way of life: the case of the Veneto

Rivers and waterways have been very important in history because they are sources of freshwater and direct ways to communicate across lands. In many cases, this functional relationship has prompted and affected the adaptation of the surrounding landscape. Controlling the flow of water and adapting it to specific needs has been one of the motivations behind the creation of many landscapes, in Egypt, Europe and elsewhere in the world. In a few cases, “water cultures” have emerged. These cultures have made of the waterways their cultural focus. These cultures are particularly important because they demonstrate in a straightforward manner how the relationship between humans and the natural world works in two ways. I shall focus on the Veneto, the location of multiple cultures founded on special relationships with rivers and waterways, including the Terramare and the Venetian Republic.

Adopting a historic perspective, it will be possible to use this case-study to explore the fundamental relationship between humans and the environment, and how both sides are affected. The environment is frequently seen as a passive entity in need of either human management or protection from humans. By using a different perspective, in which the natural world is an essential component of the human world and the two can become inextricably linked, I hope to show how to use the archaeological record to formulate a modern approach to the environment that is respectful of both sides.

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Life by the Red Sea: adaptation strategies for the construction of ports, harbours and their facilities in two case studies.

Research on maritime aspects of archaeology in the surrounding regions of the Red Sea have largely increased in recent times and new projects are starting, quickly changing our perception of the Red Sea past culture and environment. Three Pharaonic ports have been uncovered and excavated on the Egyptian Red Sea coast in the last ten years; the identification and investigation of Hellenistic, Roman, Aksumite, South-Arabian, Byzantine and Islamic sites increased on all Red Sea coastal regions since earlier research started in the 1970s.

In comparing ports, harbours and infrastructures of different periods and coastal regions of the Red Sea, some similarity and some very distinctive characteristics emerge.

The proposed paper aims to review Red Sea coastal evidence and to discuss, in particular, strategies of adaptation in two key sites where the author conduct research. One is the pharaonic harbour of Mersa Gawasis and the other is the 1st - 7th century Eritrean port of Adulis used by Romans, Aksumites and Byzantines merchants respectively located on the northern and on the southern African shore of the Red Sea. The characteristics of harbour and port facilities and the interpretation of recent evidence from these two sites will be discussed in the general contexts of recent investigations in the Red Sea.

Miholjek, Igor

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Submerged archaeological sites from the air - case study of Kolone, Croatia

The boundary between land and water plays an important role in archaeological research. Overcoming this boundary can be achieved by using remote sensing methods which are able to deliver high quality results in documenting the topography and archaeological structures on land, in coastal areas, and even under water. Aerial Laser Bathymetry (ALB) was applied during the research of site of Kolone, located on the western coast of Istria. The site is known for stone artifacts and underwater structures dating to the Roman times. Scanning of the site resulted in a detailed and accurate terrain model of the area.

The underwater survey as well as ALS scanning showed remains of round stone pools, remains of large presses or larger installation for fabric dying, Roman harbor in the eastern part of the bay and a large construction of stone elements building the outer section of a presumed fish pond on the western side of the bay. Römisch-Germanisches Zentralmuseum Mainz financed and supported the scanning of the site and the project was conducted in cooperation between the LBI for archaeological prospection and virtual archaeology and the Croatian Conservation Institute.

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Magnetometer survey of Phanagorian water area in 2013

The drowned part of the city is covered with the sand layer, which appeared because of the centuries of coastal erosion. It makes the search of archeological objects much more difficult. Both visual and high-frequency acoustic surveys had shown very low efficiency, so we tried the magnetometry method to reveal those underwater objects, which were unable to notice visually. We succeed partly because of the specific geological structure of Taman peninsula ground, which is mostly consists of clay without any boulders. That's why almost all Phanagorian buildings were made of stone, carried from Crimea or stones from ship ballast. The magnetic intensity of these stones differs substantially from the local magnetic background that gives the theoretical possibility to reveal massive stone objects, for example, remains of ancient harbor structures.

