

Archaeological excavations from the past with new interpretations

2

*Maili Roio*¹

Introduction

1 – National Heritage Board of Estonia

In the 19th century, research on pile dwellings also made a start in the Baltic countries. Similar to many other places in Europe, the discovery in Lake Zürich in Switzerland by Ferdinand Keller also inspired discussions about prehistoric pile dwellings in academic circles here (Speck 1981). In Estonia, the subject of central European pile dwellings was introduced at the beginning of 1866 at the Learned Estonian Society connecting the intellectuals of Tartu (Engelmann 1866, 1–4). At the same time when the number of discoveries of pile dwellings significantly increased in Europe, the existence of the few possible lake settlements in the Baltics was questioned (Grewingk 1880; Schiemann 1880; Weyrich 1880). For a long time, researchers depended on the opinion of Constantin Grewingk, professor of mineralogy of the University of Tartu and an amateur archaeologist. According to his standpoint, there are few reasons to build prehistoric pile dwellings at our latitude, since the lakes here are covered with ice during lengthy seasons, thus not providing sufficient protection for a significant part of the year (Grewingk 1879, p. 176). Since professor Grewingk was an uncontested authority in both Estonian as well as Latvian academic circles, his reasons were considered adequate and interest in pile dwellings decreased for the time being (see Roio 2003).

At present, the only construction remains of a pile settlement in Estonia have been ascertained in Lake Valgjärv of Koorküla. Despite the fact that the lake settlement has allegedly already been studied since 1640 (see Hupel 1782, pp. 331–2), the existence of the prehistoric pile dwelling in the bottom of the lake was only determined in 1958 (Selirand 1960). Lake Valgjärv of Koorküla is archaeologically exceptional because the remains of piles belong to dwellings from different periods (see Roio 2006, 2007; Virtanen 2012).

Next to Lake Valgjärv of Koorküla, several prehistoric sites are known from Estonian wetlands, the excavations of which have yielded collections of piles. The kind of information exists for the two prominent Stone Age settlement sites in Kunda and Tamula (see Grewingk 1886; Jaanits et al. 1982).

In addition to Lake Valgjärv of Koorküla, this article discusses the pile remains from the find places by the Kunda prehistoric lake and Tamula prehistoric settlement sites and their research questions. Since the studies of these sites began fifty or more years ago, the preserved archaeological material has been too randomly and inaccurately described to understand the find context of the piles. Nevertheless, it is sufficient to question the long-established interpretations.



Figure 1: Map showing the places mentioned in the text. Image: Maili Roio.

Lake Valgjärv of Koorküla

The lakes of Koorküla are situated in the southern Estonian moraine landscape, demarcated by valleys and including about twenty lakes (Figure 1). Lake Valgjärv is the largest and most well known lake, at approximately 44 hectares with a mean depth of 8 m and a maximal depth of 26 m (Mäemets 1968, p. 396). The remains of log buildings are situated on the area of approximately 700 m² square at a depth of 1–4 m on an underwater ridge that proceeds from the tip of a peninsula in the central part of the western shore of the lake (Selirand 1960, p. 271). Folktales know well a tragic story of the origin of the lake, which was allegedly written down by monk Siegbert of Riga in his *Livonian Chronicle* in 1489. According to the story, around 1300 an estate owner married his sister, as a result of which the lake flooded the manor (Hupel 1782, pp. 331–2).

The legend of the origin of Lake Valgjärv of Koorküla has inspired and influenced different scholars across the ages. According to a folktale, already in 1640 the local estate owner Wolfgang Heinrich von Anrep tried to find the lost treasure at the bottom of the lake, summoning divers from Russia for the task. The divers allegedly brought up tin, copper, and wooden household objects, although after the discovery of a costly find they secretly left with it. According to some records, the number of divers called by von Anrep reached ninety and local people were also incorporated, who partly fled to Russia together with the divers (see Hupel 1782, pp. 331–2; Rambach 1818, p. 200). While this number of divers seems unrealistic, the endeavour could have still been monumental and therefore it has found its place in the oral tradition.

The first expedition of divers collecting finds from the lake was followed by several new local inspections by different researchers and other interested people in the subsequent centuries (Roio 2003, 2007). Serious research only started in 1958 with the expedition led by Selirand, which finally proved the presence of a pile dwelling at the bottom of the lake (Figure 2) (Roio 2006; Selirand 1960, pp. 270–2).



Figure 2: Getting ready for the first dive to the remains of the lake settlement in Lake Valgjärv of Koorküla in 1958. AI fk 6795 Valgjärve.

