Application of Alternative Methods in Lithuanian Field Archaeology (up to 1996)

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With the collapse of the Soviet system in Lithuania, restrictions on ideology and social activities were lifted. As far as archaeology is concerned, alternative methods in field research were adopted. These alternative methods involve the application of advances in technical science to archaeology. Though our research still follows the nineteenth century principles of excavation and find gathering, the twentieth century brought a number of new approaches which broadened traditional concepts of archaeology. In Lithuania, the latest techniques proved most successful when applied to site and artefact location, though excavation work was optimized as well. The following three methods will be highlighted: aerial photography, metal-detecting and biolocation (Fig. 1). All three methods involve no, or in the case of metal detectors, minimal damage to archaeological monuments. Though they enhance the exploration and research our cultural heritage, these methods are still controversial among Lithuanian scholars.

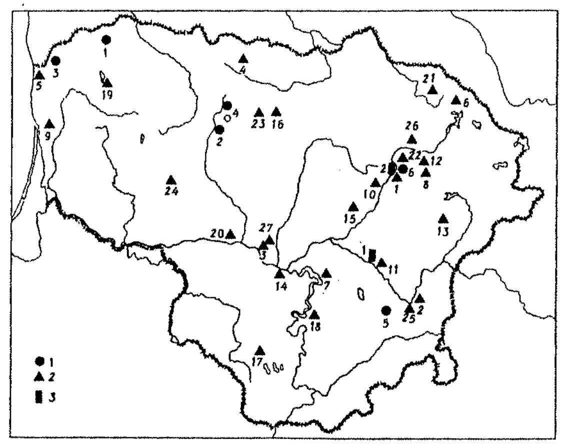

Fig. 1. Map of the application of alternative methods in Lithuanian field archaeology up to 1996: 1–aerial photography (1–Apuolė, 2–Bubiai, 3–Impiltis, 4–Lieporiai, 5–Senieji Trakai, 6–Šeimyniškėliai), 2–metal detector (1–Anykščiai, 2–Baniškiai, 3–Brūžė, 4–Budraičiai, 5–Būtingė, 6–Degučiai, 7–Dovainonys, 8–Gudiškiai, 9–Jakai, 10–Kavarskas, 11–Kernavė, 12–Kriokšlys, 13–Labanoras, 14–Marvelė, 15–Obeliai, 16–Pakalniškiai, 17–Pasimniai, 18–Paverkniai, 19–Plateliai, 20–Seredžius, 21–Skemai, 22–Šeimyniškėliai, 23–Vadaktai, 24–Varsėdžiai, 25–Vilnius, 26–Zoviškiai, 27–Žvirgždė), 3–biolocation (1–Kernavė, 2–Šeimyniškėliai) *(drawing by A. Zabielienė)*

Few attempts have been made to provide a detailed description of innovations in Lithuanian archaeology. P. Kulikauskas was the first scholar to deal with the subject (Kulikauskas 1978:86-100). Later, V. Ušinskas briefly reviewed the application of technical methods (Ušinskas 1979:24).

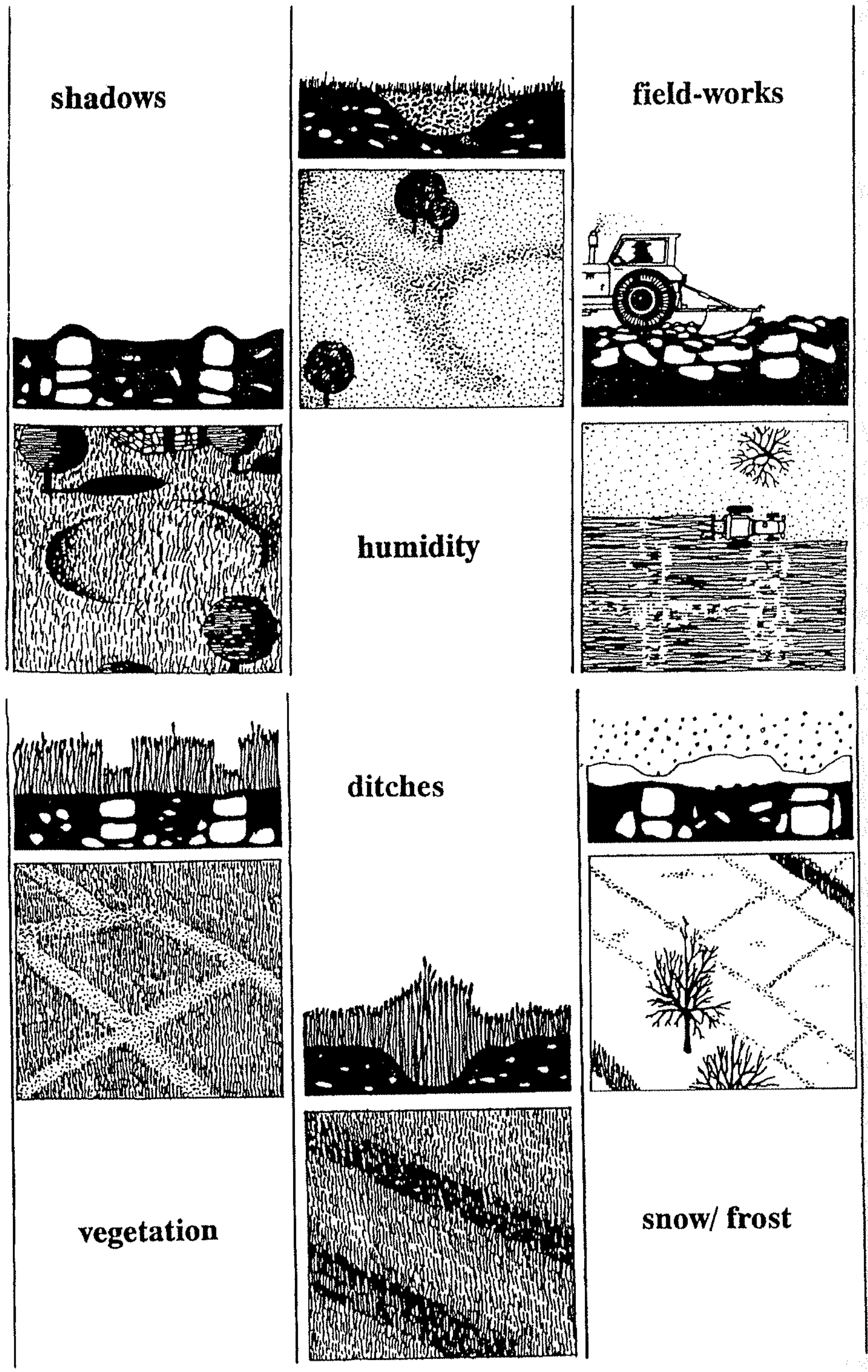

Fig. 2. The scope of aerial photography (Les indices revelateurs en photographie aerienne. In: *Dossiers de l'archéologie*. 1977, No. 22, p. 10-11).

