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A SILVER COIN HOARD FROM ORIJÄRVI, KIHILINPELTO IN MIKKELI RURAL COMMUNE, PROVINCE OF SAVO, EASTERN FINLAND

Abstract

This article summarizes the preliminary results of archaeological excavation at Orjjarvi, Kihlinpelto in Mikkeli rural commune in Southern Savo [Savonia, Sw. Savolax]. In 1998 a Viking Age silver penny was found from Orjjarvi building project area. In the excavation of 1999 a total number of 114 (103 whole and 11 fragmented) Viking age silver coins were found from a late Iron Age and medieval dwelling site at Orjjarvi. 22 of the coins are English, 2 of them are Anglo-Scandinavian imitations, the only Arabic coin is a rare Uqailid, and the remaining 94 coins are of German origin. 5 coins remain unidentified. Also a piece of hack silver, a flat bird-shaped pendant made of bronze, a large fragment of a oval tortoise brooch, an iron shepherd's crook pin and a few sherds of Iron Age ceramic were found. Almost all the finds came out of the ploughed layer. A total number of 16 structures of different sort were excavated and documented.

Keywords: late Iron Age, coins.

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The aim of this article is to present the preliminary results of the Orjjarvi trial excavation which exceeded all expectations.¹ Among other finds and fixed remains, a silver-coin hoard was found in the fields of the Orjjarvi building project area. The importance of the hoard lies on the geography of the find, as it begins to fill a vast lacuna on the distribution maps of Viking Age and Crusade Period silver hoards (cf. Salmo 1948:32; Talvio 1978:xxvi). In this article, the environmental and archaeological description and conclusion are by Mikkola, who was also director of the excavation. The identification and dating of the coins are by Talvio.

The Orjjarvi building project area is situated in Mikkeli rural commune near Rantakylä in the vicinity of the Mikkeli city limits in the Southern Savo province [Savonia, Sw. Savolax] (Fig. 1).

The size of the area is ca. 30 hectares. The project plan of the area includes the construction of 200 to 220 new wooden detached and semi-detached houses for 600 inhabitants. The Orjjarvi land area is mainly in the possession of the Mikkeli rural commune, which is also responsible for the building project. The commune financed the rescue excavation.

The amateur archaeologists of Mikkeli took primary interest in the Orjjarvi area, noting a dense plant stand of dark mullein (*Verbascum nigrum*) in the yard of Peltoranta farm. The prominent centre of distribution of *Verbascum nigrum* in the Mikkeli region completely matches the picture provided by Late Iron Age sites and finds in this area (Uino 1997:163; Seppänen 1992:53-56).

Elementary school teacher Jukka Salminen took his pupils on a field-walking trip to the area

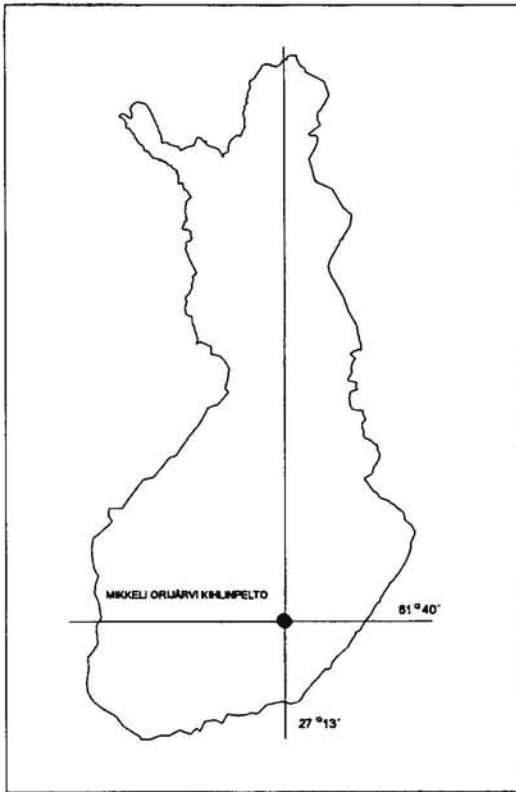


Fig. 1. The location of the Kihlinpelto site at Orijärvi.

in October 1998. The aim of the outing was to teach them how to look for archaeologically interesting field surface finds. They found mainly modern ceramics, slag and unidentified quartz flakes, but one of the pupils, Elmeri Backman, noticed a silver coin (CC 98062) on the surface of the field. The coin proved to be a German penny dating to the reign of the emperor Otto III in AD 983-1002. Owing to the development plans, the area had to be investigated.

