LANDSCAPE ARCHAEOLOGY

EKETĖ IRON AGE AND EARLY MEDIEVAL HILL-FORT SETTLEMENT COMPLEX. AERIAL ARCHAEOLOGY AND REMOTE SENSING

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Abstract

Current advances in science allow us to survey and investigate archaeological sites without destroying them. This article presents the results of integrated archaeological research in the Eketė locality. The object of study is the Iron Age/Early Medieval hill-fort and ancient settlement complex. The aim of the research is to recreate the development of the formation of the hill-fort and settlement using widely applied non-destructive remote sensing methods of landscape archaeology: the analysis of aerial photographic images and geophysical prospecting research data.

Key words: aerial archaeology, landscape studies, geophysical prospecting, remote sensing, hill-fort settlement complex.

Introduction

Non-destructive archaeology

Current advances in science allow us to survey and investigate archaeological sites without destroying them. Aerial photography and geophysical surveys belong to the non-destructive or remote sensing methods (Renfrew, 1998, p.96). Article 3 of the European Convention on the Protection of the Archaeological Heritage writes: “Non-destructive methods of investigation are applied wherever possible” (Bardauskas, Karčiauskas, 1997, p.10).

This article presents the results of integrated archaeological research in the Eketė locality. The object of study is the Iron Age/Early Medieval hill-fort and ancient settlement complex. The aim of the research is to reconstruct the development of the formation of the hill-fort and settlement using widely applied non-destructive remote sensing methods of landscape archaeology. This article is based on a presentation about the research into the Eketė hill-fort and settlement that was given in 2006 October at an international seminar on maritime landscape studies in Tallinn in Estonia.

Research into Lithuanian hill-forts

The hill-forts in Lithuania comprise only a small part of the huge tract of fortifications spread throughout Europe in prehistoric and early historic times. They began to be researched according to more or less scientific methods at the beginning of the 20th century. Throughout the course of a century, out of the 993 hill-forts in Lithuania (some of which are already destroyed), 184 have been researched to some extent (a total area of approximately 10,000 square metres). However, only the research material from about 27 hill-forts has been published (Kulikauskas, Zabiela, 1999, p.149-158; Zabiela, Baubonis, 2005, p.4, 6).

In the context of the scientific interpretation of hill-forts from archaeological material, it must be noted that several themes dominate in Lithuanian archaeological historiography. Perhaps the most widely elucidated theme concerns the evolution of hill-forts and their fortification constructions. Much attention in research literature is also paid to the archaeological material from hill-forts that is associated with commerce, trade and crafts (Daugudis, 1977; Zabiela, 1995). Archaeological data about hill-forts is used very much in the localisation of certain places or castles mentioned in written sources from the Middle Ages, in archaeologi-

cally oriented cultural-historical interpretations based on historical events, as well as in discussions on ethnic-cultural boundaries (Gimbutas, 1963, p.148-154; Daugudis, 1978, p.18; Zabiela 1995, p. 163, 164).

In the opinion of this article's author, the application of landscape archaeology's remote sensing methods in analysing known archaeological data from hill-forts enables other new angles of approach in viewing hill-forts. All of this allows researchers to better understand this cultural-historical phenomenon, and to explain it in a more understandable way to the broader public.

Research methods and sources of information

Looking at the current view of hill-forts and at general features that unite one or another group of hill-forts, it is difficult to find and understand them. Aerial photography makes it possible to see hill-forts from another angle, and shows the full view of the photographed object. This is much more informative than the typical hill-fort description, map or photograph taken from the ground.

As is known, modern aerial archaeology is not limited only to the photography of known archaeological objects, or to the search for new archaeological sites. It is a scientific method of research by which most of the time is spent in deciphering and interpreting aerial photographic images. In addition to oblique aerial photographs taken from a plane, archival vertical aerial photographs taken for cartographic purposes and digital satellite imagery were also used. As is indicated by the practice of such research, aerial photographic data is often combined with geophysical research data (*Archäologische Prospektion*, 1996).

