Ari Siiriäinen

BROMARV AND LUOPIOINEN: TWO EARLY BRONZE AGE FINDS FROM FINLAND

Abstract

Two early Bronze Age finds from Finland are discussed together with a neutron activation analysis of their metal content. The artefacts are placed in the context of trans-Baltic contacts between middle Sweden and the SW Finnish coastal region and further intercourse between the latter area and the inland. It is suggested that these contacts indicate a cultural continuity from the late Stone Age. The trans-Baltic contacts are regarded as having originated through specialized economic activity from middle Sweden.

Ari Siiriäinen, Department of Archaeology, University of Helsinki, Box 913, SF-00101 Helsinki 10.

Recently two bronze objects have been found in Finland which can be assigned to late period I or early period II (Montelius) forms.

Bromarv Framnäs, NM 20226. Fig. 1.

Basic map 2012 10, co-ord. x = 6655 38, y = 450 34 (National grid system)

A blade of a short sword was discovered by Kristian Donner in 1978 in the commune of Bromarv in western Uusimaa (Nyland) in a small potato plot close to the seashore. The find location is beneath a high and steep slope at an elevation of only 3–5 metres above sea level and consequently, assuming that the position of the find is primary, the sword must have been originally dropped into the littoral water. Thus it might be an water offering – such offerings may have been common during the Stone Age and Bronze Age even in Finland (EDGREN 1981).

On the basis of the topography of the site there was in the early Bronze Age a narrow (c. 150 m wide) sound on the bottom of which the sword was dropped. The sound lead from the seaside into a long fiord-like inlet. Nothing was found during the inspection of the site which would indicate prehistoric settlement. Close by, there are several burial cairns of the common Bronze Age type but their connection with the sword cannot be demonstrated.

The blade is badly eroded and its point has been broken off. Its present length is 36.3 cm and the original length can be estimated to have been at least 45 cm. The edges are corroded along the whole length of the blade; the cross-section was originally lenticular. Also the upper section, where the hilt has been fastened to the blade, has lost its original contours but apparently it was trapezoid with the hilt attached to the blade by at least four rivets whose holes can still be seen in the corroded edge; one rivet is still intact.

Due to the poor condition of the blade the type determination remains highly subjective – I place it with reservations in the "Griffplattenschwert"-group of swords. This type is very numerous in the Sögel-Wohlde region in northern Germany and southern Scandinavia. It is dated to late period I or the transition of periods I and II (Hachmann's early Bronze Age Horizon III – post Horizon IV; HACHMANN 1957). It was introduced to the northern sphere from Central Europe but it was soon adopted by northern bronze smiths into local production.