Neolithic settlement

A part of the remains of wooden construction in the bottom of the aforementioned lake derive from the Stone Age. Sherds of Late Combed Ware were discovered by Selirand on a survey trip to the lake in 1984, during which he found a total of twenty-seven sherds that may possibly belong to one and the same vessel. The fragments were found in the western part of the main structural remains (Selirand 1986, p. 2). Proof that the pole remains belonged to the same period as the pottery that had been discovered was provided after an analysis of the timber samples. According to the radiocarbon and dendrochronological dates, the Neolithic settlement site derives from approximately 3300–3200 cal BC (see Roio 2007; Virtanen 2012).

The Pre-Roman Iron Age

In 1989, two samples for ^{14}C analyses were taken from the unmapped pile group lying 40 m to the northeast of the main building remains investigated, whereby the results suggest the period of the 4th–2nd centuries BC (Roio 2003). Subsequently, two dendrochronological dates have been obtained from samples taken in 2003, which offered 313–246 BC as a result (Virtanen 2012). Thus, researchers have now collected sufficiently trustworthy dates to indicate activity in the later 1st millennium BC. This part of the underwater site has rarely been studied, and finds that would correspond to the above dates have not been detected, aside from a single metal ring that is supposed to originate from the same period (see Virtanen 2012, p. 64).

2nd half of the 1st millennium AD

The next settlement stage has been dated by both radiocarbon and dendrochronological analyses — as well as find material — to the 7th–9th century (Roio 2003, 2006, 2007; Virtanen 2012). The building remains of

this period have been most thoroughly studied and published. In addition, the remains of a bridge running from the western shore of the lake to the north-western corner of the construction remains have been ascertained (Selirand. 1990, p. 3). Hand-moulded pottery from the 2nd half of the 1st millennium AD is the most numerous group of finds from the pile dwelling, with a total of more than 300 fragments (Roio 2007, p. 29). Until now, the only wooden artefact from this period is a hook, which is probably connected to forest-based apiculture. The shaft of the wooden hook has a hole in it and a groove in its inner side. The excavations of Āraiši lake settlement yielded three main components of the lifting construction used in the forest-based apiculture: a hook, a beekeeper's swing and a climbing rope (see Apals et al. 2001, 324–6, fig. 226).

The research questions of Lake Valgjärv of Koorküla

During the long research history of Lake Valgjärv of Koorküla, it has never been questioned that there are underwater building remains in the bottom of the lake. This was conditioned by the fact that the construction remains could be observed from the boat while riding on the lake. The main question in the 19th century was whether the remnants were historical manor ruins or remains of prehistoric pile dwellings. Since the latter were — according to Grewingk — out of question at our latitude, the research focus of Selirand — who led the expedition in 1958 — was also to either ascertain the existence of manor ruins or prove that the story had been fabricated (Selirand 1958). After the fieldwork of Selirand, the main interpretation of the pile dwellings of Lake Valgjärv of Koorküla was that there is a unique 6th–7th century fortified settlement in the lake (e.g. Jaanits et al. 1982, p. 266; Selirand 1986, p. 352). Even the adding of comb ware sherds to the find material in 1984 did not prompt discussions of the possibility of a Stone Age pile dwelling in the lake. According to Selirand, the water level of the lake was considerably lower during the Neolithic and the habitants found a suitable camp site on the peninsula that extended to the lake but was later inundated (Selirand 1986, p. 353, 1994). The results of the timber samples already taken by the Estonian Maritime Museum in 1989 — adding pole remains from the Pre-Roman Iron Age to the finds — were only published for the first time in 2003 (Roio 2003).

The archaeological material from Lake Valgjärv of Koorküla has remained relatively one-sided compared with the other wetland settlement sites, especially if the fact is considered that the lake has been used for living during three different periods. Apparently, the long so-called research history of the lake that — according to written sources — started in 1640 by removing artefacts from the bottom of the lake and continued for several centuries has its part to play. On the other hand, until now no excavations have taken place by the groups of poles that are located a little further from the visually observable structure. Only the ends of these poles stick out from the lake bottom.

