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Some aspects of Polish Early Medieval Metalworking

By Hanna Kóčka-Krenz


The first part of this paper consists of a review of scientific works on the problems of west-Slavonic gold and silver jewelry in the 9th—11th centuries. The chief problem considered here is the origin of silver jewelry in the west-Slavonic silver hoards.

The second part discusses the tools, the techniques of fabrication, the jewelry types and the remains of workshops. Finally the stages of the development of the gold and silver jewelry in the west-Slavonic area are summarized.


On the origin of silver jewelry

The research on the Early Medieval (9th—11th centuries) silver jewelry from Poland was primarily concerned with the problem of origin. It referred mainly to the material from the hoards which provided the chief source of information.

The hoards from the period in question include, apart from well preserved or damaged jewelry, coins, silver "discs", raw materials and containers in which such objects were kept. The most common object of study were the coins. So one sided an analysis of these finds led to false conclusions as to the origin of the silver jewelry found in them.

In the early stages of research the jewelry found in such hoards was as a rule thought to be of Arabic origin. The principal argument for such a theory derived from the association of the jewelry with Arabic coins. This observation was not confined to the Polish finds, but applied to silver jewelry found in hoards from Central and Northern Europe in general. The theory was proposed by B. E. Hildebrand (1846, pp. IX and XVII—XVIII)) who claimed that silver jewelry accompanies Arabic coins, and also that such jewelry was then still manufactured in Hindustan. No such artefacts were made in western Europe, but they are found in a form of rudimentary coins on the Baltic coast. Thus B. E. Hildebrand discarded the possibility of their production in Sweden. Furthermore such ornaments are not known from hoards later than the 11th century, nor are they found with later coins. Had they been made locally the production would probably have been continued after the 11th century.

Similar views were expressed in J. J. A. Worsaae's work on the silver treasure from Cuerdale, England (1847, pp. 203 f.). He discovered that bracelets from this hoard had an ornament of punched triangles with a point in the middle. Such ornament was assumed to be characteristic of Eastern crafts.

This assumption was questioned by a German numismatist working at Petersburg — B. Koehne. He pointed out that the frames and handles of the Carolingian and English denarii from Hoen, Norway could...
not have been made by Arab craftsmen. Moreover, he noticed the resemblance between Swedish and Russian jewelry from hoards and postulated Northern and Russian as opposed to Arabic origin (1852 pp. 11—12).

In spite of Koehne's arguments, the theories of B. E. Hildebrand and Worsaae were generally accepted. Hans Hildebrand, however, modified this view (1870 p. 94), saying that the silver bracelets (with octagonal cross-section), since they were found in older hoards with exclusively Arabic coins, were made in Arabic countries. On the other hand, other types of bracelets are Scandinavian imitations of Arabic prototypes. In another work, however, H. Hildebrand admits that some jewelry from Gotland is of local workmanship; other are of varying provenance (1873 pp. 187—190).

The German scholars of the 19th century E. Kuster and O. Voss also propounded theories of Arabic origin, even as regards the simplest artefacts of bronze. This extreme view was questioned by R. Virchov, (1877 pp. 393—394), who thought that jewelry with punched triangles (so called "wolf's tooth" ornament) was Arabic in character. E. Friedel (1895 pp. 144—145) doubted an Arabic origin per se, suggesting a Byzantine source. He cited the great variety of jewelry from the hoards and their possible origin anywhere along the great trade routes. The Byzantine origin of the majority of the jewelry is indicated by high degree of technology, definite style, excellence of filigree and form of the ornaments. Support for this theory was seen in the strong contacts, not merely in trade, between the Normans and Byzantium. He did not exclude the possibility that some jewelry was made by the Varangians of Russia or the Slavs in Prague.

E. Friedel's views were not accepted and the Arabic theory, although in a more generalized form, still prevailed. J. R. Aspelin's opinion (1878 p. 10) that some silver ornaments with thick filigree, found in Perm district, were based on the 6th—7th Century Siberian prototypes and therefore could not have come from Arabia, was rejected as well.