Aerial photography is one of the most frequently applied methods in field archaeology. It reveals how subsoil strata and structures affect relief, flora and micro-climate (Fig. 2). These details can only be noted and recorded from a relatively remote point. The first aerial photographs were taken from a hot-air balloon in France in 1856 (Ebert 1977:173). However, this technique was introduced into archaeological practise only after World War I and was not adopted on a large scale until after World War II. At present, aerial photography enjoys wide-spread application in the countries of Western Europe with a cultural heritage of the Roman Empire. Numerous articles and books on the subject are published abroad. Aerial photography is carried out and interpreted by many scientific institutions and individual amateurs, and regional as well as international conferences are held. In Western countries, it constitutes an important element of mainstream archaeology.

In Lithuania, aerial photography was introduced in the post-war period during the investigation of the Apuolė and Impiltis hill-forts (Western Lithuania). An attempt on September 14, 1931 was a failure because an amateur camera was used and the hill was covered by trees (Nagevičius 1931:24). The photograph itself does not remain, though several photographs of it were taken, therefore the information at our disposal is incomplete. A 1933 photograph of the Impiltis hill-fort was more successful, and has appeared in several archaeological publications (Puzinas 1938:Fig.88) (Fig. 3). The two experiments discussed above did not lead to any wider application in Lithuania in the 1930's.

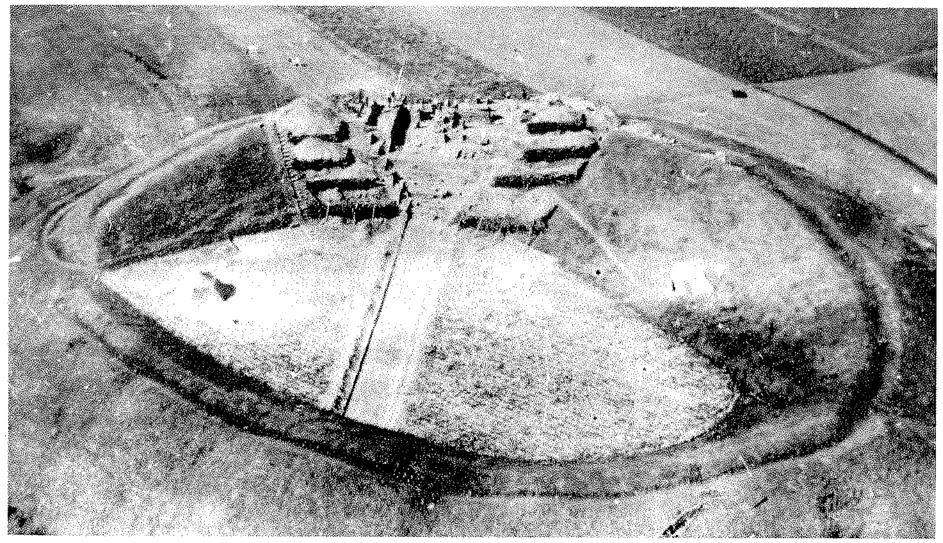

Fig. 3. Aerial view of the Impiltis hill-fort in 1933 (Puzinas J. Naujausių proistorinių tyrinėjimų duomenys. In: *Senovė*. Kaunas. 1938, T. 4, Pav.88)

Some early aerial photographs were taken in Latvia, Estonia, and Poland as well. However, in Soviet Lithuania, the security system strictly regulated the number of flights, and banned aerial photography except for topographic purposes. The results were either kept secret or they were made public, but their further application was forbidden. In the 1980's, Lithuanian archaeologists began to get limited access to aerial photographs intended for the production and correction of 1:10 000 scale land-tenure maps. The photographs were used by archaeologists to mark the location of archaeological monuments. Based on my work from 1985-1988 at the then Scientific-Methodological Council for the Preservation of Cultural Property, I can testify that the small scale of these photographs and the relatively small size of the monuments made research work impossible. Only a couple of the photographs are worth discussing. One of them shows the foundations of the Seredžius church (Seredžius was a small town washed away by the Nemunas river in the nineteenth century). Also, aerial photographs revealed the Daukšiai (Šakaliai) hill-fort in Western Lithuania which had been seriously damaged by ploughing. These examples demonstrate that aerial photography facilitates monument location and research.

Some photographs taken from the air can be found in art photographs publications. The majority of them reveal Lithuanian brick castles, and occasionally hill-forts. Archaeologists only consider special views of monuments, even though some of the photographs are highly professional. It was also in archives that colour aerial photographs first appeared. Unfortunately, the place-name censorship at the time means that inadequate information is available about these photographs.

It was only when Lithuania regained its independence that aerial photography was introduced into scientific work. In the spring of 1989, as soon as flight and photography restrictions were lifted, the Lithuanian Institute of History made an attempt to adopt aerial photography in the location of archaeological monuments. Unfortunately, the experiment failed. Since then, individual archaeologists have organized flights and made amateur aerial photographs of particular objects. However, the scarcity of information and good quality results precludes any evaluation.

Fig. 4. Aerial view of the Bubiai hill-fort and the foot settlement in 1993 (*photo J.Kaučikas*)

The most striking results were produced by the archeologists R. Olišauskas, R. Balza and B. Salatkienė in 1993 when they took aerial photographs of the area around Šiauliai (Northern Lithuania). Darker spots in the area of the cultural deposits marked the precise limits of the Bubiai settlement at the base of a hill-fort (Fig. 4). Later, a number of test-probes (made under the supervision of R. Jarockis) corroborated the aerial material. Similar results were achieved from an aerial photograph of the unfortified Lieporiai settlement where the cultural layer was very distinct. Remarkably, a second unfortified settlement was discovered at Lieporiai. This success can be attributed to aerial photography.