In 2013 the magnetometer survey of 48 hectares of Phanagoria's water area was conducted on the range of depth from 0.7 m to 4.5 m. The following devices were used: magnetometer Marine Magnetics SeaSpy and variational station based on the proton magnetometer MMP-203.

The main purpose of the survey wasn't the revealing of the separate underwater objects, but the creation of precise map of magnetic induction with minimal error for all the explored area. That enables to reveal on the post-processing stage even relatively weak anomalies, which are most interesting as potential archeological findings. For the dimensional reference of survey there was used the differential navigation receiver CSI Wireless DGPS Max with the positioning accuracy 0.3-0.6 m in real-time mode. The magnetometer survey was conducted from the board of 6-meters long inflatable motor boat on the speed 6-8 km/h by longitudinal tacks with 5 m intervals. SeaSpy magnetometer was carried on the 15 m distance behind the boat on the depth of 0.7-1.5 m. Natural variations of geomagnetic field during the whole survey were being recorded by coastal variational station.

During post-processing and creation of a detailed map it was found that mean square error of the survey was no more than 1nT, and minimal amplitude of certainly distinguished magnetic anomalies could be taken as 5nT. As a result of

the Taman water area map creation there were revealed both separate anomalies with different amplitude and square and zones of massive closely situated anomalies. The big anomalies were identified by the underwater squad as iron shipwrecks, wooden steam-sailing ship and metal fence around the underwater excavation area of 2012. Besides, there were allocated 8t big magnetic anomaly zones significantly various in square and position in water area. The biggest of them (Zone 4) goes into the sea perpendicularly to the coast line. It is 170 m long, 70 m width and has 18000m² square. In this zone anomalies of small amplitude (around 15nT) are situated very close to each other, only with 6-8 m intervals. In mechanical center of sea-end of this anomaly in 15-20 m to the south of the northern border was made a pit 2x2m and 2.5m deep. It appeared that under thin layer of sea-bottom sand there was a solid stone mound 2.4-2.5 m width, consisting of rolled boulders of metamorphic rock 0.3-0.7m in diameter. On the top part of the mound there were found fragments of ancient ceramics, the bottom part of the mound lied on sterile layer of solid grey continental silt sand. The same situation was found after pitting of the northern end of Zone 1, the difference was only in type of rock (mainly broken fossil rock) and in the mound height (1.5m).

Experience of detailed magnetometer survey of Phanagorian water area demonstrated the efficiency of special devices to allocate underwater objects covered with sediments and invisible for the naked eye. Processing of the survey results and creation of the magnet induction map enabled to reveal structures, which geomagnetic features were quite different from the natural magnetic background of Taman bay. Integration of the survey results on precise topographic basis of Phanagoria's GIS and its dimensional coordination with underwater pits and excavation areas of previous years enables to define the most perspective areas for following excavations and to filter areas of modern ferromagnetic pollution. This method allows to increase significantly informational efficiency and accuracy of survey results, enabling to find invisible objects, having own magnetic field.

Pohl, Henrik

Kuratorium Pfahlbauten - Site Management Oberösterreich

Prähistorische Pfahlbauten in Oberösterreich – ein neues Weltkulturerbe

Der 2011 erworbene Status ausgewählter Pfahlbauten um die Alpen als UNESCO-Welterbe gab den Anstoß, sich auch in Österreich diesem Thema wieder verstärkt zu widmen. Dies beinhaltet auch die Verpflichtung, für einen angemessenen Schutz dieser unter Wasser liegenden Siedlungsreste zu sorgen. Das Kuratorium Pfahlbauten mit dem National Management in Wien und den Site Managements in Kärnten und Oberösterreich wurde mit dieser Aufgabe betraut. Ein wichtiges Ziel des Site Management Oberösterreich besteht im Aufbau eines Monitorings zur Langzeitkontrolle der Unterwasserdenkmale mit standardisierten Methoden. Hier spielt die Kartierung und regelmäßige Überwachung der Fundstätten durch Wissenschaftstaucher eine wichtige Rolle.