Aspelin's views were further developed by H. Kemke in his study of the Marienhof treasure (1916 pp. 79—96). He noted H. Hildebrand's opinion concerning the variety of forms in Swedish, Western Slavonic and West European hoards. He also commented that filigree is known in the North from the time of Roman influence, and that the Arabic written sources make no mention of trade in filigree ornaments with northern Europe. Furthermore, North European jewelry decorated with filigree is indisputably different from the Arabic.

The Polish numismatist M. Gumowski, working on the Polish coins of the 10th century, expressed only certain doubts as to the Arabic origin of silver jewelry (1905 p. 10/186). These doubts were prompted by finds of earrings with pendants in the shape of a cross, which are not found with Arabic coins. H. Kemke's views were enthusiastically accepted by Father K. Chmielecki in a work on hoards, where he firmly contradicted the Arabic theory (1907 pp. 1—44).

The analysis of mutual influences between the Swedish and Oriental cultures was the basis of a new theory submitted by T. J. Arne (1914 pp. 209—210). In his own research, Arne distinguished several cultural groups in Eastern Europe, especially as regards the origin of Eastern crafts which were represented in Sweden. The imports from the post-Sassanide culture area include no artefacts with stylistic and technological features characteristic of jewelry from Polish and Western Slavonic hoards. In the case of the artefacts of Western Slavonic type found in Sweden, the only analogies known are those from Western Slavonic territory. Thus Arne recognized them as local products but believed that they originated in south-western Russia. In his view they were made as a result of Oriental, Byzantine and partly Scandinavian influences. Arne's position was an attempt to combine the theory of Arabic origin of jewelry with that of their local manufacture.

The popularity of the Arabic theory is manifest in the works of L. Niederle (1931 p. 129), who maintained that silver jewelry from Slavonic hoards came mainly from the
workshops of Persia, Arabia and Turkestan. Such a view was also supported by J. Schränil.

An intermediate position of a combined local and Oriental origin of the jewelry was adopted by the German scholars H. Seger (1928 p. 157) and R. Beltz (1929 pp. 24—25).

R. Jakimowicz (1933 pp. 103—136) examined in modern terms the problem of the origin of Early Medieval silver hoards from Slavonic lands. He started by tracing the routes along which such jewelry could have reached Poland. The distribution of the Arabic coins, which accompany jewelry, should identify the routes. In addition, he attempted to study other components of hoards which came to light in areas where Arabic coins marked certain routes. Jakimowicz also distinguished between the true Oriental elements and their local imitations which appeared in territories traversed by coin routes in Slavonic areas. The objective of this study was to establish whether jewelry of local production was of original design or whether it imitated imported goods.

The distribution of Arabic coins indicated that the coins did not reach Poland directly. They came by a circuitous route: from Bulgar on the Kama by the waterways of the Volga, Lovac and Volhov rivers, then via Lake Ladoga to the Baltic. From the Baltic they reached Scandinavia, and via Gotland the southern shores of the Baltic Sea. Such a route would also have to be followed by accompanying jewelry which would therefore be found in Scandinavian hoards. However, jewelry from Scandinavian hoards is essentially different from the Western Slavonic types. Byzantine coins which reached Poland came along the same route as the Arabic ones. This allowed Jakimowicz to assume that the 10th and 11th century Byzantine influences were not very strong (also regarding designs of silver jewelry). One of the elements contributing to the distribution of the Arabic coins was the Varangians. This is documented, on the one hand, by literary sources, and on the other, by the concentrations of finds at Ladoga, Novgorod, Izborsk, Polock, Smoleńsk, Kiev, Czernichów, Rostov and Rjazań. The quantity of coins diminished westwards, implying trade along the coast.

On the basis of the content of hoards with Arabic coins Jakimowicz distinguished several territorial groups with various types of ornament. He also demonstrated the interrelationship of neighbouring groups and the degree of influence. Of the 15 groups which he defined, the one immediately relevant is no. I. It includes almost all of Poland and the greater part of the north-western Slavonic territory. The hoards of this group contain Arabic, German, Anglo-Saxon, Scandinavian, Byzantine, Polish, Bohemian, and Hungarian coins, as well as various types of jewelry. The jewelry is small and delicate, made of thin wire and sheets of silver, with finely ornamented filigree and granulation. This group includes various types of earrings, more rarely pendants such as lunulae or round charms, amulet containers and beads of various types and sizes. Wire objects are nearly all necklaces with hammered, elongated ends (with punched ornament), equipped with two hooks or a hook and a loop.