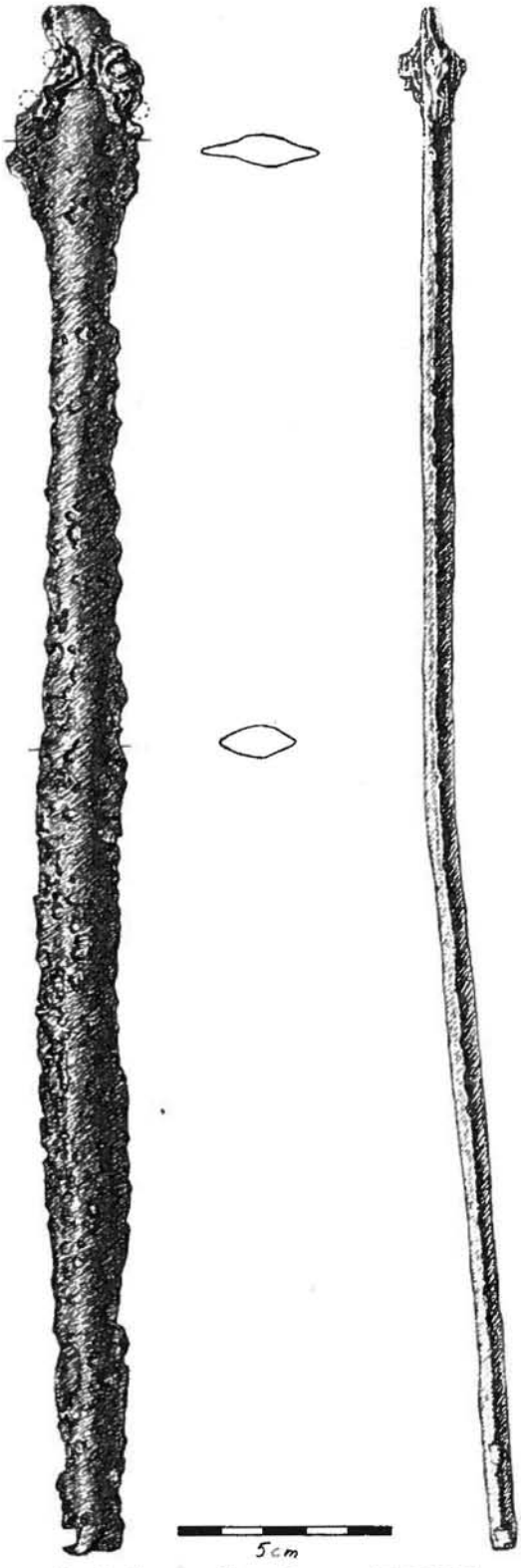

Fig. 1. The sword from Bromarv (NM 20226).

Luopioinen Evinsalo, KM 21491, Fig. 2.

Basic map 2141 10, co-ord. x = 6802 82, y = 538 78.

A dagger was found by unidentified summer visitors either in 1980 or 1981 in the commune of Luopioinen in southern Häme (Tavastland) and communicated to the National Board of Antiquities in 1982 by Matti Viukari via Pirkko Sihvo. The find site is situated on the southern shore of Evinsalo island in the northern part of lake Kukkianjärvi, c. 70 m from the shoreline above an apparent, but not very clear, ancient abrasion brink of the lake which can be distinguished c. 3.5 m above the present waterlevel of the lake. Lake Kukkianjärvi belongs to the southern Häme lake system, which ultimately drains into the Gulf of Bothnia through the Kokemäenjoki river, as one of its easternmost lakes. No indications of prehistoric settlement were observed but as the area is a yard it was disturbed and consequently it was difficult to make satisfactory observations. On the islands of Lehmisaari and Vehkasaari not far from Evinsalo in lake Kukkianjärvi there are burial cairns ("lapinraunio") of a probable early Metal Age date but their connection with the dagger find remains unknown. There are numerous prehistoric dwelling sites on the shores of the lake but only two of these have revealed datable material, viz. pottery. These are the extensive Hietaniemi site on the eastern shore of the lake, excavated by Timo and Pekka Miettinen (MIETTINEN 1965 which briefly presents the finds from the early excavations), and the Isosaari site on the southern shore on which very limited excavations were carried out by Robert Arpo. Both sites have yielded pottery from various Stone Age and later periods including sherds of eastern Epineolithic textile pottery of the Sarsa-Tomitsa type. This type can be dated to between c. 1300 BC and 300 AD (MEINANDER 1954b, CARPELAN 1979) and thus its earliest possible occurrence is during the early part of the II Montelian period and consequently during the final phase of the Kiukainen culture.

The blade of the dagger is damaged – the point is broken and the edges eroded – but it was obviously originally triangular; the length of the specimen is in its present condition 11.6 cm but it is impossible to estimate the original length. The artefact has been casted in one piece, the hilt together with the blade. The 6 cm long hilt is solid and flat in cross-section, with a flat knob on the top. There are six false rivets

