THE ARCHAEOLOGICAL INVENTORY WORK IN SPURILA, PAIMIO, COMPARED WITH RESULTS OBTAINED BY PHOSPHATE MAPPING IN THE SAME AREA

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Since the objective of this article is to investigate the correlation between the results obtained with phosphate mapping and with traditional archaeological methods, the article has been divided into sections demarcated by the anomalies in the phosphate analysis.

The prehistoric remains and single finds have been entered on the map in fig. 1. and identified alphanumerically; these identification codes will be used for reference hereafter.

Anomaly 1

This chemical anomaly revealed by the analysis is situated at 16—18 m above sea level; and one other outlying location is at 9 m above sea level.

If the outlying locations are disregarded, then the area covered by the anomaly was still below sea level at approximately 1000 BC (Glückert, 1976, appendix 1), and this excludes the possibility of the anomalous phosphor levels dating from the Stone or early Bronze Ages. If it is assumed that the outlying locations are linked to the anomaly area proper, then at least part of the area emerged above sea level in the Early Roman Iron Age (ca. 0—200 AD) (Glückert, 1976, appendix 1). One possible source of error in this argument is presented by erosion , which may have caused disturbances in the development near the bank of the river.

It is known from historical sources that a mill used to be situated very close to the anomalous area, but since the plot of land where the mill stood is still marked on the map in the southern section of the investigated area (see fig. 1 in the previous paper by Terho) it can be excluded as a source of the anomaly.

The foregoing discussion therefore suggests that Anomaly 1, like the majority of the other phosphate anomalies in the Spurila area, originated in the Iron Age.

Anomaly 2

The most extensive anomalous site in terms of phosphate levels within the area investigated consists of two hillocks surrounded by field, together with the intervening strip of field (see Terho, fig. 1). This anomaly includes burial sites C and E, and settlement F (see Fig. 1).

Burial site C is situated at the highest point of a small hill rising from field terrain,

adjacent to a small outcrop of rock. This burial site is mound-shaped, but not symmetrical enough to be a burial mound proper. When peat was removed from an area of approx. 40 × 40 cm, tightly packed stones were revealed, with a certain amount of fired clay and Iron Age pottery in the interstices. The site was accordingly interpreted as an Iron Age cremation-cemetery.

Parts of the burial ground E and the dwelling site F were investigated during 1982—1983. Burial ground E proved to be a cremation-cemetery including sections dating both from the Roman Iron Age and the Migration period (AD 0—550). The section of the dwelling site investigated has tentatively been dated in the Migration period (ca. AD 500). No traces have been found at these sites of later Iron Age burials or settlement.

The terrain at the location of Anomaly 2 is thought originally to have consisted of a single esker-shaped formation surrounded by fields, and this would help to explain the elongated shape of the anomaly together with its present location extending from one hillock to another. Although consideration must be given to the possible impact of historical era activity in raising the phosphor levels, the absence of dwellings suggests that this would have been of minor importance. Anomaly 2 must therefore have come into existence mainly in conjunction with the two burial sites, C and E, and the settlement at site F.

Anomaly 3

Both in the archaeological inventory carried out in 1983 and in the test excavations made in 1984, the traces of human activity at the site proved highly complex. The area covered by the Anomaly includes a Stone Age settlement, an Iron Age burial complex consisting of several linked sites, and a rich cultural layer originating within the historical era.

Traces of a Stone Age settlement have been found both from the eastern slope of the hill and from underneath burial ground A. A test dig was carried out on the slope, but no conclusive evidence of settlement was found other than the objects found, since the cultural stratum had become mixed with strata deriving from later stages of settlement. Underneath the burial ground, on the other hand, there was a surprisingly distinct cultural stratum. The pottery finds indicate that this settlement belonged to the late stage of the Comb Ceramic culture, the period of Äyräpää Style III: 1 (ca. 2800—2600 BC).

In the investigations carried out in 1984, it was established that burial ground A comprised a cremation-cemetery dating from the Roman Iron Age and the Migration period (AD 100—500).