Kunda prehistoric lake

In the 1870s, marl started to be mined for the cement factory of Kunda and during the course of the works prehistoric bone artefacts were dis-



Figure 3: Kunda Lammasmägi. Photo: Maili Roio 2013.

covered. A wide lake approximately 4 km long and 1–3 km with a low water level existed here on the place of modern mining area and its surroundings during the first half of the Mesolithic. The Kunda Lammasmägi settlement site — which gave its name to the Mesolithic Kunda Culture — is located in the south-eastern corner of the former lake and is stretched across an area of 100×70 m (Figure 3). The settlement site on the island in the former lake was discovered by C. Grewingk, who organised a test excavation here in 1886. The lake probably already swamped in the Mesolithic and peat was partly formed on the occupation layer of the settlement site. These peat layers created good conditions for the preservation of bone and antler artefacts, whereby spearheads, harpoons, arrowheads, ice picks, adzes, awls, axe heads, etc. were found. Stone tools and debris from their production were also gathered from the settlement site. The artefacts found on the bottom of the lake were interpreted as tools lost while fishing (see Grewingk 1882; Jaanits et al. 1982; Kriiska and Roio 2011).

Based on animal bones, dates that cover a long time span from 8700–4950 cal BC (Åkerlund et al. 1996, p. 266) and the location of the site, fluctuations in the water level and the character of occupation layer, it has been suggested that Lammasmägi was inhabited seasonally, whereas in different periods the site might have been used in different seasons (see Lõugas 1996, p. 290; Moora 1998, p. 65).

In the course of mining, jewellery from the Middle Iron Age (450–800 AD) and a strike-a-light were found. They were suggested to derive from a wealth deposit (Jaanits et al. 1982, p. 283). In the course of excavations in the Kunda swamp, mainly pine and oak poles were found, which were interpreted as fishing weirs (Grewingk 1886, pp. 179–80, 1887, pp. 167–8). The first stakes were found in Kunda swamp in autumn of 1885. The find was described by professor Grewingk based on samples and information sent to him by the director of the Kunda cement factory Viktor Lieven. The stakes were revealed in the northern part of the former lake, situating up to 2 m from each other. Sodden and friable stakes were 1–1.3 m long. One of the pine stakes sent to Grewingk was 110 cm long and with a diameter of 6 cm. The delivery also included a 50 cm long and 45–55 cm thick oak branch (Grewingk 1886, pp. 77–9).

Other piles were unearthed during the mining in the summer of 1886, when Grewingk himself was at the site and made notes about the find. According to the description, many wooden piles probably used in fishing were found in the northern part of the mining area. He counted altogether ten groups of stakes, which as a rule were located not very tightly next to each other and ran in two rows separated by 1.2–2 m. The longest pile found from the marl was 180 cm long. Grewingk included an example of an unearthed stake with the length of 57 cm and diameter of 6.2 cm. In addition, poles as thick as an arm that barely stuck out from the swampy soil also in two rows were allegedly detected on the shore of the neighbouring lake of the Mõisa swamp (Grewingk 1887, pp. 166–7).

In spring of 1936, the local people found a timber trackway of vertical logs in the swamp (the swamp below Lammamägi), which connects Lammasmägi to the surroundings ('Virumaal leiti püstpalkidest muinastee' 1936). In the same and the next year, Richard Indreko carried out archaeological excavations at Kunda Lammasmägi, although unfortunately he could not confirm the existence of a bridge or a trackway during his fieldwork.

In 1949, archaeological excavations led by Lembit Jaanits took place on the headland in the north-eastern pouch of Lake Kunda. The find material gathered from the 10 m long and 2 m wide excavation pit was very scarce, including only a molar tooth of an herbivorous animal and a fragment of a grinding stone. In addition, ends of stakes were found at a depth of 15–25 cm, which — as L. Jaanits suggested — were hewn with an iron axe. Jaanits chose the location of the excavation by using phosphate analysis. Since only a few archaeological finds were gathered from the excavation, Jaanits supposed that the high phosphate content of the soil on the eastern shore of the prehistoric lake was connected with the Iron Age or later habitation (Jaanits 1949). He neither presented the number, location or measurements of the stakes nor discussed their function in the report.

The research questions of the prehistoric lake of Kunda

The finds unearthed during the mining activities of the prehistoric lake of Kunda are treated in archaeological literature as stray finds. In other words, we are dealing with artefacts lost while fishing. At the same time, it should be taken into account that not all finds were noticed during mining and only the most remarkable artefacts were collected. In addition to fishing tools, the find material includes other artefacts like an arrowhead, wild boar fang, and angle points with slanting edge (see Grewingk 1882). Moreover, the Stone Age stray finds from Lake Peipsi were relatively recently still regarded as artefacts lost while fishing. In fact, we are mostly dealing with find material from inundated Stone Age settlement sites and in some cases also burial sites (see Roio et al. 2016).

