

POLISH RESEARCH INTO MEDIEVAL AND MODERN COIN METAL (FINENESS TESTS)

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As in the numismatic research all over the world, Polish research into coin metals split into two epochs which were differentiated with the most general feature of the research, that is its scope or, strictly speaking, its subject. For a long time, numismatists have wanted to know about the metal less rather than about its fineness. It was only in recent decades, when Polish numismatists started to ask about the full content of the coin alloy, and, to say the truth, they still do not ask about, *e.g.*, the physical structure of the coin.

As early as in the eighteenth century, Chamberlain Felix Łoyko (1717-79) used touchstone to test Medieval Polish coins or items what regarded as these. He commissioned the assayer of the Royal Mint in Warsaw, Antoni Schröder, to test the coins. (Piekosiński 1878 45; Suchodolski 1988a 140; Madurowicz-Urbańska 1976 91) Unfortunately, the test results were never published and it was only Tadeusz Czacki (1765-1813) who quoted Łoyko's results later (Czacki 1800, table at the page 179).

1. Friedrich August Voßberg

The first scholar who ordered and consistently used the metal fineness tests for Polish and related medieval coins was Friedrich August Voßberg (1800-1870), a German numismatist and coin researcher. Rare coins were tested by Voßberg with touchstone. He was supported by Gottfried Bernhard Loos (1774-1843), the general warden of the Royal Mint in Berlin. Loos used more than touchstone: he melted down selected coins and made chemical analyses of them. Voßberg used these data in his two fundamental works, *i.e.* in that about the coins of the towns of Royal Prussia (Voßberg 1841) and in the other one, on coins of the Teutonic Order in Prussia (Voßberg 1843). Most probably, Voßberg has gathered the data for a long time, giving successive coins to be analyzed by Loos. The results were sometimes astonishing. *E.g.*, Loos made three tests of bracteates from the first half of the fourteenth century. A very low metal fineness of these coins has been shown. The twentieth-century XRF analyses gave varied results of similar coins, greater part of them being of relatively high quality, *i.e.* about 60-70 per cent of fine silver, but several coins turned out to be made of a base metal containing less than 20 per cent of fine silver, *i.e.* exactly as Loos's tests said (Suchodolski 1981 177-9; Suchodolski 1988b 49-54). So Loos's test were probably correct but the coin selection made by Voßberg was perhaps improper. Perhaps Voßberg took bracteates to be tested from a hoard complex containing counterfeit coins. We will meet, however, a similar set of data more than a century later. Other results by Loos, related to double-sided coins, unexpectedly fit with the data of written evidence and also with data which were unknown in Voßberg's and Loos's epoch which misunderstood them. So Loos's analyses look like the truth.

Some other misunderstandings resulted probably from the practice of juxtaposing of data taken from melting down together certain examples of different weights. One can guess that corroded, clipped, broken and other damaged coins, generally speaking: coins of substandard weight, were melted down, whereas the better preserved and intact coins were regarded as representative enough to be weighed. Nevertheless, this lower weight might be caused not only by damages but also might be deliberate. It looks quite often in the later middle ages as if the total weight of a coin was reduced and the fineness was enlarged without changing the official mint standard. That practice enabled the mint to spare copper which would make an extra cost of coinage.

2. From Stronczyński to Friedensburg

In the first work of the most prominent Polish coin researcher of the nineteenth century, Kaźmirz Stronczyński (1809-1896), (Stronczyński 1847) one can often find opinions about coin fineness, *e.g.* 'fine

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silver' for Moravian coins of Prince Břetislav I (1029/31-1048) with the name of Vsebor (Cach 1970, no. 300) or for Polish coins with the legend MISICO (Suchodolski 1967, type II). Or, *e.g.* 'silver varied between sixteen and eight lots' for an abundant type of eleventh century cross-pennies, 'silver of a low standard, varying between five and ten lots' for a penny from the princely period of Boleslaus II of Poland (1058-1080), or 'silver of 12 lots' for a penny of Boleslaus III (1102-38) of his type 1. (Stronczyński 1847 250, 254, 255, 258, 262, 265) Sometimes the information is more complex, *e.g.* 'Silver varied. It is usually fine but sometimes, pieces seem to be struck from a metal mixed with copper, and even used as base as up to seven lot fineness' (this concerns the penny of Boleslaus III showing the prince fighting a dragon: Suchodolski 1973, type 4). (Stronczyński 1847 265.) One can guess that the author examined coins many times using touchstone.