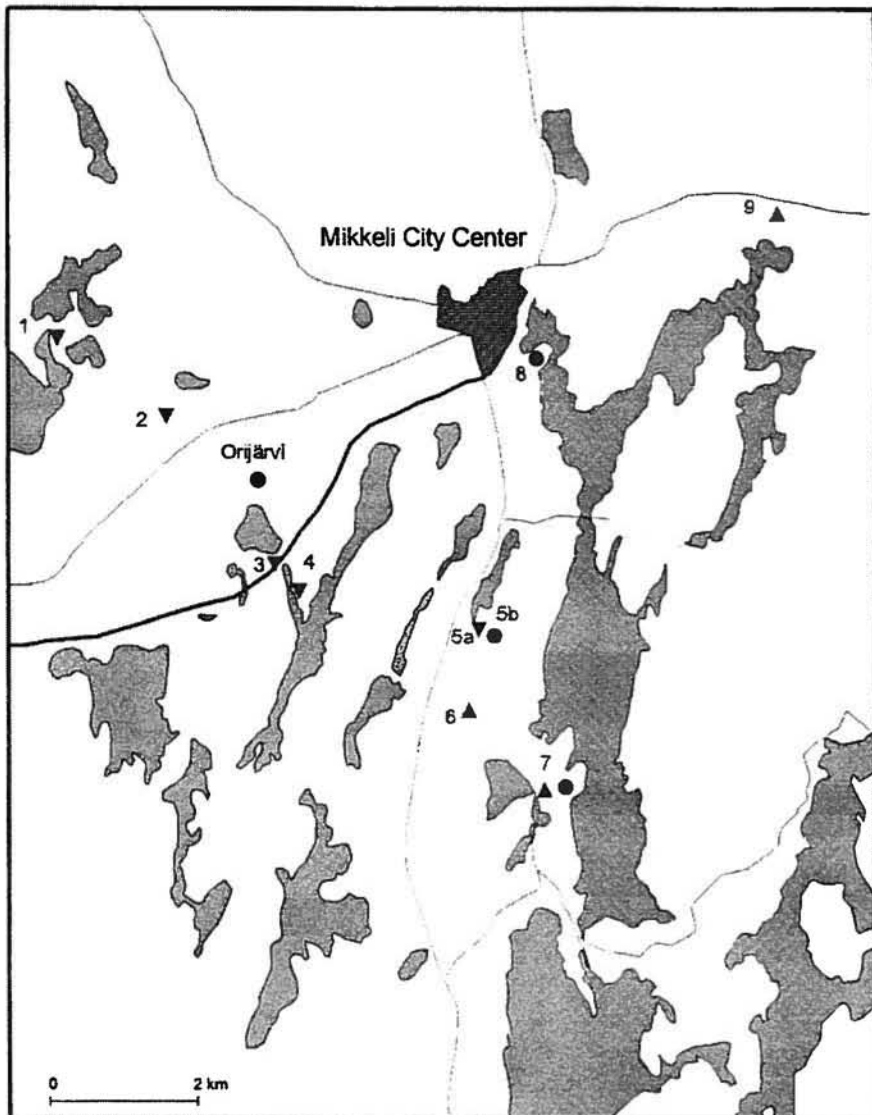
THE PHYSICAL ENVIRONMENT

The Mikkeli area belongs to the coniferous tree zone of Lake Finland according to the natural-geographical division. The landscape of the Orijärvi area is a typical example of the cultural landscape of the Southern Savo province with old open fields and meadows. The field area slopes gently to the south and southwest towards Lake

Orijärvi. The slope gradient is less than 5%. The difference in altitude between Lake Orijärvi and the northern part of the research area is 22 metres. The excavation site is situated at 102 metres a.s.l. where there is a terrace-like formation.