Scrutiny of the content of the Early Mediaeval hoards shows that jewelry of group I differs, both stylistically and technically, from silver jewelry found in other areas. Thus Jakimowicz concludes that there is no question of the eastern origin of the ornaments from group I; they were made in the area of Western Slavonia.

The work of Jakimowicz impelled the Polish, Scandinavian and some of the German scholars to accept his theory of the local origin of jewelry. Some of them, however, (e.g. H. Preidel), agree with Jakimowicz in his differentiation of the Western Slavonic jewelry group, but derive it from the monastic workshops of western Germany. Others, such as W. Frenzel and W. Petsch, questioned the Polish origin declaring that, with the exception of templering (Schläferringe) and finger rings, the ornaments do not appear in contemporary graves and that those found in hoards were deposited in fragments, i.e. as raw materials.
The argument from the absence of silver jewelry in the graves was disproved by two Scandinavian archaeologists (R. Skovmand 1942 pp. 234–243 and M. Stenberger 1958) who used analogies from Scandinavia and also stressed the fact that the contents of the graves is governed solely by the burial ritual. Both scholars furthermore underlined the differences between the Nordic and Western Slavonic jewelry. Among the Polish writers the theory of the local origin of the silver jewelry was supported by Z. Rajewski (1954 pp. 3–22), Z. Hołowińska (1959 pp. 55–105), Z. Bukowski (1960), J. Kostrzewski (1962 pp. 139–211), W. Szafranński (1963 pp. 367–380), and W. Hensel (1965 pp. 188–207). J. Kostrzewski in his work questioned the lack of silver jewelry in the graves, since he could cite a goodly number of graves with filigree silver jewelry. Moreover, ornament are also sporadically known from settlements. The use of jewelry is also attested in the imitation in cheaper materials such as bronze, tin and lead. W. Szafranński, however, though he does not object to the idea of local production, also underlines the possibility of Arabic influences theron. In view of the fact that Arab traders reached Poland in the 10th century their goods may be assumed to have given some impetus to local imitation, especially in terms of filigree and granulation. Apart from the above mentioned water route, the Arab traders could also have used another — from Baghdad to Trebizond on the Black
Sea, then towards the Dnieper estuary, along the Dnieper river to Kiev, and then directly west to Poland. The existence of such a direct route is evidenced by the similarity between silver jewelry from this group and group XIII of Jakimowicz (the so-called Wolyn-Kiev group). One can therefore challenge the degree of such influences but not eliminate them completely.

Kiersnowski (1960) took a different stand on the subject of the origin of silver jewelry found in Poland. He thinks that, apart from the fillets, finger rings and some necklaces, all other jewelry, particularly the filigree, was imported. It came from Russia or even further away, as far as the Muslim East, together with Arabic coins. This theory prompted J. Kostrzewski to take another look at the distribution of various types of Western Slavonic jewelry, and the extent to which they occur outside Poland. Furthermore, he compared the ornamental techniques of Polish jewelry with those of the neighbouring, and even of more distant lands. Kostrzewski’s research shows that most silver jewelry from Polish hoards is concentrated in Western Slavonia. It does not appear on the probable route westwards, i.e. in Russia and Eastern Poland. Apart from Western Slavonia such jewelry has been found in Scandinavia, where it is considered as an import from West Slavonic territories. In view of the discoveries of gold workshops and gold-working tools in Poland these artefacts can be considered of local manufacture.

In general, following W. Hensel’s discussion of the origin of silver jewelry in Poland, it must be said that it is of local workmanship, based on local traditions. Some foreign influences are however manifest, particularly from Byzantium and Arabia (brought via Bohemia and Moravia) and also some Scandinavian traditions.

