

# EARLY MEDIEVAL LEAD PROCESSING IN THE SLAVIC TERRITORIES AND THE POSSIBLE MENTION OF TRADE IN LEAD BY IBRĀHĪM IBN YA‘QŪB

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**Abstract:** *The purpose of this article is to draw attention to the beginnings of lead processing in the Early Middle Age, based on the latest archaeological information.*

**Rezumat:** *Articolul dorește să atragă atenția asupra apariției prelucrării plumbului în evul mediu timpuriu în lumina celor mai recente informații arheologice.*

**Key words:** *Early Middle Age, Poland, Ibrahim ibn Yaqub, lead processing*

**Cuvinte cheie:** *evul mediu timpuriu, Polonia, Ibrahim ibn Yaqub, prelucrarea plumbului*

The issue of obtaining and processing non-ferrous metals is very important for the research concerning economy in early medieval Poland. In the literature of the subject much attention has been devoted to interpreting the results of specialist analyses and location of exploited natural resources.

Gold-bearing areas were located and excavated in Silesia<sup>1</sup>, the occurrence of silver-bearing areas was defined mainly in the context of their potential use for early medieval jewellery production<sup>2</sup>. Unfortunately the least space was devoted to lead exploitation and processing, which has been closely connected with silver metallurgy, thus neglecting its significance in the production of various objects in early medieval Poland. We should quote here the words of Bogusław Gediga, according to whom lead deserved „a special study”<sup>3</sup>.

So far, we have at our disposal only one more detailed study of the issue carried out by Wojciech Dzieduszycki (1980).

Lead processing from late medieval and modern times has been very thoroughly studied by Tadeusz Dziekoński (1963, 1972) and Danuta Molenda (2001, complete literature there).

This text is aimed at drawing attention to the issue of lead processing in the early Middle Age in the light of the most recent archaeological data and a new look into the account of Ibrahim ibn Yaqub which will be further discussed below. In Europe, lead deposits are concentrated in the mountain ranges of Lower and Upper Harz, Upper Saxony, Vogtland, Thuringia, Tyrol, in the Ore Mountains, the Czech – Moravian Plateau, Rhineland and England<sup>4</sup>.

Polish lead deposits (zinc-lead ore) are located in western Lesser Poland, in Upper Silesia (Kraków – Upper Silesia coal basin), Lower Silesia – Kłodzko region and the Sowie (Owl) Mountains, and in the Świętokrzyskie Mountains<sup>5</sup>.

In the area of the Silesia – Kraków Plateau, which is the focus of our interest, there are three deposits of zinc-lead ore: in the regions of cities of Bytom – Tarnowskie Góry, Siewierz – Olkusz and Chrzanów – Trzebinia<sup>6</sup>.

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<sup>1</sup> Gediga 1988, 14, 15.

<sup>2</sup> Kóčka-Krenz 1988.

<sup>3</sup> Gediga 1988, 13.

<sup>4</sup> Kóčka-Krenz 1988, 83-84.

<sup>5</sup> Dziekoński 1963, 106 *sqq.*; Dziekoński 1972, 59 *sqq.*; Kóčka-Krenz 1988, 84; Molenda 2001, 12, 14.