The soils of the project area are mainly fine sand and moraine. The thick humus layer mixed with clay or silt covers the fields. According to the construction survey, the thickness of the ploughed humus layer is 30 to 40 centimetres. Beneath that layer is a layer of fine sand. The thickness of the sand bed varies from 3 to 11 metres (Leinonen 1998:5). The soil of the forest areas is predominantly moraine. In the bedrock of the area there are alkaline rocks (amfibolite and gabro), which are an exponent of high nutrient content in soils (Nironen 1998:3).

The correlation between Iron Age sites (and even stray finds) with certain environmental variables has been noticed in some Iron Age studies (e. g. Taavitsainen 1987; 1990:72; Orrman 1991). Further analysis of environmental variable data with geographical information systems programs has proved to be an efficient yet inefficiently used method for predicting the location of Iron Age cemeteries, dwelling sites and ancient fields. The locations of Late Iron Age sites tend to correlate with variables such as nutrient-rich and arable soils, distances from lake- and river-shores and both declivity and orientation of slopes (cf. Kirkinen 1994; Mikkola 1996). The finest grained soil deposits are fine sand, silt and clay with mutual variations. Fine-grained soils are usually found in low-lying locations, as they are often result of transport by water. The soil's ability to absorb and hold moisture in it is also a decisive factor. Fine sand is considered to be well suited to arable cultivation, as it does not harden like silt when dry. The supra-aquatic moraine soils (above 105 metres a.s.l.) are suitable for slash-and-burn cultivation even though the moraine varies greatly in terms of fertility (Kirkinen 1994:41; Uino 1997:156; Taavitsainen *et al.* 1998:207). Clay absorbs water and is usually very rich in nutrients. Tilling the heavy clay soils requires technically advanced ploughs. Therefore, vast nutrient-rich areas in Western Finland were not taken into cultivation until the Middle Ages (Orrman 1991:3-21).



● Dwelling Site, ▲ Inhumation Cemetery, ▼ Stray finds / Cemetery finds (?)

1. Tyynelä
2. Rantala
3. Mäntyrinta
4. Ketunniemi
- 5a. Moisio Latokallio
- 5b. Moisio Latokalliionpelto
6. Tuukkala
7. Kyyhkylä, Porrassalmenpelto
8. Kenkäveronniemi
9. Visulahti

(Based on map in Lehtosalo-Hilander 1988, p. 16)

Fig. 2. Map of Kihlinpelto at Orijärvi and the most important Iron Age find locations in the central Mikkeli area. The lakes are marked in light grey. Drawing Minna Koivikko / NBA

THE FINDS AND SITES OF THE NEIGHBOURING AREAS

No Iron Age finds were known from the Orijärvi area before the year 1998. The nearest Iron Age find locations are situated within a radius of 1.5 kilometres from the Peltoranta dwelling site. These are Ketunniemi, Mäntyrinta and Rantala in the Rantakylä area. There are the sites of Tyynelä, Luukkola and Nikara in the Vuolinko area within a radius of 3 kilometres. The finds date from the Viking and Crusade periods. All the finds are presumably from cremation cemeteries, and no dwelling site finds are known from the vicinity of Orijärvi. This is typical of the whole Mikkeli area, which is well known for its inhumation and cremation cemetery sites. Iron Age dwelling sites are known from Porrassalmenpelto in Kyyhkylä and Kenkäveronniemi in the Mikkeli city area. The dwelling site of Latokallionpelto in Moisio dates from the 12th century to the 15th century AD (Schulz 1994:60). The discrepancy between settlement and cemetery finds is conspicuous and needs to be explained in further studies (cf. Taavitsainen 1992).