Unpublished archaeological research report material from 1972 (Merkevičius, 1972; 1974) and the 1998 morphological research results of the hill-fort settlement's cultural layer (Jarockis, 1998) were used in the investigations of the Eketė archaeological site complex. Also employed were black and white vertical aerial archive photographs from 1958, as well as coloured oblique aerial photographs from 2003 and 2005, along with geophysical research results obtained from the hill-fort settlement in 2006.

Some of these above-mentioned investigations were performed as part of international projects. These were the 1998-2001 project "Cultural Clash or Compromise: Europeanization of the Baltic Sea Area", financed by Sweden's National Bank (Blomkvist, 1998) and the 2004-2007 project "European Landscapes: Past, Present, and Future", financed by EU Culture 2000 (Musson, Bewley, 2007). The 2006 geomagnetic research was financed by Klaipėda University, and was carried out by Martin Posselt (Posselt&Zickgraf GbR) and Dr Immo Heske of Göttingen University, Germany.

The investigations of the Eketė hill-fort and ancient settlement

The locality's setting and physical-geographical characteristics

The Eketė (Kalotė) hill-fort and settlement (A412KP) are in the Klaipėda district, in the Sendvaris area, seven kilometres inland from the Baltic coast, by the confluence of the Danė-Akmena river and the Eketė rivulet, approximately 12 kilometres to the northeast of its mouth in the Curonian Lagoon (the modern city of Klaipėda) (Plate I:1).

The hill-fort is surrounded by the Eketė valley (now dammed) to the east, south and west. Before the building of the dam, the slopes of the rivulet were steep, reaching a height of eight or nine metres. The hill-fort's levelled summit is in the shape of an irregular quadrangle, 110 metres long from east to west, and 105 metres wide from north to south. A semi-circular, 130-metre-long and eight to nine-metre-high rampart is on the northern edge of the flat hilltop. Beyond it, the remains of another four ramparts have been detected. The entrance to the hill-fort castle gate was near the end of the eastern rampart. The ancient settlement was on the eminence to the north-northeast of the hill-fort; it covered an area of two to three hectares (Plate I:2).

The Eketė (Akute, Akitte, Ackete) locality was mentioned in historical sources for the first time in 1253, and later in 1285 in a partition of land between the Livonian Order and the archbishop of Riga. The Eketė locality is marked on a 1775 map of East Prussia. It is also known from historical documents that the Eketė manor was situated near the hill-fort in the 18th century, and that a watermill was built on the Eketė rivulet (Merkevičius, 1974, p.15-19; LAA, 1975; Jarockis, 1998, p.67-68; Žulkus, 2004, p.89-90; Zabiela, Baubonis, 2005, p.414-415).

An archaeological expedition by the Lithuanian Institute of History, headed by Algimantas Merkevičius, investigated the Eketė hill-fort and settlement in 1972. Four plots, of which the total area was 180 square metres, were excavated in the hill-fort. A trench-profile (60 square metres) was dug in the area of the ditches and ramparts, on the southern edge of the hill-fort; the southeast and northeast foot of the hill-fort was surveyed (44 square metres); and a 30-square-metre plot of the settlement's southeast part was excavated. In all,

Fig. 1. Oblique photograph of Eketė from 2003: 1 settlement; 2 hill-fort

a 314-square-metre area of the Eketė archaeological site was excavated that year (Merkevičius, 1974, p.15-16).