However, the identification of find material and stakes is problematic. It can neither be confirmed nor refuted that the piles and finds were located together. It should be taken into account that large areas were not opened at the same time and it cannot be determined whether the two rows of stakes were observable at once with a few more rows added in later years or if the rows of stakes were well-defined groups forming clearly demarcated structures. Unfortunately, these questions cannot be answered, although it is clear that many groups of stakes could be found in the marl mining area in Kunda and at least some could have originated

from the same period as the Stone Age finds. Some of the pole remains could also be connected with the potential Middle Iron Age habitation; for example, the piles found during the excavation led by Jaanits rested only at a depth of 15–25 cm and had probably been hewn with an iron axe.

We still know relatively little about the early settlement of the prehistoric lake of Kunda as a whole. The last investigation at the Stone Age settlement site of Kunda Lammasmägi took place in 2014 and the most recent in-depth research was completed in 2014 as the master's thesis of Kristjan Sander (see Sander 2014). In his study, Sander emphasises the need to proceed from the investigation of Lammasmägi to the micro-regional archaeology of the prehistoric lake of Kunda and the discerning of different phases in the habitation of the settlement site based on the find material from Lammasmägi and the stratigraphy of the site. He also stressed that uniting these into a new, more complete picture — finding correlation between other settlement sites of the Kunda prehistoric lake and the habitation phases of Lammasmägi — requires extensive fieldwork in the future (Sander 2014, p. 4). Without new fieldwork, the character of the groups of piles in the prehistoric lake of Kunda cannot be clarified.

Lake Tamula

There is a Stone Age settlement site on a small low cape on the western shore of Lake Tamula in south-eastern Estonia that in archaeological literature has come to be known as the Tamula I settlement site. The Tamula I settlement site was discovered in 1938 by accident by a local photographer Ida Kepnik, who — while looking for her lost ring — found single bones from the shallow beach water. The discovery aroused her attention and she started to systematically collect finds, gathering a couple of large boxes full of various bones and artefacts (Indreko 1939).

The Tamula I settlement site was archaeologically excavated in 1938 and 1942–1943 under the leadership of Indreko, in 1946 by Harri Moora and in 1955–56, 1961, 1968 and 1988–89 by Jaanits, whereby altogether 650 m² of the site has been excavated (e.g. Indreko 1945, 1948; Jaanits 1984, 1988).

In the Tamula I settlement site, the occupation layer was formed directly on peat and later was covered by peat again, which indicates that a swampy area was chosen for living (Figure 4). Twenty-five burials were unearthed in the peat layer of the settlement site (Jaanits 1988, p. 218). Two archaeological cultures — Late Combed Ware and Corded Ware — are represented in the ceramic material. According to radiocarbon dating, the place was used as a dwelling and/or a burial site from 4600 to 2000 cal BC (see Kriiska and Roio 2011, p. 62).

Piles of pine, black alder, and other kinds of trees were found in Tamula, which were interpreted as the remains of light above-ground dwellings (Jaanits et al. 1982, p. 82; Jaanits 1984, p. 184). The piles are concentrated in the lakeside part of the settlement site. The ¹⁴C analyses of a pile from the occupation layer gave the result of 3600±180 cal BC (Lõugas 1996, p. 407). Unfortunately, the exact find spot of the pile used for the sample could not be located.



Figure 4: Tamula I settlement site. The shore of the lake is still swampy. Photo: Maili Roio 2007.

Research questions

The small cape chosen for the settlement was freed from water in the Atlantic period and peat started to form on it. During the dry Subboreal period, the water level in the lake further decreased, thus making the area suitable for living. At some point, the water level rose again and inundated the tip of the cape. The water destroyed part of the occupation layer and a number of artefacts ended up in gyttja (Jaanits et al. 1982, p. 78). It was ascertained that archaeological finds can be detected as far as 15 m from the shore (Ots and Roio 2013).

The piles in Tamula were interpreted as belonging to the above-ground dwellings, although not a single ground plan of a dwelling has been successfully detected. During the time of habitation, the site was rather a damp area. In these cases, dwellings on piles were used at the time, similar to those that we now know from Lake Valgjärv of Koorküla, one of the settlement phases that coincides with the habitation period of Tamula.

Summary

The dim view taken in the 19th century about the possibility of finding pile dwellings has later significantly hindered the locating of respective sites and the interpretation of piles. Unfortunately, only one-sided information about groups of stakes in Kunda and Tamula has preserved, which allows no final conclusions. Alas, the researchers of the site have not considered it necessary to describe the find context of the piles with sufficient accuracy. However, we should pay attention to the problem in the treatments completed so far.