11th-century finds from Ketunniemi (Fig. 2):

Spearhead	NM 26918
Silver coin	NM 29618:1
Bronze belt buckle	NM 29618:2
Two weights	NM 29618:3, 4
Glass paste bead	NM 29618:6

The site is situated on a narrow cape jutting out of Lake Pitkäjärvi. In the west, the cape borders on Ketunlahti Bay where Lake Orijärvi flows into Pitkälahti Bay. The spearhead represents either Petersen's K- or M-types (Poutiainen 1992:103; Taavitsainen 1990:189-190). The silver coin is an Anglo-Scandinavian imitation of a *Long Cross Penny* of Ethelred II the Unready, dating from the 11th century (Talvio, personal communication 1999).

11th century finds from Mäntyrinta in Rantakylä (Fig. 2):

Spearhead	NM 15901:1
Battle-axe	NM 15901:2

The artefacts were found while clearing a building site. The silver ornaments of the spearhead have fused away. Parallel objects have been found

in burial cairn number 3 in Kyyhkylä (Lehtosalohilander 1988a:176-177).

11th-century finds from Rantala in Rantakylä (Fig. 2):

Spearhead	NM 11378:1
Battle-axe	NM 11378:2

The spearhead belongs to Petersen's type G and the battle-axe is of Petersen's type M.

Viking Age and Late Iron Age finds from Tyynelä in Vuolinko (Fig 2):

Two equal-armed brooches	NM 14146:1 and NM 15888
Two chain holders	NM 14146:3 and NM 24868:1
Two sleigh-bell pendants	NM 17042 and NM 24868:2

Both equal-armed brooches with 11 knobs belong to Kivikoski's Viking Age group 7, dated to the end of 10th century (Kivikoski 1938:20-24; 1973:93-94, Abb. 679). The find location has been characterized as a cremation cemetery (Lehtosalohilander 1988a:258; cf. Taavitsainen 1992).

The Crusade Period stray-finds from the Vuolinko area (Fig. 2):

Oval tortoise brooch	NM 24667
Glass paste bead	NM 29703

The oval tortoise brooch belongs to Ailio's type J (cf. Ailio 1922). Only four brooches belonging to this group are known from Finland (Tomanterä 1994:46).

The famous Crusade Period inhumation burial-ground of Tuukkala and the Late Iron Age find site of Latokallio in Moisio and the medieval dwelling-site of Latokallionpelto in Moisio are all situated at a distance of 4 kilometres southwest from Peltoranta. The Iron Age dwelling-site of Kenkäveronniemi is situated circa 4 kilometres ENE from Peltoranta. The distance between Orijärvi and Kyyhkylänniemi is 6 kilometres. The environment of the dwelling sites at Kenkäveronniemi and Porrassalmenpelto is strikingly similar to the Kihlinpelto site. The evidence from Orijärvi supports the view that consolidated Iron Age settlement in the Mikkeli area was established as late as the 11th century.



Fig. 3. An Uqaylid dirham from Barqaid, possibly dating from 998/9, and an Anglo-Scandinavian Æthelred imitation, probably from Sigtuna (nos. 1 and 25 in the catalogue). Photo Markku Haverinen /NBA.

STRUCTURES OF THE KIHILINPELTO SITE

The term *structure* refers to all archaeologically noticeable fixed remains which are made by human beings for specific purposes or anomalies which are formed as byproducts of the past activity of people. The term *formation* is reserved for structures and features caused by geological activity. In this case the plots of discoloured soil and patches of so-called cultural layer are included into the concept of structure. In sites where ploughing has demolished almost all the upper layers of the fixed remains and cultural layer, this usage of terms is justified.

A number of prominent structures were revealed beneath the ploughed layer. Structure 1 was a deep pit filled with sooty and discoloured soil and burnt stones. Structure 2 was an oblong rectangular plot of brown coloured mixed soil measuring 2 x 0.8 metres. The structure was some 40 centimetres deep. The orientation of the structure was W-E. There was a stone setting in the western end of the structure. The resemblance of the structures to inhumation graves was striking but only a piece of animal bone and a tiny fragment of a bronze kettle were found from the upper levels of this structure. They were discovered in the vicinity of the hearth-like feature. Some tiny fragments of burnt bone and a severely corroded iron nail or rivet were found in subsequent layers. Structure 3 was a small round setting of stones and some coloured sand. It can best be described as the remains of a stone-filled posthole. Structure 4 was a large almost round pit filled with burned large stones and dark brown coloured sooty soil. Structure 5 was a round pit with kettle-shaped bottom filled with coloured and burned soil. Structure 6 was a stone setting that had been seriously damaged by recent ploughing. The structure re-

sembles hearths found from other Iron Age sites. Structure 7 was a large oval shaped pit with stone setting in the middle of it. The structure consisted mainly of discoloured and dirty sand. The function of the structure may be connected with agrarian iron production. The interpretation and dating of the structures are problematic.