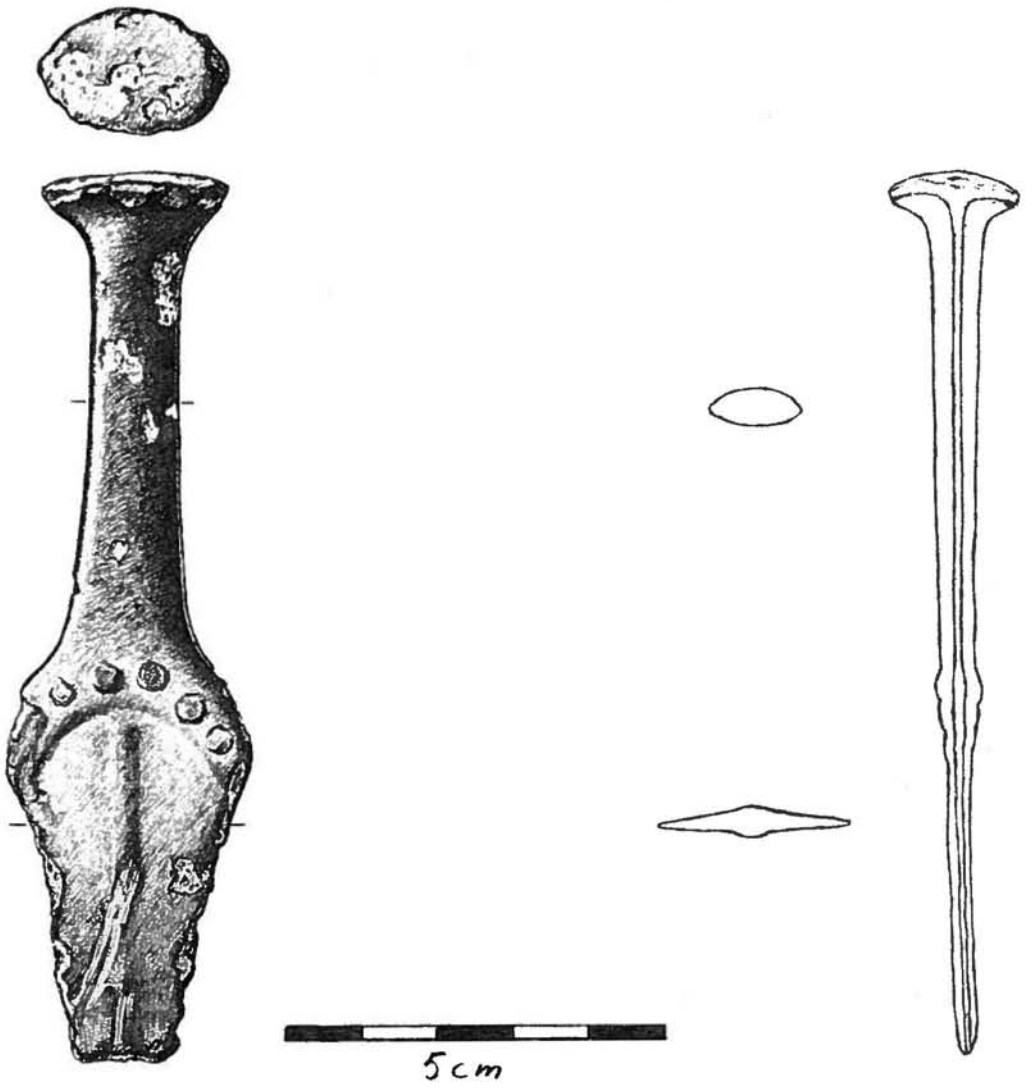

Fig. 2. The dagger from Luopioinen (NM 21491).

marked in the butt, and along the blade there is a narrow and low midrib.

The dagger belongs to the "Vollgriffdolch"-group. I have not been able to find exact parallels to it from the available literature; perhaps the closest parallels are the daggers from Arneburg in the Stendal District, Magdeburg, GDR (UENZE 1938, Tf. 51:128), Roum in the Viborg District, Denmark (BROHOLM 1943, 26 and 1952, fig. 4), Herslev in the Holbaek District, Denmark (BROHOLM 1943, 29) and Vemmelev in the Slagelse District, Denmark (ANER & KERSTEN 1976, 154) although the technique of some of these specimens is different from that of the Luopioinen dagger. There is also a fairly close parallel from Barsebäck in Skåne, Sweden (FORSSANDER 1936, fig. 43). These specimens, along with the whole group, are dated to period I and the beginning of period II (cf. also HACHMANN 1957 and LOMBORG 1969).