Durch entsprechende Maßnahmen sollen gleichfalls Basisdaten für die archäologische Forschung des Pfahlbauphänomens gewonnen werden. Dies ist umso wünschenswerter, als der ostalpine Bereich (heutiges Österreich mit den Zentren Salzkammergut und Kärnten) für das Verständnis der jungsteinzeitlichen Besiedlung Europas besonders wichtig erscheint. Nach fast 30 Jahren Arbeits- und Forschungspause in Österreich kann so der Anschluss an die internationale Forschungsgemeinde wieder hergestellt werden. Dabei spielt der Wissensaustausch mit den anderen fünf Ländern des UNESCO-Welterbes „Prähistorische Pfahlbauten um die Alpen“ eine wichtige Rolle.

Roio, Maili

Estonian National Heritage Board/ University of Tartu

The prehistoric pile dwellings in Estonia

In Lake Valgjärv of Koorküla is the only site where remains of a pile dwelling have been discovered. Lake Valgjärv of Koorküla is located in the South Estonian moraine landscape, jointed by valleys, near the Latvian border. The remains of log constructions lie on a 700 sq m large area on an underwater shallow that stretches from the tip of the peninsula located in the central part of the western shore of Lake Valgjärv.

Since 1958, various researchers have collected material from the lake of Valgjärv, thus enabling us to recognize three settlement periods: 1) Neolithic 3300 -3200 cal BC, Pre-Roman Iron Age (4th-2nd century cal BC) and the Pre-Viking/Viking Age (7th-9th century). Although the site at Lake Valgjärv has often been interpreted as a fortification built into the water, the function of the wooden constructions still remains unclear. As yet no constructions containing reference to fortifications have been identified.

Todoroska, Valentina

Struga, Republic of Macedonia

From the remains to the reconstruction: The Bay of the Bones in the Ohrid region (Republic of Macedonia)

This presentation aims to present the cultural underwater heritage of Lake Ohrid. Its main focus will be on the settlement called Ploca Micovgrad in the Bay of the Bones, where a complete reconstruction has been made of a complex of authentic structures, as well as a museum with the movable material of this prehistoric settlement has been presented. It is located along the east coast of Lake Ohrid in the Gradishte Bay. The first underwater archaeological research was conducted in 1997.

At a depth of 3-4m we discovered numerous wooden piles pinned to the bed of the lake and numerous movable archaeological material, mainly integral and fragmented ceramic vessels, chronologically belonging to the end of the Bronze and beginning of the Iron Age. In 2008, a part of the reconstruction of this site was promoted, while in 2010 it was fully presented to the wider public. Here we will present the reconstruction, protection and conservation of the site as well as the realized measures for its presentation to the wider public and to the rising of their awareness.

Zmaić Kralj, Vesna

Nova ves 1,10 000 Zagreb, Croatia

Post medieval shipwreck in the Mijoka shallows off the island of Murter, Croatia

The remains of Mijoka shipwreck lies at the depth between 37 and 40 meters, near the island of Murter. When the site was discovered by local divers in the 1970s, the removal of valuable material ensued. The site was reported in 2001, but by then it was already entirely devastated. The ship's structure was destroyed and all of the visible movable finds were looted, with only an iron anchor remaining visible on the seabed. The first research campaign showed that a stratum containing very valuable archaeological material still lies on the seabed. Because of the great value of this material, the research was conducted in five campaigns until 2012, lead by Croatian Conservation Institute. A stratum of shipwreck contained luxury consumer goods, decorative merchandise and goldsmith's material produced in the Central European centres such as Nuremberg, and glass products possibly originating from the workshops of Murano.

Based on the signatures of craftsmen on objects such as small ivory sundials or counter jettons, the shipwreck was dated to the beginning of the 17th century. The silver and gold coins found at the site are somewhat earlier: two types of Polish silver half Groschen, silver Hungarian denarii and Ottoman akches. One gold Hungarian forint minted in 1587 supports the local stories about the existence of gold on the shipwreck. Because of the small dimensions of the ships, one small anchor and the lack of artillery on board, in opposition with the valuable cargo, which would have to be heavily guarded during transport, the question remains whether it was a merchant or a pirate ship. With the lack of conclusive evidence, the answer to this question remains the object of further historical and archival research.