Burial ground B has been identified as late Iron Age by means of a probe excavation. Below the vegetation (grassy peat), there was dark soil, which in places contained soot and chips of charcoal. Other items found from this layer included burnt bone, Iron Age pottery, partially-melted glass beads, and fragments of bronze objects. The pottery is late Iron Age, with geometrical designs (ca. AD 1050—1150).

In the historical sources, two hamlets are mentioned in the vicinity of the anomaly, i.e. Spurila and Sattela. A cultural stratum from the historical period uncovered in excavations to the east of burial grounds A and B is part of the remains of Spurila hamlet, while Sattela was located to the west of this hill. The locations of the two hamlets are marked on the map (fig. 1) in accordance with cartographical information dating from 1779.

The cultural layers found in the various excavations were not always distinguishable

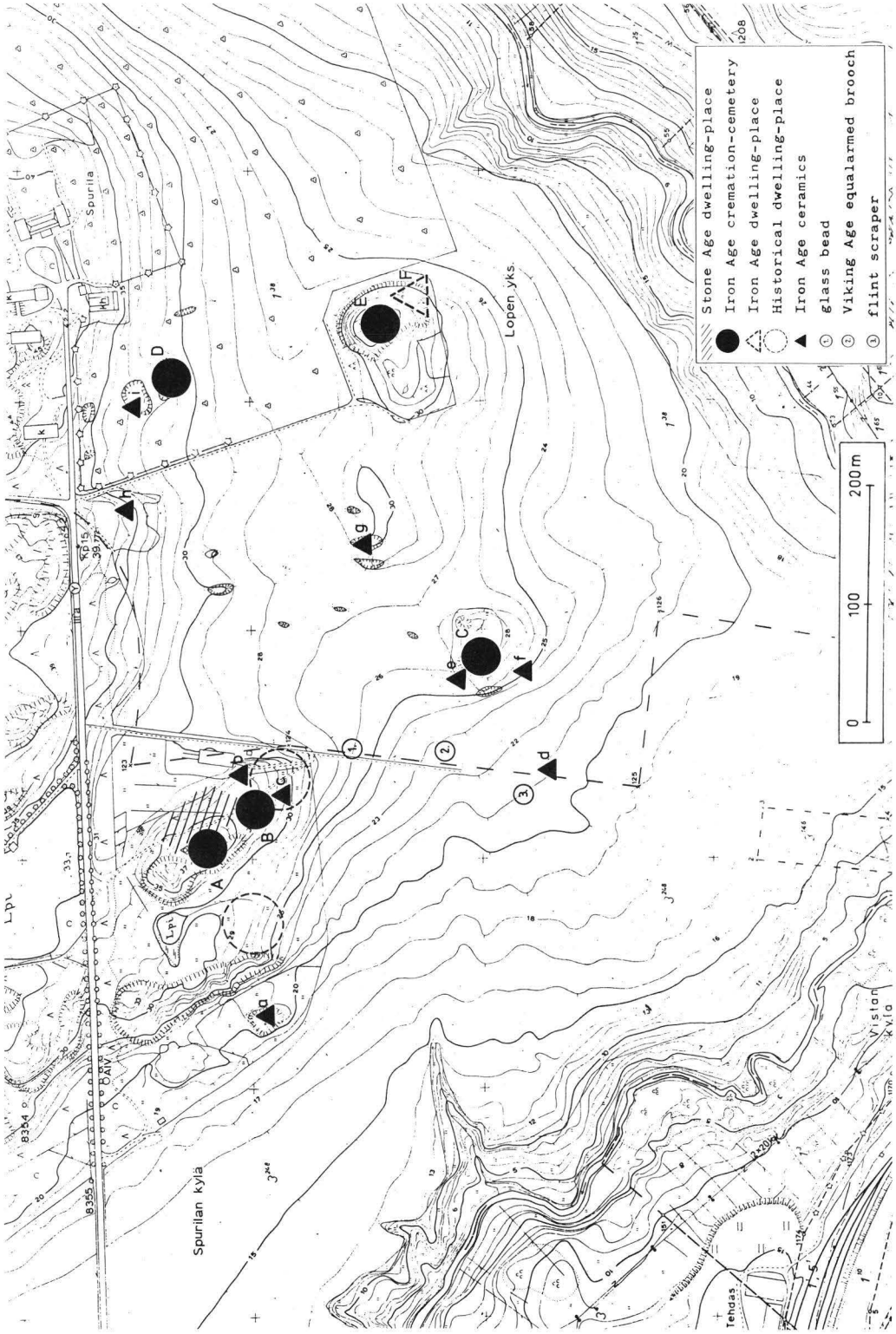

Fig. 1. Situation of the sites located by using traditional archaeological methods in Spurila, Paimio.