The trace element composition of the metal of both artefacts was analysed by the neutron activation method in the Technical Research Center of Finland by Dr. Rolf J. Rosenberg (Appendix). Unfortunately this method does not

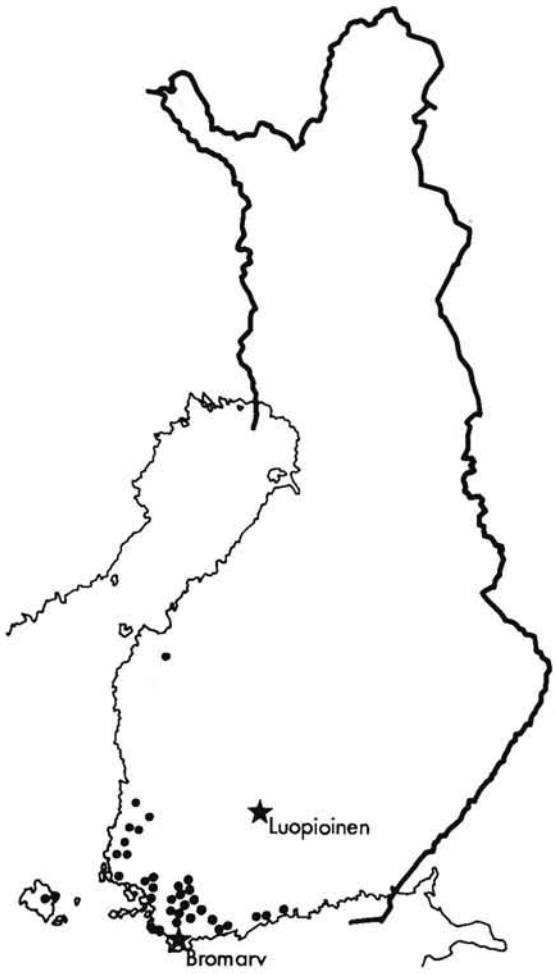

Fig. 3. The distribution of western bronzes in Finland.

detect the vismuth (Bi) content. Thus a valid comparison with the extensive analyses by JUNGHANS, SANGMEISTER and SCHRÖDER (1960 & 1968) (SAM) cannot be carried out as in their analyses Bi is one of the key elements in the copper material classification (on the criticism of the SAM method, cf. WATERBOLK & BUTLER 1965). If nevertheless, we compare briefly our results with the SAM material types we find that both the Bromarv and Luopioinen specimens are made either from FB1, FB2 or C6A copper. The first mentioned type seems to be the most common one in the Scandinavian sphere while FB2 is also common in Brittany and the British Isles and the last-mentioned type in the Aegean sphere. Chronologically the FB types in the Scandinavian sphere clearly are concentrated in middle and late period I and period II finds. Thus, if the material is of the FB type the result is not in any disagreement with the archaeological result.

Of the previously found western bronze artefacts in Finland only the spearhead from Santala in Nakkila, Satakunta, can – with reservations – be dated to period I (SALO 1974), but the number of bronze objects of western import during period II is already placed at least ten (MEINANDER 1954b, EDGREN 1969 and 1981).

As the early Bronze Age metal objects are mostly found from the coastal strip from western Uusimaa to southern Satakunta (fig. 3), there is nothing exceptional in the location of the Bromarv site.

However, the Luopioinen site is outside the main distribution area of the western bronzes. As such it can be best understood if the cultural continuity from the later Stone Age Kiukainen culture to the early Bronze Age is underlined.