THE COINS: A PRELIMINARY REPORT

With the exception of a small find made at Hämeenkoski in Tavastia in 1996, the Orijärvi hoard is the first Viking-Age coin hoard reported from Finland since 1962.

Some 45 coin hoards from the period 800-1100 are now known from the present area of Finland. Nine of them are from Åland. On the mainland the hoards are mainly concentrated in Finland Proper and Tavastia, with fourteen (?) finds from both provinces. More than half of the hoards have been found before 1900, which explains why some of the information is uncertain.

Until the summer of 1999 only two hoards containing coins were known from Savo. The find made at Ritaniemi in Mäntyharju in 1829 was wholly lost, and although it probably belonged to the eleventh century, it does not seem to have been a typical coin hoard. The Säänjärvi find from Savitaipale (1911) consisted of four armlets, one round pendant and four Islamic coins, which also had been worn as pendants. Ornament hoards of this type are mainly known from Tavastia, where they belong to the eleventh century. The Savitaipale hoard may also have been concealed after rather than before 1000, although its numismatic *terminus post quem* is 976.²

The Orijärvi find can thus be seen as the first "typical" Viking-Age hoard from Savo. A full publication of its 115 coins is not possible here,

but the following list should give a picture of its general character.

The Caliphate

1. The Uqaylids, Barqaid, AH 389? (998/9?). See Zambaur 1968:71. Pierced. (Fig. 3).

Barqaid was situated near Mosul (Al Mawsil) in present-day North Iraq. The coin, which appears to be very rare, was identified by Gert Rispling in Stockholm, but its date could not be read from the photo. The reading presented here must be considered uncertain because of the poor condition of the coin.

England

Æthelred II (978-1016)

Crux type (c. 991-997)

2. Colchester, Wulfwine.
3. London, Ceolnoth. Pierced.
4. London, Edsige. Pierced.
5. London, Godric.
6. Stamford, Godwine. Large fragment.
7. Totnes, Ælfstan. Pierced.
8. York, Thurstan.

Long Cross type (c. 997-1003)

9. Exeter, Wulfsige. Pierced.
10. London (?), [Ead?]wold. Cut halfpenny.
11. London, Leofric.
12. London, Leo[——]. Cut halfpenny.
13. Northampton, Æthelnoth.
14. Winchester, Byrthnoth. Pierced.
15. York, Wengos.

Helmet type (c. 1003-1009)

16. Huntingdon, Sewine [Zeoine].
17. Lincoln, uncertain moneyer [——]. Fragment.
18. London, Æthelwerd.
19. London, Edwine.
20. Thetford, Manna. Pierced.
21. York, Outhgrim.

Last Small Cross type (c. 1009-1016)

22. Salisbury, Godwine.
23. Winchester, Wulfnoth [Wulnoth].

Scandinavia

24. *Long Cross* type “Chester”, “Elewne”. Same dies as Malmer 9.153.1139. Pierced.
25. *Long Cross* type, “E-style”. Same dies as Malmer 9.228.1398. (Fig. 3).

Germany

Verdun

26. Henry I (919-936, posthumous). Dbg 91, 91b; CNG 3.3.1; Salmo 3:1-5. Fragment.
27. Bishop Haimo (990-1024). Dbg 96; CNG 3.8.2.
28. Bishop Haimo, CNG 3.8.3.

Metz

29. Bishop Adalbero II (984-1005). Dbg 11; CNG 9.13; Salmo 4:2. Pierced.
30. Bishop Dietrich II (1006-1047). Dbg 19B20; CNG 9.17; Salmo 4:3-5. Pierced.