Raw materials, workshops, tools and types of jewelry

The craftsmen of Western Slavonia made ornaments primarily from silver, more rarely gold. They also used bronze, tin, lead and/or tin-lead alloy, rarely copper and brass, and occasionally even iron. In the 9th, 10th and 11th centuries these raw materials, with the exception of iron, were imported. Later they were either imported or came from local sources. In the 9th, 10th and the early 11th century silver was derived mostly from Arabic coins. Later, in the 11th and the beginning of the 12th century it was obtained from German (especially Saxon), Bohemian and to a lesser extent Hungarian, English and Scandinavian coins. These coins reached Poland in the course of trade exchanges and also as tribute or spoils of war. These were undoubtedly the primary sources of silver before the exploitation of local deposits. Their use as raw material is evident from the finds of silver bars which were made from melting the coins, and which occur in hoards.

Written sources testify to the exploitation of local deposits of silver in the Cracow-Silesia district. These documents date from the early 1100’s, although they may represent slightly earlier working, maybe from the end of the previous century. The mining of precious metals becomes more common only during the 13th century. Silver was obtained from galenite ore, which also provided lead. Polish Early Mediaeval gold is mostly of foreign extraction, acquired primarily as spoils of war. A small quantity of gold was also washed out from gold-bearing sand in Lower Silesia. Exploitation of gold from the arsenic ores began in Silesia only in the 13th century. Tin is found in Lower Silesia, but although the deposits were known by the end of the 12th century, they were of no importance in the local production of bronze. Tin was imported to Poland from Bohemia, which is evident from the information of Ibrahim/Jacob of the 10th century. Copper was not exploited in Poland during the 10th—13th centuries. It was imported, most likely from the Erzgebirge or from Transylvania. Iron was commonly used in Early Mediaeval times, refined principally from bog ore and, in the area of the Swietokrzyskie Mountains, from hematite ore.

There are only a few archaeological sources
in Poland relating to the actual production of gold artefacts. The tool inventory consists of crucibles from Biskupin near Żnin, Wolin, Błonie near Grodzisk Mazowiecki, Wiślica, Gdańsk, Kruszwica and Włocławek. These are cylindrical clay crucibles, with a very glassy interior and traces of metals such as copper, tin and lead. There are also moulds for the production of bars and wires, known for example from Poznań-Ostrów Tumski or Gdańsk. In addition moulds for jewelry from Opole (two moulds for pendants in the shape of a cross), from Wolin and Barczewko near Olsztyn (for lunulae and charm). There are also both clay and stone tools. Bronze matrices for pressing ornaments from sheet metal were found at Biskupin and Brześć Kujawski. The latter find was intended for the production of trapezoidal amulet containers. Among other tools worth mentioning are: a draw-plate from Gniezno, a mould with two depressions from Biskupin and a pair of tongs from Błonie near Grodzisk Mazowiecki. Other tools include chisels, punches, shears for sheet cutting, files, hammers and small anvils. Apart from metal tools, the metalworkers most probably also used a whole array of tools made of organic materials, as evidenced by finds from Russia.

Many techniques were used in the production of jewelry. With the application of basic methods such as casting, hammering and wire-making it was possible to obtain a finished artefact, without the necessity for further shaping. Artefacts made by one of these techniques were additionally decorated by means of embossing, impressing, engraving, filigree, granulation and incrustation etc. Moreover, finishing techniques such as plating with gold and silver, cutting and polishing were also used. These techniques were frequently combined, particularly in the production of high quality jewelry. Silver ornaments were made primarily from thin sheets and wires, only exceptionally were they cast. Jewelry from the less precious raw materials were however frequently cast, more rarely hammered or twisted from wires (which were in any case much thicker than those used in silver goods).

Silver jewelry is known primarily from hoards although it also occurs in graves and settlements, especially those which resembled early towns.

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Fig. 3. Earrings and lunula pendant — örhängen och halvmånformigt hänge. 1—4. Earrings — örhängen (1. with cylindrical beads — med cylindriska pärlor; 2. with two animal heads — med två djurhuvuden; 3. with an empty long pendant — med långt tomt hänge; 4. with corn pendant — med axformigt hänge; 5. cross-shaped open-work — korsformigt öppet filigranhänge). 6. Lunula shaped pendant — halvmånformigt hänge.