During the Kiukainen stage there were fairly active contacts over the Baltic Sea between the middle Swedish coast and the southwestern Finnish coast. Activity was mainly directed from west to east. This is reflected in the archaeological record in Finland by certain Scandinavian artefact types such as eg. some of the subtypes of the so-called simple shaft-hole axes. Their connection with east Baltic axes cannot be completely ruled out (MEINANDER 1954a, 76-), but there are however obvious import specimens from Sweden among these. The distribution area of the simple shaft-hole axes is mainly the southwestern Finnish coast with isolated finds from the eastern coast of the Gulf of Finland and the Ostrobothnian coast, and a further extension of find sites stretching from Satakunta inland towards the lake region of Häme (MEINANDER 1954a, fig. 44). Thus, and also according to pottery evidence, there must have been intercourse between the southwestern Finnish coastal Kiukainen culture and the inland culture in southern Häme. The latter area, however, apparently preserved its traditions from the preceding local Boat Axe culture and thus differentiated, together with the Ostrobothnian and southern Finnish coastlands, into a cultural sphere of its own, as Carpelan has preliminarily argued on the basis of ceramic technology (CARPELAN 1979, 15).

The Scandinavian contacts also brought to Finland daggers and sickles of flint (MEINANDER 1954a, 121-, SALO 1972). They are confined to the coastal Kiukainen sphere with some isolated occurrences further inland as far as cen-

tral Finland and middle and northern Ostrobothnia (fig. 4). These artefacts, at least the daggers, must be regarded as prestige objects and in this respect similar to contemporary and later bronze artefacts. In Scandinavia they are dated to the stone cist period and the Early Bronze Age periods I and II (LOMBORG 1973).

The early western bronze artefacts can be logically seen as a continuation of an earlier flow of innovations from Scandinavia, originating ultimately from the southern part of the subcontinent and northern central Europe but probably reaching the southwestern Finnish coasts through middle Sweden (CARPELAN 1982). Through the intercourse between the southwestern Finnish coast and the inland sphere some of these artefacts even reached the lake region of Häme. The Luopioinen dagger is one of these while the Bromarv sword never found its way beyond the coast.

CARPELAN (1982) has presented a plausible hypothesis on the nature of the trans-Baltic contacts. The pre-third period dwelling sites in Finland still contain only common ceramics of Kiukainen type and no traces of Epineolithic pottery, although there are both artefacts and burial cairns of Scandinavian type dated to period II. According to Carpelan, this indicates a special kind of economic activity from middle Sweden from where groups of men roamed the Finnish coasts to fetch commodities (furs, seal, fat, fish, meat etc.) for the southern Scandinavian sphere which were used in turn to obtain metal from more southerly regions. These groups of men, which used to live among the local inhabitants but did not leave archaeologically detectable traces such as pottery on the dwelling sites, brought with them bronze artefacts for exchange with the local people and buried their dead according to their own rituals. It was not until the beginning of period III – when habitation finds of Scandinavian type appear – that a migration of Scandinavian population started to the southwestern Finnish coasts triggering off certain profound social and demographic processes (cf. SEGER 1982).

SALO (1972) has emphasized the similar spatial distributions of the early Bronze Age bronzes and sickles of flint in southwestern Finland, but while he explains this by assuming a contemporaneity of these categories (cf. also SALO 1981, 269–), I am inclined to see in these a manifestation of cultural continuity over the later Stone Age – Bronze Age interface. The trans-Baltic activity from the Swedish side started already during the Finnish later Stone Age and continued unchanged in its economic character, steadily increasing throughout the early part of Bronze Age until period III, as Carpelan argues. The Bromarv and Luopioinen finds belong to the stage in this development when stone artefacts began to be replaced by bronze objects in the exchange system between Scandinavians and the Kiukainen population of southwestern Finland.