Huy

- 31-32. Otto III (983-1002). Dbg 223; Salmo 13:1.
33. As above, variety with bust to left?

Maestricht?

34. Cf. Dbg 244.

Cologne

- 35-46. Otto III (983-1002). Häv. 34. (The coin found in 1998 is one of these.)
47. Henry II as king (1002-1014). Dbg 346; Häv. 156; Salmo 35:385.
48. Henry II as king. Dbg 355; Häv. 157; Salmo 35:386-389.

Soest

- 49-51. Otto III (983-1002). Häv. 849.
- 52-54. Otto III. Häv. 73 or 849; Ilisch 1990: p. 143.

Igel

55. Duke Theodorich (984-1026). Dbg 432; Salmo 37:1-3.

Dortmund

56. Otto III as emperor (996-1002). Dbg 744; Berghaus 7; Salmo 43:3-5.
57. Henry II as king (1002-14). Dbg 752; Berghaus 13 (obv. identical with 13b); Salmo 43:17-25. Cut half.
58. Henry II as king. Dbg 749; Berghaus 16; Salmo 43:11-16. Cut half.

Lüneburg

59. Duke Bernhard II (1011-1059). Dbg 589; Salmo 63:20-46.

Otto-Adelheid type

60-88. Hatz 1968: varieties II.4.c, III.6.h, III.7.c?, III.7.p, III?, IV.3.b var., IV.5.a, IV.5.b? (pierced), IV.5.u?, IV.5 (2), IV.5-6 (3), IV.6.y, IV.9, IV.10.d?, IV.10, IV.10 var., IV.17 var. (2), IV (4), IV?, IV-V (2); uncertain.

89. Slavonic (?) imitation of Otto-Adelheid type. Cf. Hatz 1991:Taf. 2.

Sachsenpfennige

90-95. Dbg 1330; Salmo 68:3-37. One of the coins is a large pierced fragment.

Mainz

96-100. Ottonian period, Dbg 778/9; Salmo 75:1-64.

101. Henry II (1002-1024). Dbg 788; Salmo 75:139-146.

102. Archbishop Willigis (975-1011). Dbg 802; Salmo 265-76.

Worms

103-104. Otto III (983-1002). Dbg 844; Salmo 76:7-44.

Strasbourg

105. Henry II as king (1002-1014). Dbg 915. Cf. Salmo 78:2-3.

106. Henry II as emperor (1014-1024). Dbg 920.

Augsburg

107. Bishop Bruno (1006-1029). Dbg 1025; Salmo 86:3. Pierced.

Regensburg

108. Henry IV as duke (995-1002). Cf. Dbg 1071; rev. identical with Hahn 25e2.³

109. As above. Cf. Hahn 25b1. Fragment.

Unattributed

110. Salmo 93:48.

Unidentified

111-115. Two of the coins are fragments.

Most of the coins in the find were struck around 1000 or a few years earlier, but there are also several German coins of Henry II (1002-1024) from various mints and one of Duke Bernhard II (1011-1059) from Lüneburg. At least one of the coins of Henry II has been struck after he became Holy

Roman Emperor in 1014. The *terminus post quem*, then, is 1014. The coin in question is, for the present, the latest Viking-Age coin known from Savo.

Apart from the Savitaipale hoard, all other datable coin finds from this province are relatively recent single finds from the Mikkeli area. They include one Abbasid dirham from 940-944 from Näreperlo (1973) and an unidentified Islamic fragment from Kenkäveronniemi (1997). There is also an English coin of Æthelred II from Sairila (found in the 1950s, reported in 1995) and an Anglo-Scandinavian imitation from Rantakylä-Ketunniemi (1996). A German coin from Porrassalmepelto (1991) was provisionally identified as an Otto-Adelheid penny but the attribution is not certain.⁴