The hill-fort

Plots no 1 and 2, covering 60 and 40 square metres, are in the northeast corner of the hill-fort's levelled summit, near the northeast edge of the rampart. Rectangular post constructions were uncovered at a depth of 40 to 50 centimetres below the current ground surface; they constituted the remains of a four to five-metre-wide and ten-metre-long building. The 100-milimetre-diameter posts were laid out in three rows. They were dug into the undisturbed bed and surrounded by rocks. Poles were piled up between the posts. This is evidenced by the triangular cross-section's pieces of clay plaster. A great many pieces of iron dross, broken iron artefact fragments, several small pieces of crucibles, and parts of iron knives and scythes were found in the building area. According to the archaeological finds, it is believed that this had been the workshop of an artisan who worked with iron. The building has been dated to the second half of the first millennium or the beginning of the second millennium AD. A Roman coin (a Liucilla Augusta sestertium) dated to the second century AD was found in the area of the building, as were iron and bronze roughouts or half-finished products, iron tools, whetstones, unworked pieces of amber, glass beads, many bronze artefact fragments, an iron weight, and an iron rivet.

Plots no 3 and 4, each covering 40 square metres, are in the central and southwest parts respectively of the hill-fort's levelled summit. Not many artefacts were found in plot no 3: an unidentified Roman coin, fragments of a scythe, a knife, a rivet, and bronze ornaments. The artefacts found in plot no 4 were hafted iron knives, spindle whorls, whetstones, fragments of bronze ornaments, a forged iron nail, an iron roughout, many pieces of unworked amber, and modelled clay potsherds.

A trench three metres wide and 20 metres long was dug in order to try to understand the structure of the earthen fortifications to the north and behind the large rampart. The trench was oriented north-south, at a slight angle to the west (343º). Four places with small ditches and three ramparts between them were uncovered at a depth of 1.2 to 1.6 metres from the present ground surface. One hundred and fifty archaeological finds dating from the beginning of the first millennium to the beginning of the second millennium AD were found during the excavation (Merkevičius, 1972).

The settlement

An ancient settlement that covered an area of two to three hectares was situated on a rise north-northeast of the hill-fort (Fig. 1). A map and the approximate boundaries of the settlement were established in the fall of 1972, at which time the settlement was ploughed up.

Fig. 2. Archival vertical photograph of Eketė from 1958: 1 settlement; 2 hill-fort; 3 manor.

Signs of the cultural layer could be seen in the ground in a 130 to 140-metre-wide north-south veering tract, and in a 60-metre-wide tract on the northern edge of the settlement, as well as in a 180 to 200-metre-wide tract at the southern end of the settlement near the hill-fort's ramparts. A cultural layer that reached one metre thick was found at the settlement.

In an effort to determine more accurately the boundaries of the extent of the hill-fort settlement's cultural layer, 44 boreholes were drilled in 1997 in an approximately six-hectare area to the north and northwest of the hill-fort. The boreholes were drilled with a manual geological drill, and spaced at 20 to 30-metre intervals. Based on the data obtained from the drillings about the cultural layer's thickness and intensity in the hill-fort's settlement, it was determined that a continuous cultural layer, albeit partially destroyed from ploughing in some places, with numerous pieces of clay plaster, spread across a 480 by 140-metre area north and northeast of the hill-fort, in all covering an area of more than six hectares. From the frequency of the boreholes, made every 30 to 50 metres, it is evident that the central part of the settlement was opposite the hill-fort from the northeast side, where a 30 to 70-centimetre-thick cultural layer, distinguished from its surroundings by its intensity, was found (Jarockis, 1998, p.67).

A geophysical survey that covered a 50 by 122-metre area was conducted in 2006 in the south of the hill-fort's settlement, across from the hill-fort (Plate I:3). A fluxgate magnetometer Förster Ferex 4.032 DLG. was used for the survey. It was determined that the magnetic anomalies are concentrated in the central part of the settlement across from the hill-fort, as well as in the settlement's northern part near the slope. Signs of structures that had been laid out parallel to each other can be traced opposite the hill-fort from the view obtained from the magnetic anomalies. It is conjectured by the passageways that orderly constructed rows of buildings could have been here. The passageways are oriented in the direction of the hill-fort (Plate II:1).