Lake Valgjärv of Koorküla was already periodically used as a dwelling site since the Neolithic, whereas always one and the same part of the lake was used. The northern part of the Kunda prehistoric lake yielded plenty of groups of piles, which were regarded as the remains of fishing weirs. Assemblies of piles were also found in the neighbouring swamp. Considering the find context of the piles — i.e. the depth of their location — it was

suggested that the majority of the stakes unearthed in the 19th century belong to the Stone Age. As a supporting argument for the usage of the poles as fishing weirs, it was highlighted that the diameter of some of the piles was approximately 6 cm. Unfortunately, we only know the diameter of a couple of stakes and one oak branch, in case of which it is unclear whether identifiable traces of working were discerned at all. In addition to the problems with the interpretation of piles, it is also doubtful that the artefacts found during mining marl are accidental, e.g. lost while fishing. Considering the diversity of finds and the presence of piles and other wooden elements, it is more likely that at least a part of the prehistoric settlement layer was destroyed in the northern part of the lake.

A relatively large area has been excavated at the Tamula settlement site, although unfortunately the documentation of piles remained inadequate during the investigation. Moreover, it is hardly satisfactory to estimate the using time of the piles solely based on the radiocarbon analysis of a single pile.

All three discussed sites have a special status in Estonian archaeology with their long research history, although in the light of the research questions presented in the article the investigations conducted thus far cannot be regarded sufficient. All three sites require additional fieldwork, thorough analysis, radiocarbon and — if possible — dendrochronological dates to specify the periods of their using, as well as palaeogeographical reconstruction and association with the geological development of the waterbodies.

References

- Åkerlund, A., M. Regnell, and G. Possnert (1996). 'Stratigraphy and Chronology of the Lamasmägi Site at Kunda'. In: *Coastal Estonia. Recent Advances in Environmental and Cultural history*. Ed. by T. Hackens, S. Hicks, V. Lang, U. Miller, and L. Saarse. Rixensart: PACT Belgium, pp. 253–72.
- Apals, J., M. Atgāzis, J. Graudonis, I. Loze, Ā. Mugarēvičs, A. Vasks, and I. Zagorska (2001). *Latvijas senākā vēsture 9.g.t.pr.Kr.-1200.g.* Riga: Latvijas vēstures institūta apgāds.
- Engelmann, J. (1866). 'Vortrag über Pfahlbauten'. In: *Sitzungsberichte der gelehrten Estnischen Gesellschaft zu Dorpat 1866*, pp. 1–4.
- Grewingk, C. (1879). 'Archäologische Mittheilungen, Pfahlbau in Arrasch'. In: *Sitzungsberichte der Gelehrten Estnische Gesellschaft 1879*, pp. 175–77.
- (1880). 'Zur Pfahlbautenfrage Liv-, Est- und Kurlands'. In: *Sitzungsberichte der Gelehrten Estnische Gesellschaft 1880*, pp. 47–65.
- (1882). *Geologie und Archaeologie des Mergellagers von Kunda in Estland*. Vol. Bd. IX. Archiv für Naturkunde Liv-, Est- und Kurlands. I Serie. Dorpat: Verlag der Dorpater Naturforscher-Gesellschaft.
- (1886). 'Ein neuer archäologischer Fund im Mergel von Kunda'. In: *Sitzungsberichte der gelehrten Estnischen Gesellschaft zu Dorpat 1885*, pp. 177–80.
- (1887). 'Archäologische Ausflüge in Liv- und Estland'. In: *Sitzungsberichte der gelehrten Estnischen Gesellschaft zu Dorpat 1886*, pp. 153–77.
- Hupel, A. (1782). *Topographische Nachrichten von Lief- und Ehistland*. Riga: Verlag Johann Friederich Hartknoch.
- Indreko, R. (1939). 'Aruanne inspektsiooni kohta Võru Tamula järve kiviaja leiukohal 13. augustil 1938. a'.
- (1945). 'Märkmeid Tamula leiu kohta'. In: *Suomen Muinaismuistoyhdistyksen Aikakauskirja XLV*, pp. 26–43.