The nearest parallels for the Orijärvi hoard can be found in Tavastia. The SysmäBVäärämaa hoard with its 98 coins was concealed after 1006, and the *terminus post quem* for the 137 coins known from the Asikkala-Pätiälä hoard is c. 1020. In all three finds the German coins account for some 80 percent. Their chronological composition is, however, less in agreement: in the Orijärvi find the percentage of eleventh-century issues is slightly over 30, in the two others it is around 10. Such differences between individual hoards are not, however, unusual, and it seems very probable that the early eleventh-century coin finds of Savo reflect contacts with Tavastia. The Karelian hoards (all from the ceded area) date mainly from the second half of the century.⁵

OTHER FINDS

A large part of the finds date back to the historically recorded times. A number of fragments of bronze, iron and lithic artefacts, sherds, daub and iron slag were recovered. Nails and rivets were recovered in large quantities. Most of these are undoubtedly from the historically recorded periods.

The finds of definite Late Iron Age date are a large fragment of an oval tortoise brooch, a flat bird-shaped pendant, a silver fragment of a penannular brooch and a shepherd's crook pin (Fig. 4). The fragmented oval tortoise brooch belongs to Ailio's H-type dating to the Crusade Period (cf. Ailio 1922; Kivikoski 1973:133, Abb. 1060). As pointed out by conservator Leena Tomanterä (per-

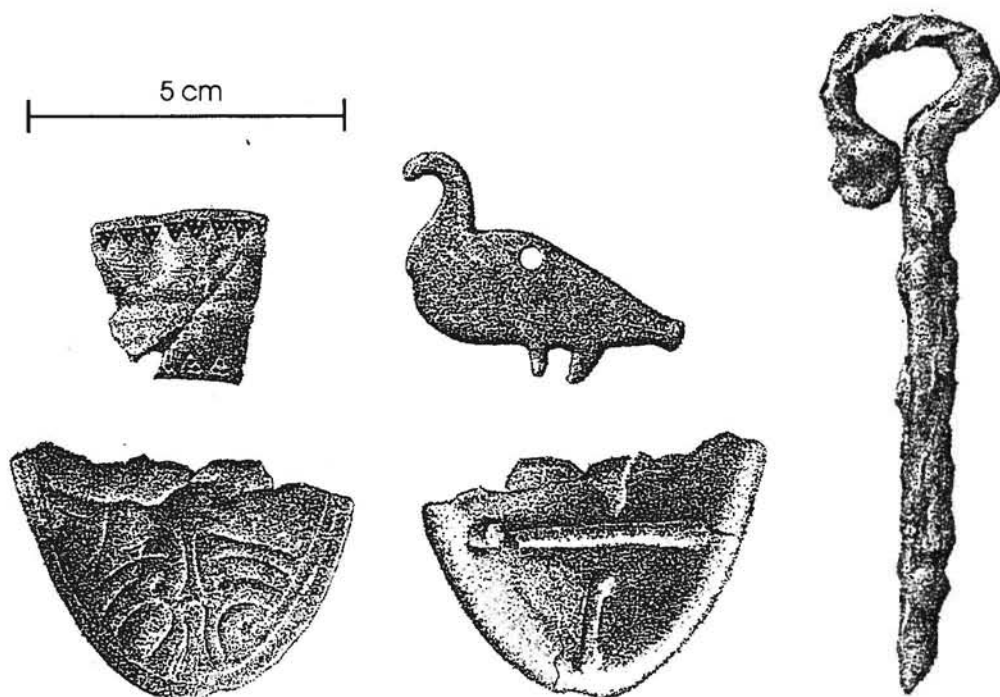


Fig. 4. Fragment of a silver ornament, a bird-shaped bronze pendant, a fragment of a bronze oval tortoise brooch (with obverse) and a shepherd's crook pin made of twisted iron rod. Drawing Mikko Rautala / NBA

sonal communication), the brooch was apparently cut off and flattened on purpose. This suggests that the metal were used secondarily. Type H is the most common type of oval tortoise brooches, as there are over one hundred specimens from Finland and ceded Karelia. One third of all known H-type brooches are from Mikkeli area. Another concentration of H-type brooches is in the Ladoga Karelia (Tomanterä 1992:102; 1994:44). The flat bird-shaped pendant of bronze has no exact parallel among the Finnish find material. It resembles flat bird-shaped pendants from the Western Finland but the Orijärvi, Kihlinpelto pendant is conspicuously smaller and especially the neck of the bird is shorter (cf. Kivikoski 1973:108, Abb. 791). No exact parallels have been found in the Karelian or Russian material (Uino, personal communication 1999).