Lead and particularly its alloys were already known in the Slavic territories in the older phases of the early Middle Age. They were used for producing various ornaments. Some objects included in the treasure of the so-called *Ants Antiquities* serve as samples of tin-lead alloys being used. The results of the chemical content analyses show that some ornaments from the treasure found in Gaponovo in Russia were made from lead-tin alloy in which lead was the dominant element<sup>7</sup>. However, in another treasure found in Velikie Budki in Ukraine some ornaments were made from a similar alloy but with tin as the dominant element<sup>8</sup>. Similar alloys were also used in other treasures from the Dnepr zone found in Koziivka, Novaia Odessa, Smorodinsk, Nižnesyrovatska<sup>9</sup>. In the treasures found in Koziivka and Novaia Odessa there were two forming models which had been used for production of finger-shaped fibulas<sup>10</sup>. The findings of casting moulds in the Slavic territories seem worth noting since, according to some scientists, they were used for producing casts from fusible alloys (tin-lead)<sup>11</sup>. Valentina Goriunova (1987) also drew attention to the use of lead-tin alloys for production of ornaments in the forest and forest-steppe zones. In the younger phases of the early Middle Age, lead objects were produced with varying frequency. In Velika Morava lead was used to make crosses, lunulae and other objects<sup>12</sup>. The production of lead ornaments intensified in the 11<sup>th</sup> century, which was connected with the exploitation of the local sources of raw material<sup>13</sup>. Among the findings from before the 11<sup>th</sup> century, there is an interesting specimen of a lunulae from Naszacowice (the 2<sup>nd</sup> half of the 9<sup>th</sup> or the first third of the 10<sup>th</sup> century)<sup>14</sup>, the chemical content of which is very similar to some artefacts known from Dąbrowa Górnicza - Łosień site 8, but chronologically younger<sup>15</sup>. It seems theoretically possible that in the areas where they are located (regions of Olkusz, Chrzanów and Silesia - Dąbrowa coal basin), those deposits must have been exploited before the 11<sup>th</sup> century. While discussing the similarities of the chemical content of the artefacts made of lead, one must mention the famous *bullā* from the times of Bolesław Krzywousty (Bolesław III Wrymouth) the content of which is highly similar to that of the artefacts found in Łosień. The above mentioned bulla refers to same the time horizon when the settlement in Dąbrowa Górnicza – Łosień functioned, and bears evidence of lead trade beyond the borders of Lesser Poland.

It has proved impossible so far to precisely locate the places of processing galena and other ores in order to obtain lead. One of the structures discovered in Bytom was considered to be a device for processing lead<sup>16</sup>. Therefore the discovery of a few furnaces in the Dąbrowa Górnicza – Łosień settlement throws interesting new light on the reconstruction of the processing of lead and silver. As mentioned above, the results of the research on that site evoked the relation of the Jewish traveller – a Radhanite, Ibrahim ibn Yaqub – which survived

<sup>6</sup> Szydłowska 1988, 42; Kóčka-Krenz 1988, 84.

<sup>7</sup> Egor'kov, Ščeglova 2000, 58, tabl. 1.

<sup>8</sup> Goriunova 1992, tabl. 1.

<sup>9</sup> Egor'kov, Ščeglova 2000, 56.

<sup>10</sup> Egor'kov, Ščeglova 2005, 22, tabl. 1; Šablavina, Szmoniewski, in print.

<sup>11</sup> Ščeglova 1999; Šablavina 1999.

<sup>12</sup> Polek 1994, 68, 69.

<sup>13</sup> Dzieduszycki 1980, 410.

<sup>14</sup> Poleski 1992, fig. 9.

<sup>15</sup> Biborski 2004, 257-259.

<sup>16</sup> Szydłowski 1966, 95, 96.

until the present times owing to the work of an 11<sup>th</sup> century Arab chronicler al-Bakri. The information it contains is one of the most important historical sources from the dawn of the existence of Poland. The source was published by Tadeusz Kowalski, an eminent Polish orientalist, together with a scientific commentary, under the title „*Relation of Ibrahim ibn Yaqub from his travels to the Slavic territories, reported by al-Bakri*” in volume 1 of the 2<sup>nd</sup> series of „*Pomniki Dziejowe Polski*” („Monuments of Polish History”) in Krakow in 1946.

The results of recent archaeological excavations and progress in palaeographic and historical research encourage having another look at the information included in Ibrahim ibn Yaqub's narrative. The main inspiration is the unexpected discovery of a production settlement, where relics of silver and lead smelting were found, which could be dated back to the times of the first Piasts' monarchy. Our attempt to investigate this source is by no means a call for a new study of the text which, in our opinion, was perfectly rendered by Tadeusz Kowalski<sup>17</sup>.

The focus of our interest is one sentence included in the *Relation*..., when Ibrahim ibn Yaqub<sup>18</sup> enumerated various kinds of merchandise imported to and exported from Prague:

„...the city of Faraga (Prague) is among the richest in merchandise. There come to it from the city of Karako (Krakow) Rusyns (presumably Varangians that is Norse merchants) and Slavs with their merchandise. And they come to them from the land of Turks...”