In the spring of 1994, archaeologist V. Žulkus photographed archaeological monuments in Western Lithuania. The material revealed the Jakai (Sudmantai) hill-fort which had been completely destroyed by cultivation. A mound surrounded by several structures was also discerned. Aerial photography facilitated the location of the possible site of the Teutonic (14th century) Windburg Castle in the peninsula of Ventė (the eastern coast of the Courish lagoon) and the identification of the Eketė settlement at the base of a hill-fort.

The same year archaeologist A. Kuncevičius took aerial photographs of Trakai in South-eastern Lithuania. Extremely thick deposits of soil at the Senieji Trakai castle site impeded the location of stone walls. However, an earlier 14th century settlement site was located nearby. Archaeological monuments in the area around Anykščiai (Eastern Lithuania) were photographed by A. Strolia. The material on the Šeimyniškėliai hill-fort located the cultural deposits, and photographs of the estate site in Anykščiai revealed some structural features.

Several conclusions can be drawn regarding the use of aerial photography in Lithuania archaeology. First, the Lithuanian topography (thick soils, rare rocks and stones) means that only some archaeological monuments, mainly ancient settlements, can be effectively explored. For example, interesting experimental photographs were taken over the Maskoviči hill-fort (North-eastern Byelorussia). They reveal the former hill-fort with a conical top and a linear settlement at its base (Дучыц 1991:26, 28. Рис.18). Aerial photography provides scientists with a means of identifying the remains of medieval stone buildings as well. Large-scale action could be taken to document medieval barrows and barrow cemetery sites (barrows used to be surrounded by pits and ditches). As Lithuanian archaeological monuments have been well studied, it is unlikely that aerial photography will reveal new hill-forts or altar stones. In 1980, twenty-five archaeological sites were discovered in the Kaliningrad district: two hill-forts, eleven settlements, five barrows, three cemeteries and a altar stone (Кулаков 1981:18). In 1981, ten more sites were added to the list (Кулаков 1983:23). However, further archaeological investigation should be carried out to corroborate the aerial material. In Lithuania, the success of aerial photography is determined by two main factors: the time and height of a flight. On the other hand, scientific survey is impeded by the country's large forested areas (one third of Lithuania's territory is covered with forests, mainly coniferous) and intensive land-reclamation in the second half of the twentieth century (three million acres of land have been reclaimed so far).

The second alternative technique involving minimal damage to archaeological monuments is metal-detecting. The first primitive metal detectors were used after World War I. In 1926, G. William successfully employed a self-made metal detector in the excavation of Panama, the ancient capital of Panama (Kosidovskis 1968:236-240). After World War II, the use of metal detectors in European archaeology became especially wide-spread (Laming 1952:71-75). In the 1980's so-called "treasure hunters" began to explore archaeological sites. Their activity was not legally regulated and caused extensive damage to archaeological monuments. Consequently, the method itself was misinterpreted (Planck 1992:4-5). Metal-detecting as a technique was reconsidered only when laws were introduced to prevent its abuse (Koppen 1992:19-26). For instance, in Sweden (Metalldetektor 1980) as well as in other Western countries, the citizens are informed about metal detectors and restricted in their use (Kyhlberg 1985:7-9; Metaldetektor 1984; Metaldetektorer 1982; Metallsökare 1983). However, it remains a controversial topic in the scholarly community (Boss 1990; Gruijl de 1990; Willems 1990; Zwaall 1990). In practise, metal detectors are particularly useful in locating artefacts. At the Early Medieval settlement of Gniezdov (Russia), ploughing work unearthed a hoard of Arab silver coins. In 1975, a metal detector brought to light seventy-one coins, seven of which were missed during ordinary excavations (Авдусин, Каменецкая, Пушкина 1976:53; Ваганов 1984:27-28). Excavations at the Kulmoinen hill-fort (Finland) in 1983-1988 produced 235 metal artefacts (Taavitsainen 1990:171-174). In Denmark between 1966 and 1988, numerous finds

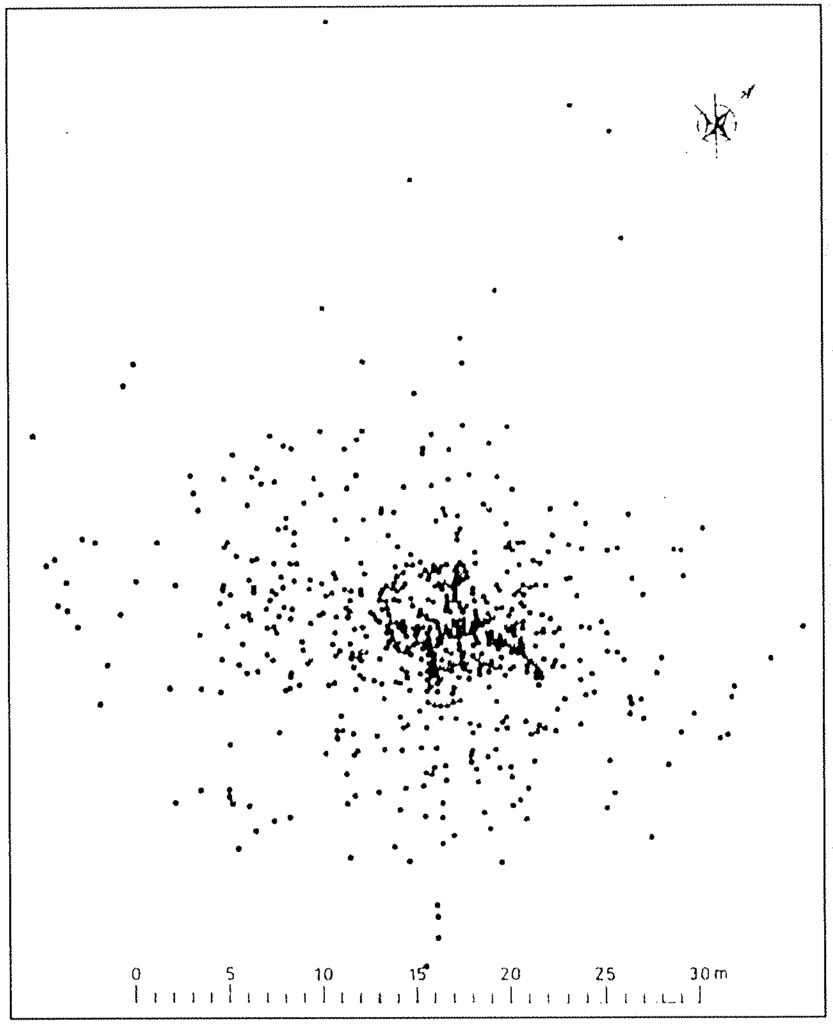

Fig. 5. Coin distribution in the Stenkyrka hoard (Gotland, Sweden) (Östergren M. Metalldetektorn i praktiskt bruk. In: *Gotländskt arkiv. 1985*. Visby. 1985. S.19. Bild 3)