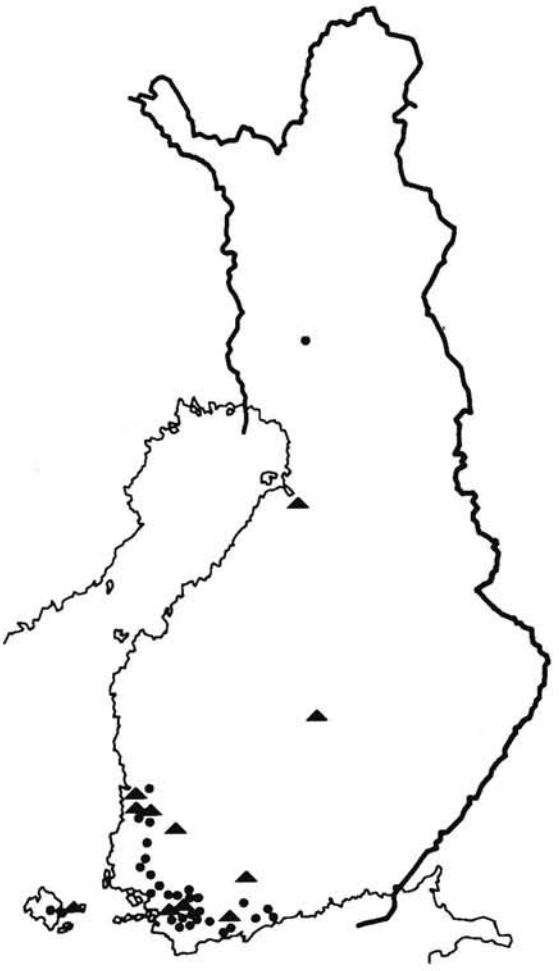

Fig. 4. The distribution of daggers (triangles) and sickles (dots) of flint in Finland.

LITERATURE

ANER, E. & KERSTEN, K. 1976: *Die Funde der älteren Bronzezeit des nordischen Kreises in Dänemark, Schleswig-Holstein und Niedersachsen.* Bd. II. Neumünster.

BROHOLM, H.C. 1943: *Danmarks bronzealder.* Bd. I. København.

– 1952: *Danske oldsager* III. Aeldre bronzealder. København.

CARPELAN, C. 1979: Om asbestkeramikens historia i Fennoskandien. *Finskt Museum* 1978.

– 1982: Om bronsålderns jordbrukssamhälle i Finland. In T. Sjøvold (ed.): *Introduksjonen av jordbruk i Norden.* Oslo.

EDGREN, T. 1969: Kotokallio in Lieto. Ein Grabfund aus der älteren Bronzezeit im Dorf Vanhalinna. *Suomen Museo* 1969.

– 1981: Lans och yxa. Kring trenne nya metallföremål från Finlands bronsålder. *Finskt Museum* 1979.

FORSSANDER, J.E. 1936: Die ostskandinavische Nørden während der älteren Metallzeit Europas. *Skrifter utg. av Kungl. Hum. Vetenskapssamfundet i Lund* XXII.

HACHMANN, R. 1957: Die frühe Bronzezeit im westlichen Ostseegebiet und ihre mittel- und südosteuropäischen Beziehungen. 6. *Beiheft zum Atlas der Urgeschichte.* Hamburg.

JUNGHANS, S., SANGMEISTER, E. & SCHRÖDER, M. 1960 & 1968: *Studien zu den Anfängen der Metallurgie;* 1. Metallanalysen kupferzeitlicher Bodenfunde aus Europa; 2. Kupfer und Bronze in der frühen Metallzeit Europas. Berlin.

LOMBORG, E. 1968: Frühbronzezeitliche trianguläre Metalldolche in Dänemark. *Acta Archaeologica* XXXIX.

– 1973: Die Flintdolche Dänemarks. Studien über Chronologie und Kulturbeziehungen des südskandinavischen Spätneolithikums. *Nordische Fortidminder,* Ser. B, Bd. 1. København.

MEINANDER, C.F. 1954a: Die Kiukaiskultur. *Suomen Muinaismuistoyhdistyksen Aikakauskirja* 53.

– 1954b: Die Bronzezeit in Finnland. *Suomen Muinaismuistoyhdistyksen Aikakauskirja* 54.

MIETTINEN, T. 1965: En idol från Hietaniemi i Luopioinen. *Finskt Museum* 1964.

SALO, U. 1972: Suomen varhaisimmat sirpit. *Kotiseutu* 4–5/1972.

– 1974: Pronssikeihäänkärki Kalannista. *Karhunhammas* 1.