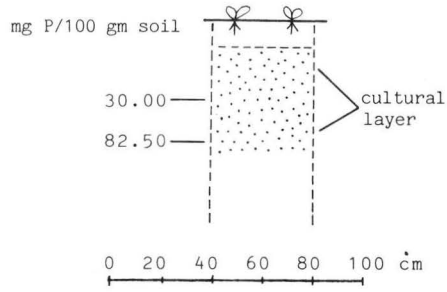

Fig. 2. Cultural layer in test-pit 590/430, that appears to be a single stratum. The phosphate content is however rising in the lower part of the layer.

from each other visually: in places, Stone Age chippings, Iron Age pottery, and brick were all uncovered within what appeared to be a single stratum. It seems that what obtains at locations such as these is a kind of 'gliding' stratigraphy: despite the apparent homogeneity of strata, it was noted that chippings were typically found at the bottom, while finds dating from later periods were higher up.

Chemical analysis also reveals differentiation within apparently homogeneous strata, the tendency being for phosphate content to rise as one penetrates deeper into cultural strata (fig. 2). This is due to the 'gliding' stratigraphy phenomenon mentioned, rather than to phosphor being washed down into lower layers; the reasons for the greater phosphate levels deeper down is that the impact of the Stone Age remains is greater at the lower levels. The differences in phosphate content are the result of differences in the phosphor enrichment resulting from different forms of human economic activity, as was recognized by the originator of phosphate analysis, Arrhenius (1935, p. 66 and 69).

At one site excavated, two distinct cultural layers were discovered, separated by what was interpreted as a clean layer of soil. Here too, however, the tendency for phosphate levels to increase with increasing depth also obtained, and even within the layer of soil taken to be clean, the phosphate content was considerably higher than in the cultural layer above it (fig. 3). This case appears to represent not an error in observation but an example of phosphor enrichment of a stratum visually indistinguishable from ordinary soil. In chemical terms, therefore, this layer must be seen as cultural, even though it was impossible to identify it as such by means of archaeological visual methods.

In considering the variations in phosphate content occurring with remains from different periods, however, it is clear that burial grounds form an exception, since the levels of content found here are not directly dependent on economic activity in the way applicable to settlement sites. At Spurila, the majority of high phosphate content locations are linked precisely with cremation-cemeteries. Even where the burial ground

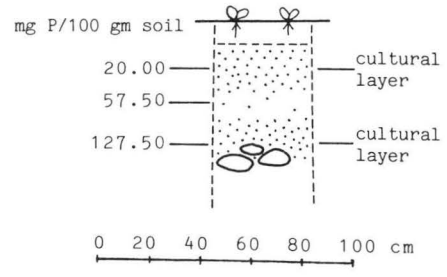

Fig. 3. Cultural layers in test-pit 600/430. The phosphate level is increasing with increasing depth even within the layer of soil taken to be clean.

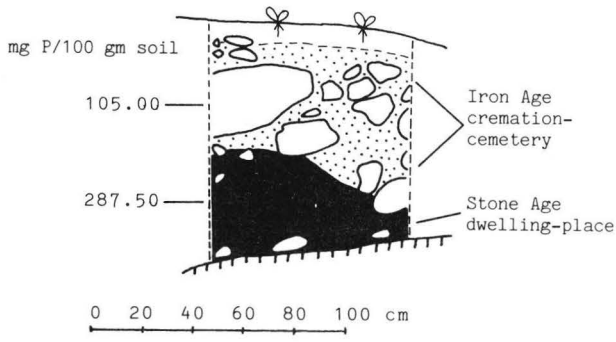

Fig. 4. A Stone Age settlement-layer situated underneath burial ground A. The phosphate contents show that the two layers are different also in chemical terms.

levels are clearly distinguishable from those of Stone Age settlement (as at burial ground A: see fig. 4), the phosphate content values are surprisingly high.