were encountered on sites dating from the 5th to 8th centuries (Petersen 1991:49-66). Out of fifty human bronze figurines, thirteen were located using a metal detector (Liebgotl 1988:207-222). In 1980-1988, the method helped to detect more than two thousands coins (Jensen 1988:223-230). Striking results were achieved in Gotland (Sweden) where in 1978-1984, around a hundred hoard sites were discovered. The finds included: 369 silver and 16 gold Roman coins, 3672 silver coins and 20 silver ornaments from the Viking period, nine silver and four gold medieval coins, and around 100 iron and bronze artefacts (Östergren 1985:15, 16, 27) (Fig. 5). Metal-detecting can be applied in the study of archaeological monuments from the early Iron Age. In 1978, scientists discovered twenty-two bronze, gold, silver, iron and lead items at the site of Hala Sultan Teke (Turkey). A total of 159 artefacts were recovered that year (Fischer 1980:32-33).

In the 1980's, the first primitive military (mine) detectors "ИМП" were applied in Lithuania. More advanced technical devices were not available at that time. However, some researchers did not support the idea of metal-detecting in Lithuania. "Detectors do not prove successful as they sense any metal artefact, e.g. a nail or a tin. Furthermore, their sensing capacity is only 0.5-1.5 m underground" (Kulikauskas 1978:97). This statement was made by P. Kulikauskas, one of the most prominent Lithuanian archaeologists of the twentieth century. To the best of my knowledge, the first person to apply a military mine detector for archaeological research in Lithuania was V. Urbanavičius. He located a window frame of a brick church on the Kavarskas farmstead (Eastern Lithuania) in 1974. In 1983, I employed a metal detector of the same type in the investigation of Šv. Jokūbas (the former Giedrys) street in the Old Town of Vilnius (research supervisor V. Ušinskas.). Structural remains were examined along with a cultural deposit containing many iron construction parts, mainly nails and bindings. The work was greatly impeded by the detector's sensitivity to non-metal magnetic items: brick fragments, pieces of tile, potsherds, and burnt stones. Also, the signals of larger items drowned out the sounds produced by smaller ones. In the course of the investigations, a sixteenth century silver groat was encountered as well.

An "ИМП" was employed in the survey of barrows and unfortified settlements in Kernavė (Eastern Lithuania) (research supervisor A. Luchtanas). On the top of one earth pile a massive nineteenth century iron axe was encountered, while exclusively modern metal artefacts were found in the uppermost layer. Particularly interesting work was conducted on the shore of the Obeliai lake (Eastern Lithuania) in 1983 (research supervisor V. Urbanavičius). There, underwater cremations (or an offering site?) from the 13th to 14th centuries were brought to light with the help of a backhoe. One part of the excavated soil was washed while the other was examined with a metal detector. Two different instruments were employed: a Soviet military mine detector "ИМП" and a Canadian metal detector "ORION-121". This strategy was chosen because of the sensitivity of the first device to iron artefacts that of the second to non-ferrous metals. In addition, the excavated earth formed a 20 cm thick layer which was scrupulously examined. Following the removal of metal artefacts, it was ploughed, harrowed and re-examined. Three weeks (44 hours) of work at the site produced 300 different metal artefacts, not to mention 150 pieces of 20th century waste-metal, or slag. The finds also included: iron knives, axes, spearheads, strike-lights, bronze brooches, mountings, pendants, and keys. Some specific results of the work can be mentioned as well. Thirty hour's use of "ИМП" located 160 artefacts, 156 of which were iron and ten bronze. A detailed examination of plant roots revealed eleven iron artefacts, mainly strike-lights. In comparison, the "ORION-121" detected 136 items (19 iron and 117 bronze) in 14 hours. To sum up, metal-detecting resulted in two hundred and sixty-eight finds. This work is presented in V. Urbanavičius' 1983 documentary film *Secrets of the Obeliai lake*, and briefly discussed in his book (Urbanavičius and Urbanavičienė 1988:36).

Around 1990, private individuals started to bring advanced metal detectors from Germany and England into Lithuania. Only a small number of these instruments were acquired by individual archaeologists and archaeological institutions. In Lithuania at the beginning of 1996, there were approximately one hundred modern metal detectors, and the same number of amateur, out-of-date and self-made machines. However, some finds by amateurs are not reported to scientists. For example, about 100 medieval hoard sites initially excavated without the use of metal detectors have subsequently been looted by "treasure hunters". Data from Western countries demonstrate that elimination of metal detectors reduces the recovery rate of medieval metal artefacts by half. Russian archaeologists, however, suggest that only 30 percent of metal artefacts are missed (Вахрушин, Кулешов, Станюкович 1979:63). However, the Russian statistics might be influenced by the poor quality of the instruments. In most cases, finds are located in disturbed layers, and in burial sites.

Methodologically, the application of metal detectors in Lithuanian field archaeology is based on the experience of other countries. A special interest is demonstrated by J. P. Taavitsainen's (Finland) research at the Kuhmoinen hill-fort. He marked the location of metal artefacts on the general hill-fort map, while the items themselves were replaced by bronze nails (Taavitsainen 1990:172). In Thetford (England) the excavated area was quartered and conventional research techniques were employed. After the examination of the plough soil, a 10 cm thick layer was mechanically removed and re-examined with metal detectors (Gregory, Rogerson 1984:180-182).

The year of 1993 proved to be a turning point in Lithuanian archaeology. In the autumn of that year, researcher G. Vėlius discovered a medieval cemetery in Kernavė (Eastern Lithuania) with the help of a metal detector "CS2MX" (Vėlius 1996:149-150). That same year, the Centre of Cultural Heritage bought a "METADEC3" to be used in the study of medieval estates and hoard sites (Ivanauskas 1995; Ivanauskas 1996; Strazdas 1996). The English archaeological society of metal detecting presented the Museum of Lithuania Minor (Klaipėda) with the detector "CS770". In 1995, the Castle Research Centre, "Castles of Lithuania", and Vilnius University began to apply advanced instruments. Also in 1995, Polish archaeologists employed an underwater metal detector at Plateliai Lake (Western Lithuania). At a medieval bridge site, it sensed an iron cannon shell and a harpoon (Kola, Žulkus 1996:297).