Research data analysis

The hill-fort

By taking photographs at certain intervals of time, it is possible to observe a hill-fort's physical condition and to record disturbances to it. Many hill-forts have survived to our days partially destroyed by water or wind erosion. An analysis of vertical 1958 archive photographs used in aerial archaeology showed (Fig. 2) that the view of the hill-fort has changed markedly in the last 50 years. Without a doubt, most damage to the hill-fort occurred with the dam that was built across the Eketė rivulet in the 1970s. Practically one third of the hill-fort was demolished by water erosion in its aftermath (compare with Plate I:2).

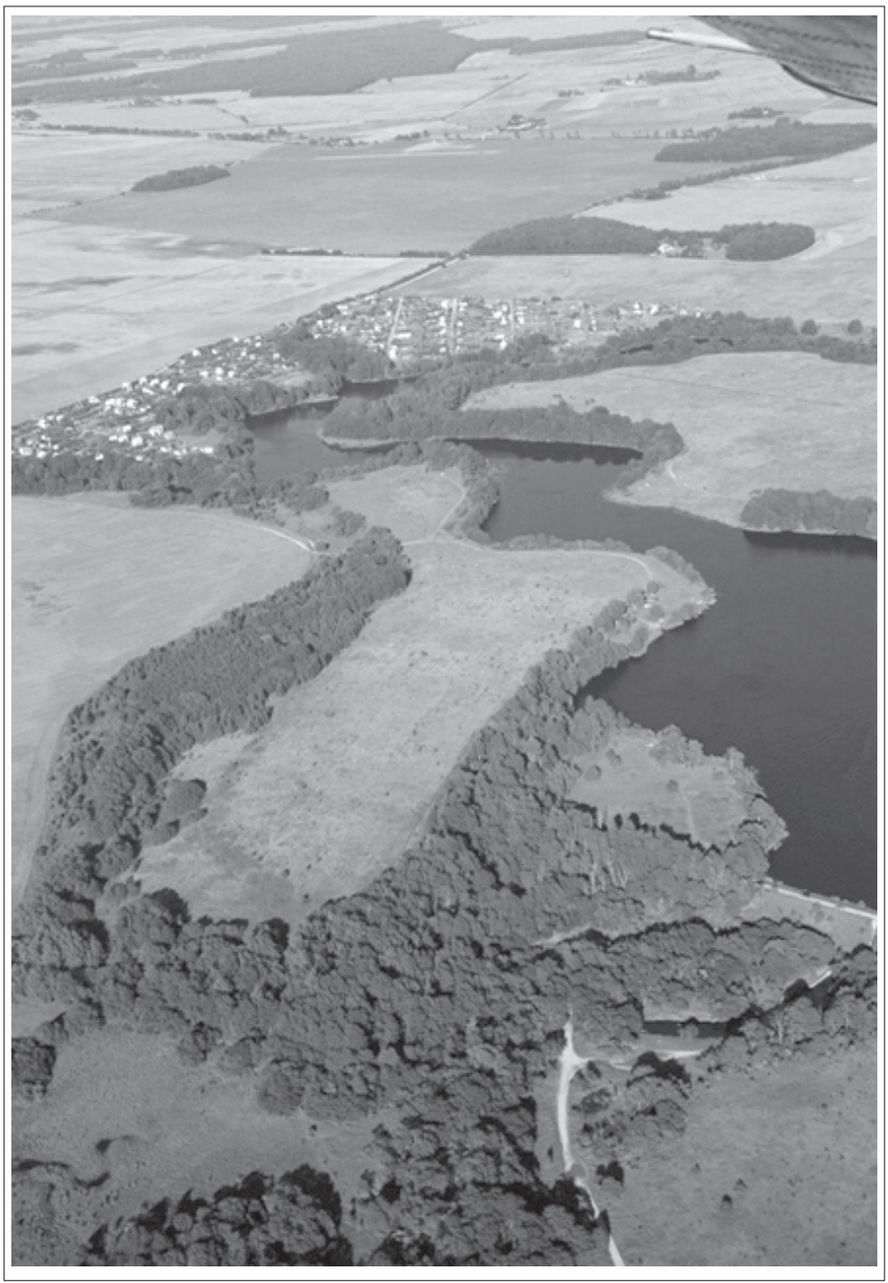

Fig.3. Oblique photograph of Eketė from 2005. The arrow points positive cropmarks, possibly indicating the settlement's fortification ditch.