The analysis of Anomaly 3 on the basis of phosphate mapping alone would have led to fatal misinterpretation. It is in fact probably justified to state that the interpretation of any such complex area by phosphate analysis alone is impossible, no matter how close together and how carefully the samples are taken. Cultural strata of different dates can be observed with this method, but not demarcated. Anomaly 3 came into being as the combined result of the activities pursued in conjunction with a Stone Age settlement, the two Iron Age cemeteries A and B, and the historical-period hamlet of Spurila, while the most westerly situated points may be connected with the historical hamlet of Sattela.

Anomaly 4

The eastern section of the Anomaly is clearly linked with burial ground D (see fig. 1), all the sample points with divergent readings being grouped together around a small outcrop of rock in an apple orchard.

Burial ground D has been taken to be the remains of an Iron Age cremation site, and has been confirmed as such by means of a probe excavation. The excavation revealed dark, stony soil, containing both burnt bone and Iron Age pottery.

During the 1950s, a sword, bent in two places (TYA 223: 1082), was found in the apple orchard, but lack of precise information makes it impossible to locate this find on the map. The sword dates from the later Iron Age (ca. AD 600—1150), and clearly originates from a cremation-cemetery, since it had been bent in the grave. This sword presumably is connected with burial ground D.

A find of pottery relating to the western section of the Anomaly was made at location h (see fig. 1) in conjunction with taking a phosphate sample. The find included burnt bone, fired clay, and Iron Age pottery; these finds have however not as yet been definitely linked to a burial ground nor to any other specific prehistoric site.

Most of Anomaly 4 would therefore seem to have come into existence as a result of Iron Age activity. Its eastern section is linked with burial ground D, probably in conjunction with the use of the cremation site; there ar no traces of settlement in the area. The small surface area of the eastern section of the Anomaly, and its concentration around the burial ground, suggest that this was indeed a burial ground with no settlement in the immediate vicinity.

Conclusions

It has been shown that the phosphate mapping carried out in the area under investigation correlated very highly with the location of Iron Age prehistoric remains. With one exception, in Anomaly 1, high phosphate levels were found to be associated with cremation-cemeteries.

The depth used for taking samples (ca. 30—40 cm) proved appropriate for establishing differences in phosphate content level. Neither variation in the granular calibre of the soil, nor the effects of artificial fertilization, were found to affect the results obtained at Spurila, since the taking of the samples from beneath the cultivated layer prevented the impact of recent added phosphor content being reflected in the samples. A small source of error in the phosphate mapping was however increased phosphate content as a result of settlement within the historical period.

Both the archaeological inventory, and other findings, indicate that settlement in the Spurila area has continued uninterrupted from the older Roman period through into the historical period. Human activity and settlement in the area is however older, since a Stone Age settlement was located on the site of burial ground A and on the slope to the east of this during the late Comb Ceramic culture (ca. 2800—2600 BC).

During the Roman Iron Age, two distinct settlements were in existence. Since there are no traces at burial ground E of continued settlement during the later Iron Age, it may be assumed that at least one of the burial grounds C or D belonged to the same settlement which had earlier used burial ground E. This conclusion is reinforced by the fact that burial continued on the hill where burial ground A is located into the later Iron Age, at burial ground B. The hypothesis is therefore proposed that burial grounds C and D date from the later Iron Age.

The major problem faced in reconstructing the pattern of Iron Age settlement at Spurila concerns the location of the dwelling sites. Concrete traces of dwelling sites have so far only been identified in the vicinity of burial ground E (dwelling site F). As with the burial ground at E, it is possible that dwelling site F terminated with the older Iron Age. At present, therefore, no traces of later Iron Age dwelling sites have been identified at Spurila at all. Unless Anomaly 1 proves to be this late Iron Age settlement, therefore, both phosphate mapping and traditional archeological inventory will have failed to locate the dwelling sites. Nevertheless, the results of phosphate mapping in the Spurila area may be considered adequate evidence of the efficiency of this method in locating prehistoric remains.

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