I have been applying metal detectors in archaeological work since 1992. Initially a low-sensitivity "MD96N" was used. In 1995, the Open Society Fund for Lithuania sponsored the acquisition of a "CS4ZX", a state-of-the-art device. A special program has been initiated to study Lithuanian hill-forts. In order to locate fine metal artefacts, a microdetector "MK101" was issued. Over a period of four years, metal detectors helped to reconstruct the history of twenty archaeological sites dating from the Iron Age to the Middle Ages. These technical devices were

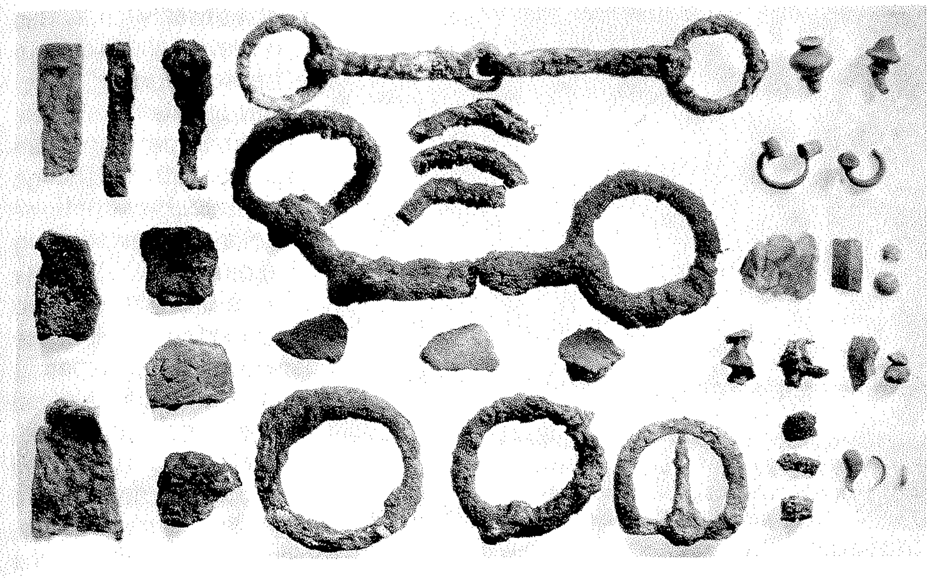

Fig. 6. Metal artefacts detected at the Masteikiai cemetery (*photo K. Vainoras*)

also widely used in the investigation of the Šeimyniškėliai hill-fort (Eastern Lithuania). The finds included: two iron crossbow arrowheads, fragments of bronze ornaments, a rare Lithuanian coin from the 15th century, a medieval lead bullet and six bronze Russian kopecks dating from 1873-1915 (Zabiela 1996:75-76). On most sites, the success of work can be solely attributed to metal detectors. It was established that a number of Lithuanian hill-forts did not have any significant cultural layers, but were encircled by earth fortifications. On medieval sites, metal detectors indicated abundant iron artefacts which were not revealed during traditional excavations.

In 1994, at the Prague groats hoard in Baniškiai, twenty-one coins were located with a metal detector (Ivanauskas 1995:23). In the same year, a metal detector indicated 250 fragments of different bronze artefacts, with a total weight 1.05 kg, during excavation of the Paverkniai hill-fort in Southern Lithuania (Zabiela 1996:70). Half of the finds were only a few millimetres in diameter and weighed only a few grams. After only half an hour of metal-detecting in the Masteikiai cemetery (Central Lithuania) in 1994, thirty-one iron and bronze artefacts were recovered from the second millennium cremations: fragments of an iron bridle bit, brooches, mountings etc. (Fig. 6). An hour's detecting work at the first millennium AD Vidgiriai cemetery (Western Lithuania) produced the following finds: a bronze bracelet, two crossbow brooches, an axe, fragments of a bracelet, a necklace, a tin-plate, iron hafts and fragments of a knife.

The past four years of intensive metal detecting in Lithuania have revealed some general trends. Firstly, abundant metal waste from the late twentieth century impedes the location of some metal artefacts. This is particularly a problem in the upper-most layers (turf and a 20-30 cm thick disturbed layer). Metal waste constitutes 99 percent of the detected metal artefacts (Fig. 7). Since every signal must be checked, the abundant twentieth century material slows the process by

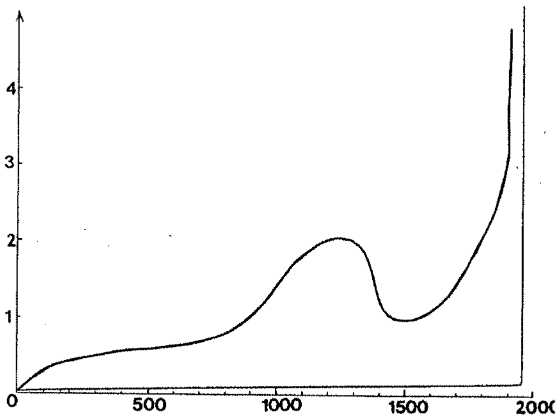

Fig. 7. Chronology of metal artefacts and their distribution. Vertically: the density of metal artefacts in one cubic metre of cultural layer in numbers; horizontally: time in years (*drawing by A. Zabielienė*)

as much as twenty times. This does, however, tend to discourage "treasure hunters". A second drawback is the relatively small optimal operating depth (not more than 20 cm). Though their technical instructions indicate a deeper sensing depth (sometimes even a few metres), this only holds true with large finds. As a rule, these finds are made of separate types of metal and are located in metal-free layers of the soil, parallel with the surface layer. Usually they do not present any scientific interest. Archaeological value is attached to the artefacts in the undisturbed layers deeper than 20 cm below the surface. In some cases, a depth of 20 cm can be too great for a detector to sense small finds. This failure is usually the fault of the operator, since advanced instruments should not fail to locate items at this depth.