The following types of jewelry can be distinguished:

(1) Necklaces — made of four or six twisted wires with the ends flattened to form little plates. The plates, covered with punched geometric motifs, have hook and loop clasps. They are of local, Pomeranian-Great Poland origin, though with some Scandinavian influences. Fig. 1: 1.

(2) Amulet containers — made in two types. The older type, Fig. 2: 1, dated to the 9th—11th centuries, are in the form of rectangular boxes with cylindrical handles, ornamented with filigree and granulation and with plastic ornamentation of smooth or notched bosses or rows of horse’s heads. These are also of local production, maybe with some

Fig. 4. Oval beads ornamented with granulation and filigree. — Ovala pärlor ornerade med granulation och filigran. Obra Nowa, woj. Zielona Góra. Collection: Muzeum Archeologiczne, Poznan, inv. nr 1950: 76 (Slaski & Tabaczyński 1959 pp. 44—45).
Bohemian influences. The younger type, Fig. 2:2, manufactured from the beginning of the 11th century onwards, are trapezoidal. They are made from silver sheets decorated with empty bosses soldered onto the surface. Some amulet containers were produced by pressing them out in a mould, with a central figural motif such as the tree of life, animals and birds in antithetic formation, or representing a walking griffin and lion. These motifs are Eastern in character, but were most probably transmitted from western Europe. Here they were assimilated, underwent various changes and then, together with other Romanesque elements, through Bohemian sources were incorporated into Polish metal-working. Trapezoidal amulet holders are also of local manufacture, which is evident in the find of a bronze mould from Brześć Kujawski.

(3) Earrings — made in a variety of forms, largely on Polish territory. They include: starshaped earrings (second half of the 10th—beginning of the 12th century), from the beginning of the 11th copied in tin (Fig. 1:8); earrings with three cylindrical beads (second half of the 10th century) (Fig. 3:1); semi-circular earrings with chain attached pendants (9th/10th—11th century) (Fig. 1:2); earrings with oval beads (so-called Tempelhof or Świątecki type), second half of the 10th century, made in imitation of Moravian prototypes (Fig. 1:3); basket earrings (after 962 until second half of the 11th century), most probably imitations from Bohemia or Moravia (Fig. 1:5); earrings with an empty, long filigree pendant (beginning of the 10th—11th century), artefacts of local manufacture (Fig. 3:3); earrings with two animal heads (960—1050), of local manufacture, (Fig. 3:2); crescent earrings with corn pendants, in all probability copies of Moravian ornaments, or imports (Fig. 3:4); earrings with cast grape pendant (second half of the 10th—beginning of the 11th century), Polish artefacts, are either imitations of southern forms or imports (Fig. 1:4); cross-shaped open-work earrings (960—1060) (Fig. 3:5).

(4) Beads — also of various types. The most common are beads with bosses, oval beads ornamented with filigree, biconical beads and beads made of two pyramids joined together with four stalks of zig-zag wire. Fig. 1:7 och 4.

(5) Clasps — for pinning together clothes, in form imitating the ends of silver necklaces.

(6) Finger rings — made of metal strips or wire.

(7) Temple rings (Schläfenringe) Fig. 1:6 — of several varieties, the most common being S-shaped and empty (of Pomorze type) made of sheets—they are ornamented with geometric, floral or animal motifs.

(8) Lunulae — which are partly Russian imports, though there is evidence for local manufacture as well Fig. 3:6.

Silver jewelry was copied in cheaper raw materials. For example, earrings with beads were made of bronze, star-shaped earrings of tin. Beads were cast from tin, lead or tin-lead alloy. Trapezoidal amulet holders were made of bronze and tin, lunulae were cast from lead and clasps were beaten out of bronze sheets.