The settlement

During a survey of the ploughed up settlement in 1972, it was observed that the settlement's western edge ends at approximately the northwest corner of the hill-fort. It almost corresponds to the small rise noted in the soil at the western edge, where there is an approximately 0.5-metre-high terrace. The northern edge of the settlement rests on a rather deep ravine, at the bottom of which flows a stream. It appears that the eastern edge of the settlement was separated from the remaining high part of the settlement by a ditch. Its remains are currently comparatively clear at the settlement's northeastern edge. Here, an approximately 20-metre-wide and approximately one-metre-deep depression can be seen in the surface of the soil. It narrows and grows shallower to the south, so it is not very clear along the southeast edge of the settlement (Merkevičius, 1972).

The land of the hill-fort's settlement has been uncultivated and unploughed for a good ten years. This cannot be seen in an aerial photograph taken in the spring of 2003; however, an aerial photograph taken in the summer of 2005 recorded a semi-circular tract, approximately five to six metres wide and 100 metres long, in the western and northern parts of the settlement (Fig. 3). According to the methodology of established archaeological features in aerial photographs, a darker tract of vegetation such as this is ascribed to positive vegetation indicators. This means that the undisturbed bed in this area has, in fact, been disturbed, presumably by the digging of a ditch. The collation of the survey

The hill-fort's original shape is clearly visible in the archive aerial photograph. According to the photograph, the hill-fort is ascribed to the coastal type of hill-forts, with an oval levelled summit that was encircled by a rampart all the way round. The most recent archaeological literature still mentions that the hill-fort's levelled summit is in the shape of an irregular quadrangle (Zabiela G., Baubonis Z. 2005, p.414), while the rampart encircles the levelled summit in a semi-circular shape.

research with the aerial photographic data suggests that when the hill-fort's settlement thrived, earth and timber fortifications, and unprotected sides, were surrounded by a rampart and a ditch.

The manor

Aerial photography allows us the possibility to record not only one site, but entire complexes of sites. Hill-forts, just like other sites in the past, never existed singly. They appeared and developed in particular contexts, alongside other features of the cultural landscape from the same or from different times. Some previous ancient castle sites, as places of habitation with more or less expressed features of urbanisation, continued to exist in the Middle Ages. As wooden castles in hill-forts declined in the 14th and 15th centuries (Zabiela, 1995, p. 182), the function of the central point in country localities was gradually taken over by manors (Miškinis, Šešelgis, 1965, p. 218).

It is known from historical documents that from the 18th century a watermill that belonged to the Eketė manor stood at the east foot of the hill-fort. The east part of the levelled summit, closer to the large rampart, was dug out when building the dam on the Eketė rivulet for the manor's mill. The foundation of this mill and the remains of the dam are at the east foot of the hill-fort. The manor itself was founded southwest of the hill-fort, on the other bank of the rivulet. The manor's remains were discovered in the 1958 archive aerial photograph. The manor seemed to consist of a U-shaped yard that was surrounded by buildings on three sides (Plate II:1). It burned down at the end of the Second World War.

Conclusions

Aerial photography is widely used nowadays in many European countries in the determination of cultural heritage sites, and their protection and monitoring, and when collecting information for monument protection about known features, and when searching for new archaeological sites. The application of remote sensing research in the survey of archaeological sites and their surroundings is taking its first steps in Lithuanian archaeology. Regarding hill-fort archaeology, it is clear that there is a problem. It is doubtful that traditional research methods only, that is, extensive archaeological excavations (as was mentioned in the article's introduction, 184 hill-forts have been investigated in Lithuania to date, and only about 15 per cent of the research material has been published), will allow us to find out any more about the actual hill-forts or about the people who constructed them.