In the other classical work by Stronczyński (Stronczyński 1883-5), one can hardly find data on the coin fineness. *E.g.* in the description of the Majków hoard, Stronczyński writes about the jewellery: 'made from silver almost 16 lots fine' but says nothing about the metal of coins. (Stronczyński 1883-1885, vol. I 54) But sometimes we can find a piece of information like the previous one, *e.g.* about pennies of Boleslaus II in his royal period (1076-1079/80) (Suchodolski 1973, type 2): 'the silver is basically heavily mixed with copper and in some examples the fineness drops to five lots' and, in other cases, 'made from somewhat worse silver' or 'silver that pure drops to eight lots'. More often, the information is very general, *e.g.* 'pure silver', 'good silver', 'silver, as it looks, mixed with copper but generally good enough' (Stronczyński 1883-5, vol. I 238; vol. II 17, 19, 20, 47, 49, 53, 58, 59, 63, 66-7, 71, 72). Only once we meet the author drawing a conclusion from these data, when he noticed that a certain penny type of Boleslaus III (Suchodolski 1973, type 4) has 'usually pure silver but also one can find examples made from silver mixed with copper, and sometimes even seven lot silver, probably contemporary forgeries'. (Stronczyński 1883-5, vol. II 73) We see that larger differences of silver fineness among coins of a single type made Stronczyński guess a forgery even if the die impressions gave no reason for suspicions.

In the third volume of the same work, Stronczyński quoted more detailed data about Polish coins from the fourteenth and fifteenth centuries. *E.g.* he noticed that kwartniks of King Casimir III the Great (1333-70) drop in fineness from fourteen to nine lots. It was different with groschen of this king. All of them have thirteen lots, which indicates that their time of issue was short. So Stronczyński's conclusions regarded not only the mint standard, but also the dynamics of its changes (Stronczyński 1883-5, vol. III, 22). But these data were not the results of Stronczyński's own research; instead were quoted from the work of Franciszek Piekosiński (1844-1906). *E.g.* Piekosiński observed in Ruthenian halfgroschen of Polish King Ladislaus II (1387-1434), silver that varied between fourteen and six lots (Piekosiński 1878 149). This indicates, as Piekosiński and Stronczyński thought, chronological differences between the issues (Stronczyński 1883-5, vol. III 64.).

Sometimes Stronczyński verified the data given by Piekosiński, but he avoided a detailed information, *e.g.* he noticed that some coins looked better than Piekosiński had stated. In another case Stronczyński observed that some halfgroschen of King Casimir IV (1437-1492) that he had seen, from the early period of the king's reign, were 'made from almost pure copper' but he gave no details (Stronczyński 1883-5, vol. III 71). Both opinions about the coin metal were probably based upon judging from their appearance rather an examination. Interestingly, this time Stronczyński dismissed the suspicion of forgery because of well cut dies of these copper halfgroschen and their perfect impression. In my opinion, the halfgroschen 'from almost pure copper' were obvious forgeries.²

Stronczyński also verified data about coin standard given by Ignacy Zagórski (1788-1854) in his work on modern Polish coins (Zagórski 1845). Seeing that Zagórski's information did not meet a basis in documents quoted by him, Stronczyński guessed that Zagórski had used his good connections with the Warsaw Mint where a dozen coins might have been melted down and examined (Stronczyński 1883-5, vol. III, p. 146). For Stronczyński himself, the only source of information about the modern coin standard were mint ordonances. However, regarding Lithuanian thirty-groschen coins from 1564 (Fig. no 1) which were deprived of this evidence, he noticed that their silver fineness was too poor as for talers, but again he gave no details. One can guess that Stronczyński determined the fineness according to the outer look of the coin (Stronczyński 1883-5, vol. III 161). Generally, at this stage of his research, Stronczyński commissioned

² The early halfgroschen of Casimir IV are generally rare and absent from finds. Quite recently, in 2006, such a 'copper' halfgroschen has been found in Gdańsk, Żytnia Street, that is, outside the area of everyday circulation of genuine coins which was limited to the borders of the Crown of Poland.

touchstone tests but he did not entrust the results and used them to generally determine a coin quality rather detailing the accounts, particularly of a mint standard.