- Indreko, R. (1948). *Die mittlere Steinzeit in Estland. Mit einer Übersicht über die Geologie des Kunda-Sees*. Vol. 66. Kungliga Vitterhets Historie och Antikvitets Akademiens Handlingar. Stockholm: Wahlström & Widstrand.
- Jaanits, L. (1949). 'Aruanne arheoloogilistest kaevamistest Kunda järve ümbruses ja Lammasmäel 5.–26. juulini 1949. a'.
- (1984). 'Die kennzeichenende Züge der Siedlung Tamula'. In: *Iskos* 4, pp. 183–93.
 - (1988). 'Eesti sooarheoloogias'. In: *Eesti sood*. Ed. by U. Valk. Tallinn: Valgus, pp. 217–21.
- Jaanits, L., S. Laul, V. Lõugas, and E. Tõnisson (1982). *Eesti esiajalugu*. Tallinn: Valgus.
- Kriiska, A. and M. Roio (2011). 'Prehistoric Archaeology of Wetlands in Estonia'. In: *Wetland Settlements of the Baltic. A Prehistoric Perspective*. Ed. by E. Prancëkaitė. Vilnius: Center of Underwater Archaeology, pp. 55–73.
- Lõugas, L. (1996). 'Analyses of Animal Remains from the Excavations at the Lammasmägi Site, Kunda, Northeastern Estonia'. In: *Coastal Estonia. Recent Advances in Environmental and Cultural history*. Ed. by S. Hackens, V. Lang, U. Miller, and L. Saarse. Rixensart: PACT Belgium, pp. 271–91.
- Mäemets, A. (1968). *Eesti järved*. Tallinn: Valgus.
- Moora, T. (1998). 'Muistsete loodusolude osast kiviaja asustuse kujunemisel Kunda ümbruses. Loodus, inimene ja tehnoloogia. Interdistsiplinaarseid uurimusi arheoloogias'. In: *Muinasaja teadus* 5, pp. 11–151.
- Ots, M. and M. Roio (2013). 'Aruanne allveeuuringust Tamula ja Vagula järves. 21.–23. mai 2007'.
- Rambach, F. (1818). In: *Neue Inländische Blätter* 25, p. 200.
- Roio, M. (2003). 'Koorküla Valgjärves asuvate ehitusjäänuste retseptsoon ja tõlgendamise läbi aegade'. In: *Muinasaja teadus* 13, pp. 251–66.
- (2006). 'The investigation of underwater heritage in Estonia. Archaeological Research in Estonia 1865 – 2005'. In: *Estonian Archaeology* 1, pp. 301–310.
 - (2007). 'New Interpretations of Settlement Remains in Lake Valgjärv of Koorküla, Estonia'. In: *Journal of Wetland Archaeology* 7, pp. 23–32.
- Roio, M., A. Baburin, and A. Kriiska (2016). 'Archaeological survey in the northern and north-western parts of Lake Peipsi'. In: *Archeological fieldwork in Estonia 2016*, pp. 225–34.
- Sander, K. (2014). 'Kunda Lammasmäe kiviaja asulakoht'. PhD Thesis. University of Tartu.
- Schiemann, T. (1880). 'Über C. Grewingk Schrift'. In: *Baltische Monatschrift* 27, pp. 605–07.
- Selirand, J. (1958). 'Mida varjavad Valgjärve vood?' In: *Noorte Hääl* 16.
- (1960). 'Valgjärve arheoloogilise uurimise esialgseid tulemusi'. In: *Eesti NSV Teaduste Akadeemia Toimetised* 3, pp. 268–76.
 - (1986). 'Neue Funde aus dem See Valgjärv'. In: *Eesti NSV Teaduste Akadeemia Toimetised* 4, pp. 252–53.
 - (1994). 'Allveearheoloogias Eesti vetes'. In: *Amforad, vrakid, vette vajunud linnad*. Ed. by G. Lanitzki. Tallinn: Valgus, pp. 177–187.
- Speck, J. (1981). 'Pfahlbauten: Dichtung oder Wahrheit? Ein Querschnitt durch 125 Jahre Forschungsgeschichte'. In: *Helvetica Archaeologica* 45/48, pp. 98–138.
- Virtanen, K. (2012). 'Koorkülan Valgjärven vedenalainen muinasjäänösalue. Pro gradu-tutkielma. Helsingin yliopisto, Filosofian, kulttuurin ja taiteiden tutkimuksen laitos, arkeologinen oppiaine'. PhD Thesis. University of Helsinki.
- 'Virumaal leiti püstpalkidest muinastee' (1936). In: *Postimees*, p. 2.
- Weyrich, J. (1880). 'Die Pfahlbauten im Arraschschen See'. In: *Beilage zur Rigaschen Zeitung* 1880, p. 45.