– 1981: Satakunnan pronssikausi. *Satakunnan historia* I,2. Rauma.

SEGER, T. 1982: On the structure and emergence of Bronze Age society in coastal Finland: a systems approach. *Suomen Museo* 1981.

UENZE, O. 1938: Die frühbronzezeitlichen triangulären Vollgriffdolche. *Vorgeschichtliche Forschungen* 11. Berlin.

WATERBOLK, H.T. & BUTLER, J.J. 1965: Comments on the use of metallurgical analysis in prehistoric studies. *Helinium* V,3.

Appendix

Rolf J. Rosenberg

Technical Research Centre of Finland
Reactor Laboratory
SF-02150 Espoo 15
Finland

NEUTRON ACTIVATION ANALYSIS OF THE BROMARV AND LUOPIOINEN BRONZE OBJECTS

It is a common practice to try to identify the origin of archaeological objects by means of their trace element composition. Neutron activation analysis is a suitable method for the analysis of some of these elements, because its good degree of sensitivity allows the use of small samples. This is important as many of the objects at hand are rare and therefore valuable. In the following the analysis of a bronze sword and a bronze dagger is described briefly.

The samples were taken by drilling a 4 mm deep hole with a steel drill 3 mm in diameter. The first millimeter was removed before taking the sample in order to avoid contamination by the altered surface layer. The metallic components of the steel in the drill are Fe,Mn, Cr, Mo, W, V and Co. Samples of 15 mg were dissolved in quartz ampoules with ultrapure HNO_3 and diluted to 200 μl so as to avoid self absorption during irradiation. The tin in the bronze sample precipitated. A reagent blank was also prepared. As standards aquatic solutions of the appropriate elements were used.

The samples and standards were irradiated for 25 h in a thermal neutron flux of 10^{13} $cm^{-2}s^{-1}$ in the Triga Mk II reactor of the Technical Research Centre of Finland. After irradiation the samples were transferred into polyethylene capsules using a Pasteur pipette. The samples were agitated vigorously in order to transfer all the precipitate.

The samples were measured 5 days and again 13 days after the irradiation for one hour using an automatic gamma spectrometer. An Ortec Ge(Li) detector with a relative efficiency of 25 % and an energy resolution of 2.1 keV FWHM at 1332 keV and Nokia LP 4900 pulseheight analyzer were employed. Table 1 shows the elements analyzed, the radionuclides used and their nuclear data. Table 2 gives the results obtained.

The blank contained small peaks of ^{51}Cr, ^{60}Co, ^{187}W, ^{198}Au and ^{122}Sb these corresponding to negligible concentrations as compared with the results reported. Co is an exception because of the high ^{60}Co background in the laboratory. This had to be corrected. The low upper limits for Cr, W and Mo indicate that the samples have not been contaminated significantly by the drilling and thus the values for Co should also be true values. The high acid concentration of the samples ought to hinder the absorption of the radionuclides on the walls of the quartz ampoule. This has been demonstrated in an earlier work by measuring the quartz ampoule before and after sample removal.

Table 1 Isotopes used and their nuclear data.

Element	Isotope	Half-life	Gamma energy (keV)		
Cr	^{51}Cr	27.8 d	320.0		
Co	^{60}Co	5.63 a	1173.2	1332.5	
Ni	^{58}Co	71.3 d	810.3		
Zn	^{65}Zn	243.8 d	1115.5		
As	^{76}As	26.3 h	559.1		
Mo	^{99}Mo	66 h	140.5		
Ag	^{110m}Ag	250.4 d	657.7	884.6	937.4
Sb	^{122}Sb	2.74 d	654.0		
W	^{187}W	24 h	685.7		
Au	^{198}Au	2.70 d	411.8		

Table 2 Trace element concentrations in μg/g.

Element	Sword	Knife
Cr		<10
Co	24	95
Ni	270	1600
Zn	8.8	<50
As	137	1090
Mo		<20
Ag	4.6	90
Sb	66	1290
W		<3
Au	0.24	1,2