Franciszek Piekosiński, the outstanding Polish medievalist who worked, among others, on Polish later medieval coinage and monetary history, gave some general remarks on coin metal examination in the eighteen-seventies:

'A touchstone examination is universally applied which does not destroy a coin and [...] everyone can make it. Its results, however, are neither accurate nor quite reliable. The touchstone enables the determination of the fineness within an accuracy of one lot, or, for a well-trained eye, half a lot. One cannot be certain, though, because the metallic sheen deludes eye many times. A fire examination, though, gives the most accurate result, expressed in thousandths. But it needs various devices as a test furnace, extremely sensitive scales etc., or, one has to turn to an assay office or a mint office for help. And, what is the most important, one has to sacrifice a coin. [...] Even the fire examination may give a false result if one accidentally takes a counterfeit coin. Therefore, if one wants to have a reliable result, one must put several examples through a fire examination for inspection.' (Piekosiński 1878 9)

Obviously, Piekosiński could 'put through a fire examination' only the most common coins³ with one exception. He was given by Karol Beyer, and exactly for assay purpose, a small crumb, accidentally broken off from an extremely rare coin. There were two examples of the Mazovian duke Siemowit III's silver coin known at that time, regarded as *kwartnik* or half-groschen, and none of them has been preserved until today (Fig. no 2). The crumb turned out to be 610/1000 fine (Piekosiński 1878 154). Apart from that, Piekosiński made and published the longest series of touchstone examinations of Polish later medieval coins. Unfortunately, he did not provide documentation needed by a present-day researcher, as *e.g.* descriptions and photographs of the tested examples. However, as Voßberg's experience shows, these data might be used at least for reconstructions of actual mint standards. Piekosiński competently compared the experimental data with written evidence.

Karol Beyer (1818-77) used the touchstone only when researching the Wieleń hoard from the very end of the thirteenth century: 'as far as the fineness is concerned, it may be given only approximately, according to the touchstone examinations', he wrote (Beyer 1876 11). About one of the bracteate types, Beyer gave such a supplementary note: 'In the description a thirteen lot fineness is given, but this looked strangely high so we examined a greater number of them. Then we have found examples of a twelve and eleven lot fineness, so we assumed twelve in average' (Beyer 1876, 56). This indicates certain proficiency at determining the fineness according to the outer look, which was next verified with touchstone.

The author of an important description of the late twelfth century Głębokie hoard of bracteates, rev. Ignacy Polkowski (1833-88), either finds pure silver or passes the fineness over in silence (Polkowski 1876). This looks like a result of an outer look examination only. Count Stanisław Walewski (1840-1896)⁴ who wrote a great monograph on Polish three-groschen coins, did not examine coin fineness at all. He wrote about supposed forgeries: 'they visibly do not meet the prescribed standard and fineness' (Walewski 1884 203), which he estimated after the outer look.

The father-founder of the Silesian numismatics, Ferdinand Friedensburg (1858-1930), continued Stronczyński's studies on bracteates from the late twelfth and early thirteenth centuries that he recognised as Silesian. Later, some of them turned out to come from other parts of Poland, though. In his introduction to the problem of bracteates he wrote: *Einzelne Stücke [...] halten 14 Loth, sind also fast ganz fein, da man das Silber damals bei uns wohl kaum hat viel feiner darstellen können, andre sind 12löthig [...], noch einige nur 10löthig [...]* (Friedensburg 1888 17). As can be seen, Friedensburg referred to touchstone tests, and within an accuracy of two lots only. Unfortunately, nobody has checked his results more accurately till now. The later group of Silesian bracteates, the so-called large module bracteates, were tested more carefully, since they gave results of 10, 13, 14 or 15 lots (Friedensburg 1888 19). One can guess they were also touchstone tests. Friedensburg noticed that bracteates were remarkably different in respect of silver fineness occurred

³ *E.g.* the fire examination of two Polish half-groschen of King Alexander which gave the results: 368/1000 and 375/1000 (Piekosiński 1878, 98).