The experience and results achieved by our European colleagues stimulated the creation of a Lithuanian methodology in metal detecting, the principles of which are outlined below. Artefacts from disturbed cultural layers or burials are plotted on a general map indicating the survey area. Though artefacts often shift from their initial position during the excavation of a cultural layer or a grave, the mapped find-sites prove to be exact enough. All layers of the soil are examined every 10 cm, and excavated earth is metal-detected twice. Turf undergoes a similar analysis first after its removal and later after being turned over. Traditional methods are employed in the examination of metal artefacts, while non-archaeological metal items are regarded as waste. Sometimes, a special type of artefacts is detected and further problem-centred research is conducted. This is common when a coin hoard was previously poorly located and inadequately surveyed, and a metal detector is then used to locate the remaining coins (Fig. 6). For example, in 1992 this strategy was used at the Papiškiai hoard site (South-eastern Lithuania). The finds included dozens of damaged 16th-17th century coins, and fragments of two clay money-boxes (Ivanauskas 1995:50-51).

I believe that metal detecting can be productive even when it is not followed up by excavation. Even if items can be located only in the upper-most layers, it is possible to reconstruct the chronology (time of abandonment) of the hill-fort. In Lithuania only 100 out of a total of 1000 hill-forts have so far been excavated. Most often, the soil surface proves to be disturbed, i.e. ploughed, which simplifies the dating of the hill-fort and eliminates the need for any further disturbance by archaeologists. Detecting is generally discontinued when the first clearly dated item is encountered. Our aim is not to extract all the metal objects from the surface layer.

During the 1995 examination of five supposed hill-forts in the Raseiniai district (central Lithuania), an iron axe with a wide blade and a blunt end (13-14th century)

was detected in a rampart of the Ižiniškiai hill-fort (Fig. 8). This confirmed the hypothesis that the Pilėnai castle stood there until 1336 when it was demolished by Teutonic knights. No archaeological finds were detected in the other hill-forts, though written sources indicate that the castle was burnt down with all its riches and its defenders, who committed suicide rather than yield themselves prisoners (Wigand 1863: 488-489).

Fig. 8. Axe with a wide blade and a blunt end detected in situ at the Ižiniškiai hill-fort (*photo G. Zabiela*)

The advantage of a metal detector lies in its sensitivity to small metal items in situ; 95-98 percent of artefacts are discovered in this way. The rest are not brought to light either because they are seriously damaged, or through faulty operation of the detector. Further earth sieving and washing must then be undertaken. It is also important to stress that even state-of-the-art metal detectors can not replace a shovel. On the other hand, even a primitive detector advances research exceedingly.

Biolocation, or dowsing, is the last alternative field research method that will be discussed. For many millennia people used a willow or osier twig to locate well sites. In general, biolocation proves useful in the location of stone and brick foundations and trenches (Fig. 9). It also reveals trees and bodies of underground water, which means that an operator's experience in interpreting the signal is

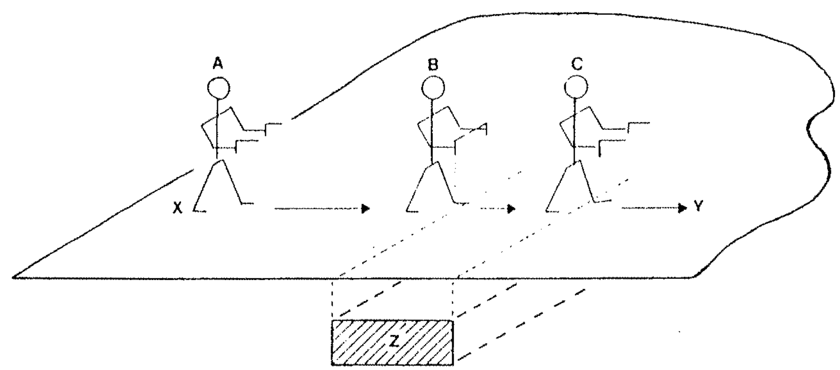

Fig. 9. Principles of biolocation (Bailey R. N., Cambridge E., Briggs H. D. *Dowsing and church archaeology*. Wimborne. 1991, p. 122, Fig.32)

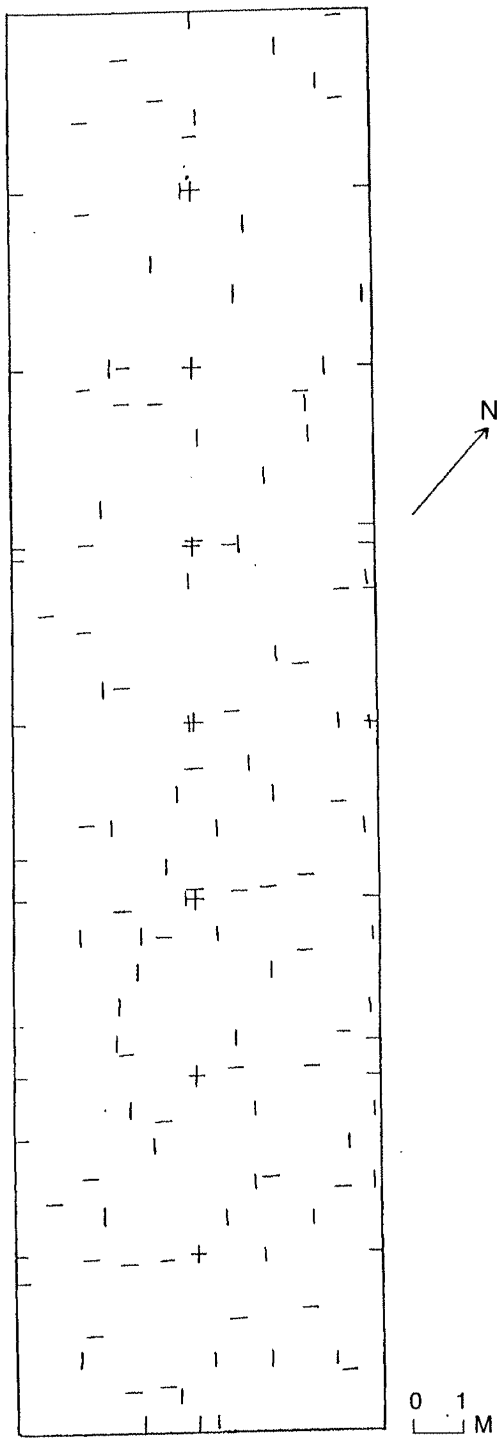

Fig. 10. Map of biolocated anomalies in the Šeimyniškėliai hillfort (drawing by A. Zabielienė)

essential. A detailed study showed that biolocation is based on very small movements of human hand muscles in response to different soil strata.