A shepherd's crook pin made of iron was found with a metal detector in the northern part of Peltoranta field. The pin is 108 mm long. The diameter

of the flat loop is 30 mm. It is made of twisted iron rod. The shepherd's crook pin was a common artefact form in Western Finland. The shepherd's crook pin is a Baltic ornament type and the oldest ones are from Early Roman Period (Ranta 1996:43). It was mainly used in the Merovingian Period but some scholars date its use as late as to the Viking Age (Lehtosalo-Hilander 1982:108; Ranta 1996:42). There are 47 specimens of the variant with the twisted rod in the collection of the National Museum. These all are from the Western Finland. The pin may have been used either with men's cloaks or in women's clothing. Large pins could also have been used for holding the head of flax or wool when spinning thread with a spindle (Ranta 1996:43; Luoto 1992:80, Sepänmaa 1996:29-30). Even though the pin from Orijärvi, Kihlinpelto is not a typical one, it cannot be given this interpretation, as it appears to be far too small for spinning purposes.

SUMMARY

Kihlinpelto in Orijärvi is a typical Late Iron Age site in many respects. The silver hoard makes it special as nearly four decades have passed since the last silver coin hoard of this scale was found in Finland. The hoard was the first silver-coin hoard known from the entire province of Savo. Even though the Orijärvi find is without any parallels in the Savo area, it is not the only silver find from the Mikkeli area. A silver hoard has been found in Mikkeli area in Aittosaari, Kokkokallio (NM 11564:1-2). The find comprises two massive silver pins (Lehtosalo-Hilander 1988a:179-180).

A total number of 16 structures were recorded beneath the ploughed layer. One of the structures may well be an unfurnished inhumation grave. Although the dating of the structures is undetermined, it is quite clear that the place was occupied during the Late Iron Age. The ceramic material indicates the continuity from prehistory to the historically recorded periods.

The site displays both topographical and structural similarities with the Late Iron Age dwelling site of Virala at Janakkala in Southern Häme. The obvious interpretation of the site is that it is a dwelling-site dating from 11th century to historically recorded times. The silver coin hoard has apparently been hidden on the site in the end of the Viking Age or in the beginning of the Crusade Period (*tpq* AD 1014). The person responsible for the hiding the treasure might have been a local trader, but the silver might also have been collected for smelting. On the other hand the hoard from the hill-fort of Kapatuosia ("Cappadocia") in Hollola comprises circa 335 tiny coin fragments and is therefore of different nature than the hoard of Kihlinpelto. It was most certainly meant to be smelted (Talvio 1982:36).

But are the excavated structures of the same age as the unquestionably prehistoric objects? Has the splendour of the finds overwhelmed the excavator's critical thinking and forced him to conclusions that are too easy? These questions cannot be answered until there are radiocarbon dates of the structures. The formation processes should also be taken into consideration. If anything, the case of Orijärvi shows the need for proper archaeological investigations at single coin-find sites where the topography and vegetation are favourable for Iron Age settlement.

NOTES

1. This article deals only with the excavations of the year 1999. Excavations at Kihlinpelto site in Orijärvi were continued in the summer of 2000, and 21 more coins were found, now making the total number of coins of the Orijärvi hoard 136. Furthermore, the easternmost ancient field known in Finland was uncovered. The finds from the ancient field point to the Iron Age. Grains were found in connection with the field and it is probable that 14C dates will be available in the near future.
2. Both finds will be included in a presentation of the coin finds of Finland from the period 800-1200 (Talvio, forthcoming). See also Lehtosalo-Hilander 1988:181.
3. See Talvio, forthcoming.
4. See Talvio, forthcoming.
5. See Talvio 1978: xxvii-xxxii and Talvio, forthcoming.

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