⁴ The date of his death given by Strzałkowski, *i.e.* August 1872, is obviously wrong (Strzałkowski 1991 130). According to the website, *Potomkowie Sejmu Wielkiego* (<http://www.sejmwielki.pl:2318/sejmwielki?p=stanis+aw;n=hr.+colonna+walewski+z+walewic+h.+pierzcha+a+kolumna>, Stanisław Walewski died on 22 March 1896 at Grzybień. This matches other information on his numismatic activity: he sold his collection to Count Andrzej Potocki of Krzeszowice in 1893.

together in hoards. This group of coins was tested with analytical methods in the nineteen-nineties and gave generally much worse results.⁵ However, the latter tests have never been published.

3. How Gumowski was deceived by an assayer

In 1914, Marian Gumowski (1881-1974) mentions in his 'Handbook of Polish numismatics', among other necessary examinations every coin must be put through, 'to make an assay'. Next, he explains: 'There are two ways used to do it. First, one can melt down a coin and make a chemical analysis that results reveals the pure silver content [...]. Secondly, one can use touchstone [...]' (Gumowski 1914 34-5). He quotes scarcely the results of such investigations, looking for an actual mint standard. More often he uses these results in his other works. *E.g.* in the pamphlet 'Lithuanian medieval numismatics', in view of numerous coins of uncertain denominations, he guesses these denominations according to results of touchstone examinations. In the monograph of the Vilnius mint in the sixteenth-seventeenth centuries, the data on the coin fineness were used for calculations of the actual mint standard of coins struck after uncertain ordinances or those which are uncertain in respect of the Polish or Lithuanian monetary system they belonged to (Gumowski 1921 41). Gumowski widely used also the chemical data given by Piekosiński. He regarded the unique Lithuanian groschen of Alexander II (1492-1506) as a pattern piece because of its improper fineness (Gumowski 1921 19-20). We know today that this coin was an antiquarian deception.

About the same time, in 1918, Jarosław Doliński (1881-1971) demonstrated gravimetric analysis to Polish researchers, naming it a 'hydrographical method' (Doliński 1918). I did not find anybody who used it for research purposes, although it remains popular among collectors. The touchstone method was in frequent use instead. *E.g.*, Wiktor Wittyg (1857-1921) examined the Drwęca hoard from the tenth-eleventh centuries which was probably the first hoard examined in full (or at least in representation of all variants which is not clearly stated) (Wittyg 1920). Wittyg involved the fineness as one of arguments in the great discussion about the provenance of cross-pennies. Earlier, the same author examined the Viking-age hoard from Kuiavia and the hoard of Lithuanian coins from the fourteenth-fifteenth centuries, found in Raudondvaris, Lithuania (Wittyg 1886).

During the nineteen-twenties, the fineness tests completely disappeared from Polish numismatic research. And even later, during several decades after the Second World War, Gumowski was the only scholar who used the traditional methods of examinations. He commissioned an assayer to examine the Teutonic bracteate hoard found on the Kaszownik pond in Toruń. These were touchstone examinations exclusively. Basing on their results and on the comparison with the same examinations of similar bracteates from other sources, he found the fineness of Kaszownik coins surprisingly low, less than 200/1000 on average. He came to the conclusion that the Kaszownik coins are a hundred years later than Teutonic coins of similar types made of better silver, c. 500-700/1000, in the first half of the fourteenth century (Gumowski 1962). This had serious consequences regarding methodological thought in Polish numismatics: if the coins which are identical in types differ so remarkably in fineness, which indicates also a difference in their epoch, a research into coin types plays only an auxiliary part towards metal examinations and, strictly speaking, towards fineness tests.

Later examinations made with the XRF method, of the same coins of the Kaszownik hoard, showed that the metal fineness was commensurate with other Teutonic bracteates of the same types, struck in the first half and the middle of the fourteenth century, *i.e.* 500-700/1000. Thus Gumowski was given false results, probably fictitious or taken from Voßberg's book. (Suchodolski 1988b 30.)

4. Conclusion

The information on coin fineness was used, more or less successfully, to reconstruct mint standards, to discern forgeries, and, sometimes, to determine the time of coinage. But most often, these data, even if available and published, were passed over in numismatic inquiries. Probably, many scholars suspected their low reliability and incomparability, as I often do. However, what can we do with the old data on coin fineness? Are they fit for our purposes? Or, were all these efforts and even all the coins melted down, lost in vain?