There are only four metal workshops known in Poland — at Blonie, near Grodzisk Mazowiecki, at Tum, near Łęczyca, at Kruszwica and at Gdańsk. It consisted of two buildings, one dated to the end of the 11th century and the beginning of the 12th, the other to the first half of the 13th century. Each contained a hearth, ovens with clay domes and evidence of metalworking in the form of tools, raw materials — copper, brass, tin, lead and silver, unfinished artefacts, and debris.

On the basis of the archaeological and written sources a differentiation in the field of metalworking can be established. This depended on the craftsman’s degree of technological skill, and the social position of the client. Thus we can talk of the village craftsmen working in the vicinity of less important cities, city craftsmen working in the major cities and "palace" craftsmen working at the castles and stately homes of princes.

Metalworking was distinguished from smithery from the 9th century onwards. Definite development is evident from the be-
ginning of the 10th century. Through the 11th and 12th centuries the city crafts surrendered to mass production. The production of metalworking craftsmen satisfied the needs of the internal market with mass production and catered for the feudal needs with artefacts of high quality.

The results of research on Western-Slavonic gold- and silver jewelry from the period 800—1100 A.D. are still unsatisfactory. There is a great lack of knowledge concerning both the techniques of manufacture and a need for a thorough stylistic analysis of the jewelry. To get a more representative picture of the work of gold- and silversmiths a reconsideration and deeper analysis is necessary of the silver hoards and of jewelry from workshops and graves.

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Några synpunkter på tidig-medeltida ädelmetallsmide i Polen

Studiet av tidig-medeltida silversmycken har under sin första etapp främst kommit att ägnas frågan om smyckenas ursprung. Detta hänger intimt samman med att det i första hand var de i skatterna ingående och till präglingsort bestämbra mynten som kom att granskas.


Jakimowicz' grupp I omfattar nästan hela Polen och större delen av de nordvästliga slaviska landområdena. I här påträffade skatter ingår, förutom arabiska, tyska, anglosaxiska, skandinaviska, bysantinska, polska, tjeckiska och ungerska mynt, även små, fina smycken tillverkade av tenn och tinn, smidd och driven plåt och tråd som ornerades vid filigran och granulation. Smycken som tillhör denna grupp skiljer sig radikalt från sådana ur andra territoriella grupper, såväl från teknisk som stilistisk synpunkt. Jakimowicz hävdade att silversmyckena i grupp I utgör lokala, västslaviska produkter.

Jakimowicz' synpunkter blev erkända av både polska och skandinaviska arkeologer samt även av vissa tyska forskare men man fortsatte med ingående diskussioner. Sammanfattnar och generaliserar man W. Hensels reflexioner om den dryftade periodens silversmycken från polskt område så kan man hävda att de är lokalt tillverkade men under främmande påverkan, i synnerhet bysantinsk och arabisk sådan (genom tjecko-moravisk förmedling) men även i viss mån skandinavisk.

För smycketillverkning använde de västslaviska hantverkarna först och främst silver, mera sällan guld, men även brons, tenn, bly eller legeringar av bly och tenn. Sällan användes koppar och mässing och mera sporadiskt stål. Bortsett från stålet tillverkades dessa produkter under perioden 800—1100 huvudsakligen av importerat råmaterial.

Redskap, fåtaliga verkstadslämnings och färdiga föremål, påträffade i Polen, vittnar om att silversmycken tillverkades i första hand av tenn och tinn, smidd och driven plåt och tråd som ornerades med filigran och granulation; de göts sällan. Däremot förekom gjutning ofta av smycken av enklare material och dessa var i sin tur sällan smidda eller flätade av tråd. Bland silversmyckena kan man ur skilda halsringar, amulettkapslar, örhängen, pärlor, dräktspänningar, ringar, tinningssmycken och lunulaformade hängen.

På grundval av arkeologiska fakta och andra källor finner man hantverkkaruppror som arbetat vid hov, i staden och på landsbygden. Stadshantverket hade mellan 1100- och 1200-talet övergått från produktion i liten skala (på beställning) till produktion för massavsättning, varmed man tillgodosåg den inhemska marknadens behov och samtidigt förverkligade feodalherrarnas beställningar av föremål av högre kvalitet.