The data on the application of the method are rather scanty. In the parish of Gnojno, Kielce voivode (Poland) a priest, Skorczynski, located a number of ancient items which have now been transferred to the museums of Kielce and Szydlowec (Gąssowski 1983:90). In England, biolocation helped to establish the structural plans of forty-four churches. The plans and reported data have been published (Bailey, Cambridge, Briggs 1991).

Since the method of biolocation lacks clear scientific proof, its application in Lithuanian archaeology remains controversial. Nevertheless, in 1989, biolocation revealed the foundation of the ancient Kernavė church in Eastern Lithuania (operator A. Luchtanas). The results were corroborated by further archaeological examination. In 1995, J. Kanarskas managed to locate several features: in the Lazdininkai burial place he located barrows and a grave inside stone circles. Also, in Northern Lithuania, E. Prascevičius investigated a number of cemeteries and settlements in order to locate particular graves or burial sites. However, excavation work in some of these areas did not support the biolocation data.

In 1994-1995 I used biolocation to investigate the Šeimyniškėliai hill-fort (Eastern Lithuania). In future, excavation work will bee proceeded by biolocation to produce reliable data. Over the course of two years at Šeimyniškėliai, a systematic method of biolocation was developed. The willow or osier twig is replaced by two U-shaped copper pieces of wire. An operator moves along lines which are parallel both to a fibreglass measuring tape and each other (at 1 m intervals) (Fig. 10). The investigation is most effective if the operator maintains a constant direction of movement, and does not vary the working hours. While working, the results, which are registered with the operator's name, are reported to another person. Though research work on the Šeimyniškėliai hill-fort is still in the progress, it can be inferred that the obtained data different. On top of the hill-fort, a lot of anomalies have been registered which indicate different cultural layers.

In summary, the alternative methods discussed: aerial photography, metal detecting and biolocation, are likely to continue in use in Lithuanian archaeology. Though in Soviet years monument location and research were impeded, now the experience of Western countries is allowing Lithuanian scholars to catch up with the latest developments. Alternative archaeological methods are crucial as they are non-destructive, and allow reliable information to be collected before excavation work. In this sense, the value of these methods extends well beyond the 20th century.

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Netradiciniai metodai Lietuvos lauko archeologijoje: taikymo patirtis (iki 1996 m.)

GINTAUTAS ZABIELA

Santrauka

Lietuvos archeologija išgyveno penkiasdešimt tarybinio laikotarpio metų, kurie pasižymėjo įvairiausiais žmonių veiklos suvaržymais. Vienas iš tokių suvaržymų buvo draudimas naudoti archeologijoje netradicinius metodus. Straipsnyje detaliau nagrinėjami tik trys tokie metodai: aerofotografija, žvalgymas su metalo detektoriais bei biolokacija (1 pav.). Apie netradicinius tyrinėjimų metodus ir įvairias šio mokslo naujoves Lietuvos archeologai iki šiol rašė labai mažai.

Aerofotografija yra vienas seniausių ir labiausiai archeologų aprobuotų netradicinių archeologijos paminklų lauko tyrinėjimų metodų. Ji pagrįsta žemėje slypinčių sluoksnių bei struktūrų poveikiu žemės paviršiaus reljefui, augalijai ar mikroklimatinėms sąlygoms (2 pav.). Pirmoji aerofotografija padaryta Prancūzijoje 1856 m. iš oro baliono. Šiandien šis metodas Vakarų Europos šalyse pasidaręs bemaž tradicinis. Lietuvoje pirmą kartą aerofotografija panaudota tarpukario laikotarpiu tyrinėjant Apuolės bei Impilties piliakalnius Vakarų Lietuvoje (3 pav.). Tarybiniu laikotarpiu panaudoti aerofotografiją archeologijos paminklų tyrinėjimuose bei paieškoje nebuvo galimybių. Lietuvos archeologams nuo 8-ojo deš. buvo prieinamos tik topografinės nuotraukos bei meniniai fotoalbumai. Sąlygos aerofotografiją panaudoti grynai moksliniams tikslams susidarė tik Lietuvai išsivaduojant iš totalitarinio režimo. Lietuvos istorijos institutas jau 1989 m. pavasarį nesėkmingai mėgino suorganizuoti platesnius bandymus taikyti aerofotografiją archeologijos paminklų paieškoje.

Iki pat 1996 m. aerofotografiją, ieškodami archeologijos paminklų, Lietuvoje naudojo pavieniai archeologai. Savo iniciatyva jie organizuodavo skrydžius virš reikiamų objektų ir fotografuodavo juos mėgėjiškais aparatais. 1993 m. Šiaulių apylinkėse archeologai R.Olišauskas, R.Balza bei B.Salatkienė patikslino jau žinomų archeologijos paminklų, tokių kaip Bubių piliakalnio bei Lieporių neįtvirtintos gyvenvietės, teritorijas (4 pav.), surado antrąją Lieporių gyvenvietę. 1994 m. pavasarį V. Žulkus iš oro fotografavo Vakarų Lietuvos archeologijos paminklus, A.Kuncevičius žvalgė Trakų apylinkes Pietryčių Lietuvoje. Anykščių apylinkių Rytų Lietuvoje archeologijos paminklus tuo pat metu iš oro, skrisdamas savo darbo lėktuvu, fotografavo A.Strolia.

Visų šių skrydžių metu sukaupta papildomų duomenų apie jau žinomus archeologijos paminklus. Lietuvos sąlygomis specifinės grunto savybės, tokios kaip storas dirvožemio sluoksnis bei retai pasitaikančios kietos uolienos, leidžia efektyviai žvalgyti tik kai kurias archeologijos paminklų rūšis, pirmiausiai senovės gyvenvietes. Perspektyvi aerofotografijos pritaikymo kryptis yra buvusių pilkapių bei pilkapynų vietų paieškos bei kai kurių kapinynų teritorijų žvalgymai iš oro. Aerofotografijos naudojimą apsunkinantys veiksniai Lietuvoje yra palyginti nemažas krašto miškingumas bei XX a. antrojoje pusėje praėjusi intensyvi melioracija.