Perhaps the reliability of the traditional 'fire examinations' needs to be verified. It is not clear whether today's chemists regard the nineteenth century methods as correct and reliable. From the present

⁵ Information by Mr. Robert Pieńkowski.

point of view, the old 'non-destructive' method, *i.e.* touchstone, is highly inaccurate and unsatisfactory. On the other hand, it was not far from the medieval method. As far as this method was applied by scholars who were familiar with silver (or gold) products so well that they were able to discern obvious mistakes, using touchstone results today we can look at medieval coins like contemporary people did. It does not mean that the old information give us a more objective knowledge, but this subjective knowledge is closer to the medieval subjective knowledge and might explain phenomena unintelligible with modern methods. But twentieth-century researchers lost their intuition. They knew they needed to believe the specialists who were virtually beyond criticism. This misled not only scholars who used old-fashioned touchstone examinations, but also some quite modern researchers who had got great tables of data of XRF-analyses.

The XRF methods began to be applied to Polish numismatic research in the seventies of the twentieth century. First time we were provided with data about trace element content of coins in the mid-seventies. These were Arabic coins from the Viking Age. Zofia Stós (later: Zofia Gale), the researcher who was a chemist and not a numismatist, showed characteristics of individual Arabic mints (Stós-Fertner 1975; other analytical works: Stós and Florkowski 1974; Jędrzejewska 1976-1977; Florkowski and Stós-Fertner 1976; Gałązka and Kozirowska 1976; Kozirowska 1993; Ostachowicz, Ostachowicz and Paszkiewicz 2001). Generally, however, the scope of investigations was not large and it was limited to several groups of medieval and early modern coins which were within interests of individual scholars. The numismatists mostly asked about the metal fineness and not about the whole content. What is even worse, only a part of the results was published. Only today two larger research programs were initiated, in the University of Wrocław which is represented by Dr. Miazga and me, and in the Czapski Museum in Cracow. The Wrocław program, which is being realised in the Institute of Archaeology, is aimed at examining some 600 coins. These coins represent the oldest Polish coinage from the eleventh century as well as later coins up to the early modern times. Our research is not broadly conceived but we are going to create a tool basis for other researchers and to make a database for Polish and related coins.

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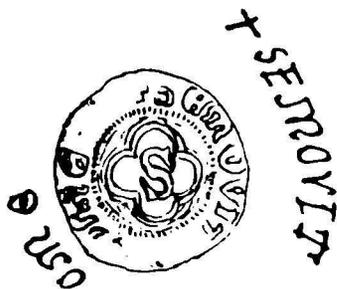
Captions

Fig. 1. — Mazovia, Siemowit III (1341-81), silver coin (half groschen?, kwartnik?), found in Lviv before 1846. Drawing and commentary by Karol Beyer (after E. Triller 1991 39): 'This was the first specimen of the kwartnik of Duke Ziemowit II [sic] of Mazovia. It was purchased by Kajetan Jabłoński, the bookseller in Lwów. I bade it in 1846 [actually, the Jabłoński collection sale was in 1847], but it was Preiss in Petersburg who got it. The other was found in Szczerców [i.e. in the Lubośnia 1847 hoard] and went to Mr. Stroncz[ylński] who sold it to me. This went together with my collection to Entailer Zamojski. The former was bought from Preiss along with all his Polish collection by A. Merzbacher who sold it to me in Frankfurt a./M. in 1873. Unfortunately, I lost it there. K. B.' The Zamojski collection was completely burnt by Germans in Warsaw in 1944.

Fig. 2. — Lithuania, Sigismund August (1529-1572), *puskapė* or *półkopek* 1564, Tykocin mint, 26,95 g. Warszawskie Centrum Numizmatyczne, Sale Catalogue 35 (2.12.2006): 173.



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To był pierwszy Oskar Kwartuska Lieniowi
do H. R. Merowickiego, nabył go pierwszy
kapitan Jabłoniski Kierpas we dworze, karygowca
go w 1846 r., dostał się jednak Preisowi w Petersburgu.
- Wskazywano matant się jeden w Petersburgu, do
którego spawano stroner, ten go mi odłupit a z moim
złotorem przeszedł do Ordynata Zamyskiego. Pier
wszego zaś nabył z całym polskim zborem od Preisza
A. Metzbacher i oddał go w 1873 r. w Frankfurtu
u. M. ale mi nicakty lenie zginął Th. B.