The application of aerial archaeology non-destructive methods, by which aerial photographic images were used in the interpretation of the archaeological material in an integrated analysis of the Eketė hill-fort and settlement material, allows us to draw the following conclusions:

1. The hill-fort's condition has markedly deteriorated over the past 50 years. Approximately one third of the hill-fort was destroyed by water erosion by the dam.

2. The shape of the hill-fort's levelled summit and fortifications are incorrectly named in the archaeological literature. It is, in fact, a coastal type of hill-fort with a flat hilltop that is oval-shaped and that was encircled on all sides by a rampart. In its shape and environmental-geographical situation, the Eketė hill-fort is similar to the Impiltis hill-fort in the Kretinga district in northwest Lithuania.

3. On its unprotected sides, the hill-fort's settlement was fortified with a rampart and a ditch. Traces of these fortifications were observed in aerial photographs that were taken in 2005. According to the measurement data of the magnetic field, the hill-fort's settlement had a planned structure. This type of hill-fort and fortified settlement is very similar to one that existed in the city of Birka during Viking times on one of the islands of Lake Mälaren in Sweden.

4. According to the archaeological finds, amber was stored at the west, north and east sites during the Roman Period, while two Roman coins bear testimony to the trade in amber. Crafts existed at the hill-fort during the Late Iron Age: bronze ornaments were cast and iron was worked. Iron rivets found in the hill-fort's cultural layer indicate nautical navigation.

5. A manor, traces of which were found in an archive aerial photograph, according to historical documents was built alongside the hill-fort in the 18th century, which testifies that the Eketė locality's central function continued to be maintained. A small-scale archaeological survey within the locus of the manor would help determine when the manor was built.

6. Near the manor, at the foot of the hill-fort, was the dam of a millpond. A morphological analysis of the lowest sediment of the current millpond would test the premise that the dam on the Eketė rivulet also existed in prehistoric times.

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EKETĖ – GELEŽIES AMŽIAUS IR ANKSTYVŲJŲ VIDURAMŽIŲ PILIAKALNIO IR GYVENVIETĖS KOMPLEKSAS. AEROARCHEOLOGIJA IR NUOTOLINIS ŽVALGYMAS

Romas Jarockis

Santrauka

Šiuolaikinio mokslo laimėjimai leidžia žvalgyti ir tirti archeologinius paminklus jų neardant. Šiame straipsnyje pateikiami kompleksinių tyrimų Eketės vietovėje rezultatai. Tyrimų objektas – Eketės geležies amžiaus / ankstyvųjų viduramžių piliakalnio ir senovės gyvenvietės kompleksas. Tyrimo tikslas – rekonstruoti piliakalnio ir gyvenvietės formavimosi raidą naudojant kraštovaizdžio archeologijoje plačiai taikomus neardančiuosius nuotolinių tyrimų metodus – aerofotovaizdų analizės ir geofizikinių tyrimų duomenis.

Atliktas tyrimas leidžia teigti, kad piliakalnio gyvenvietė iš neapsaugotos pusės taip buvo įtvirtinta žemės pylimu ir grioviu. Gyvenvietės magnetinio lauko matavimo duomenys leidžia teigti, kad piliakalnio gyvenvietė buvo planinės struktūros. Šalia piliakalnio XVIII a. rašytiniuose šaltiniuose minimas dvaras sugriautas II PK metu. Jo tikslią buvimo vietą pavyko lokalizuoti archyvinėje aerofotonuotraukoje. Nedidelės apimties žvalgomieji tyrimai dvarvietėje padėtų nustatyti laiką, kada dvaras piliakalnio papėdėje buvo įkurtas.