Antroji pagal svarbumą netradicinė archeologijos paminklų tyrinėjimų kryptis yra metalo detektorių naudojimas lauko tyrinėjimų darbuose. Pirmieji primityvūs metalo detektoriai archeologiniuose kasinėjimuose buvo panaudoti po Pirmojo pasaulinio karo, tačiau plačiau paplito tik po Antrojo pasaulinio karo. Šiandien juos naudoja daugiausia vadinamieji lobių ieškotojai. Atidžiau į metalo de-

tektorių naudojimą archeologijoje pažvelgta tik 8-ajame dešimtmetyje. Archeologų tarpe metalo detektorių naudojimas iki šiol tebekelia diskusijų. Žinoma daug sėkmingų metalo detektorių panaudojimo užsienio šalyse atvejų, kada, dirbant su jais, buvo aptikta monetų (5 pav.) bei paskirų metalinių dirbinių.

Lietuvoje pirmieji bandymai naudoti netobulus tarybinius karinius minų ieškiklius buvo 8-ajame dešimtmetyje. Tokie prietaisai naudoti Kavarsko vienkiemiuose, Vilniuje, Kernavėje. Išimtis iš negausių metalo detektorių panaudojimo atvejų tarybiniais metais buvo V. Urbanavičiaus 1983 m. Rytų Lietuvoje vykdyti Obelių ežero pakrantės tyrinėjimai. Čia dviem skirtingais metalo detektoriais šio straipsnio autorius tikrino iš ežero iškastas žemes su degintinių palaidojimų liekanomis. Per 44 darbo valandas buvo rasta daugiau kaip 300 įvairių metalinių XIII-XIV a. dirbinių. Maždaug nuo 1990 m. modernius metalo detektorius į Lietuvą įvežti pradėjo privatūs asmenys. Naujieji lobių ieškotojai pirmiausiai perkasė anksčiau rastų lobių vietas, išrinko ten pasilikusias monetas. Nuo 1993 m. metalo detektoriai keliose įstaigose pradėti naudoti moksliniams tikslams.

Šio straipsnio autorius metalo detektorius archeologiniuose tyrinėjimuose naudoja nuo 1992 m. Per ketverius metus detektorius panaudotas žvalgant bei tyrinėjant apie 20 archeologijos objektų iš geležies amžiaus–viduramžių laikotarpių. Eksperimentai, atlikti jau tyrinėtose archeologijos paminklų vietose, parodė, kad, kasant tradiciniais metodais, nepastebima dalies metalinių dirbinių (6 pav.). Ketveri intensyvaus darbo metai, atsižvelgus į užsienio šalių patirtį, leidžia apibrėžti tam tikrą metalo detektorių naudojimo specifiką bei galimybes Lietuvoje. Išskirtinis dalykas Lietuvoje yra labai didelis archeologijos paminklų užterštumas XX a. antrosios pusės metalinėmis šiukšlėmis. Dabartiniai metaliniai dirbiniai sudaro faktiškai 99% visų aptinkamų metalinių radinių (7 pav.). Palyginti nedidelis (paprastai ne daugiau kaip 20 cm) optimalus metalo detektoriaus darbo gylis lemia tai, kad sluoksnius metalo detektoriumi tenka tikrinti kas 10 cm, įskaitant ir išmestas bei atgal į tyrinėtą plotą supilamas žemes. Kiekvienas metalinis archeologinis dirbinys fiksuojamas tyrinėjimų plane. Šio straipsnio autoriaus išbandytas ir rezultatyvus yra piliakalnių tyrinėjimas su metalo detektoriumi plačiau jų nekasinėjant. Taip Įžiniškių piliakalnio pylime aptiktas XIII-XIV a. geležinis pentinis plačiaašmenis kirvis (8 pav.). Su metalo detektoriumi archeologinių tyrinėjimų metu, šio straipsnio autoriaus paskaičiavimu, galima aptikti iki 95-98 % visų metalinių dirbinių.

Paskutinis netradicinis lauko tyrinėjimų metodas yra biolokacija. Biolokacijos metodu gerai fiksuojami mūriniai pamatai arba perkasimai. Virgulė paprastai pasisuka jų riboje (9 pav.). Paties metodo veikimo principas nėra pakankamai išaiškintas. Biolokacijos panaudojimo užsienio šalyse žinoma vos pora pavyzdžių Lenkijoje ir Anglijoje. Kadangi šis metodas nėra pakankamai moksliškai pagrįstas, jis iki šiol Lietuvos archeologijoje plačiau netaikomas ir lieka diskusinis. Iki 1996 m. tik keli žmonės įvairiuose Lietuvos archeologiniuose paminkluose bandė panaudoti virgulę. Plačiausiai biolokacija išbandyta tyrinėjant Šeimyniškėlių piliakalnį Rytų Lietuvoje. Virgulės posūkio vietos buvo grafiškai fiksuojamos (10 pav.). Tyrinėjimai biolokacijos būdu Šeimyniškėlių piliakalnyje nebaigti, tad apie mokslinius rezultatus kalbėti dar anksti.

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Refitting as a Method in Stone Age Archaeology: A brief Introduction

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Introduction

This paper provides an introduction to the method of refitting lithic artefacts. One of the strengths of the method lies in its potential to draw powerful conclusions from lithic debris, that is to say, that which often constitutes 90% or more of our recoveries on stone age sites, but which at the same time traditionally recieves not even 10% of our attention. In recent years the application of refitting has grown in breadth and scope, and it has gained recognition world wide as a means by which to evaluate stratigraphic integrity, and investigate human behaviour through the study of intrasite analysis and technology. Beyond this, refitting has played a central role in the development of a new approach to lithic studies, that of the *chaîne opératoire*. Examples will be drawn both from the author's own experience as well as from other, primarily Norwegian, research.

It is observed that the method can also be applied to materials other than lithics. It has been succesfully used with both ceramics and bone, and can potentially be applied to any materials that have been broken. However, it must be noted that when used with these other materials the method can not generally address technological questions as is the case of lithics. This is because the sequence of blows and flake removals involved in the production of lithic tools, which results in the "broken" pieces to be refitted, are in fact a record of specific technological behaviour, and the method of refitting can reconstruct this behaviour. Broken pot sherds, on the other hand, while they do form a record of how and where a pot is disposed of, do not reflect how the pot was manufactured. It is noted that while refitting could potentially identify sherds from a specific pot that have been re-used for some purpose and that this can be seen as a form of "technological" behaviour, there is irregardles a significant difference in the type of results achieved. In order to more clearly demark these significant qualitative differences in the nature of the results of the method as applied to lithic vs. non-lithic materials, it is preferred here to reserve the term refitting to lithic studies and apply the term mending to the analysis of other materials.

The Method of Refitting

Refitting is in principle a simple operation. It involves fitting struck or broken pieces back into their original form. The assumption is that each break is unique,