It is commonly assumed that „the land of Turks” means early medieval Hungary, although the term could also refer more generally to „Islamic countries”<sup>19</sup>, as well as Khazaria. Constantine VII Porphyrogenitus described the Hungarian – Khazar relations in the following way: *They [The Hungarians] were with the Khazars for three years and in all the wars were allies of the Khazars. For their bravery and their alliance the Khagan – the Khazar prince – gave the first chieftain of the Turks (i.e. the Hungarians), called Lebedias, a Khazar lady in marriage [...]*<sup>20</sup>. In the literature of the subject there are disputes concerning the length of the above mentioned alliance, which might have lasted 3 years or 200 to 300 years<sup>21</sup>.

Some Arab chroniclers, e.g. Ibn Rosteha, did not differentiate between Magyars and Turks<sup>22</sup>, therefore calling them Turks despite the fact they belong to Finno-Ugric peoples. In the more recent literature, the complex cultural interactions between Magyar and Turkish tribes are discussed by Vincent Múcska<sup>23</sup>. It needs to be pointed out that Hungary was inhabited by the Khazar Kabar whose religion was Judaism<sup>24</sup>.

Coming back to the main issue of this study we read on in the *Relation*...

... *Muslims, Jews and Turks*...

<sup>17</sup> See notes in Lewicka, Rajewska, 2004, 13. This postulate was formulated by a historian J. Hauzinski at the *All - Poland Arabic Conference* in Poznań in 1997 (Lewicka – Rajewska 2004, 13)

<sup>18</sup> For more information concerning this category of merchants see F. Kmietowicz, entry „Ar-Radhanija” [w.] SSS. IV, part II, 449.

<sup>19</sup> See Lewicki 1971, 699.

<sup>20</sup> After Dąbrowska 1979, 159.

<sup>21</sup> Dąbrowska 1979, 159.

<sup>22</sup> Lewicki 1977b, 33.

<sup>23</sup> Múcska 2004, 277-289.

<sup>24</sup> Lewicki 1979a, 700.

Muslims, Jews and Turks were most probably merchants from Arab countries, arriving mainly from Khorezm in Asia, Jews – Radhanites, Hungarians and possibly Khazars who supposedly converted to Judaism<sup>25</sup>.

„...Muslims, Jews and Turks also with merchandise and selling weight, and take away slaves, tin and kinds of furs...”<sup>26</sup>.

The last fragment of the quotation from the *Relation...*, is the most valuable for us and will be further discussed. Particular attention should be paid to *tin* being listed among merchandise, as this metal is very rare in Europe. Mentioning ‘tin’ in the sentence is the more surprising since this metal can be found neither in the area of our interest, nor in Central and Eastern Europe. Indeed the tin ore in the present Czech – German borders in Krušné Hory (Erzgebirge) have been found, however traces of the exploitation earlier than developed phases of Middle Age are not confirmed<sup>27</sup>.

In the area of southern Poland some zinc-lead ore can be found, but no tin. However, zinc was not extracted because of the complicated technological process which was fully developed only as late as the 18<sup>th</sup> century. Referring to the issue of tin appearing in the Slavic territories, it must be noted that both metals were frequently confused ages ago, though not because of their properties only names. In modern Russian tin is nowadays called *olovo* and *svinec* means lead. Neither archaeological nor historical sources confirm that Prague was ever a centre of tin trade. The objects made of this metal are known from archaeological sites, but none of central-European cities can be identified as „famous” for tin trade in the early medieval times.

Therefore, it is difficult to regard Prague as the centre of tin trade in that context. Associating this city with lead and silver trade, which were mined in Czech in the early middle ages – lead deposits are located near Kutna Hora, Tabor, in Horki, Pintovce, Kosina and in the eastern slopes of the Brda range near Příbram, while silver deposits are located in the Czech-Moravian Plateau near Jihlava, Havlickovy Brod and Příbislav, and in the Ore Mountains<sup>28</sup>.

The other interesting words, which make one analyse the quoted text, are: kinds of furs. Further on it will be explained why there are doubts concerning the translation of those words, the meaning of which was already discussed in the literature of the subject as mentioned by Tadeusz Kowalski in his rendering of the *Relation...* (footnote 42 and 76). It is indispensable here to mention the resources used by Tadeusz Kowalski for the Polish translation. *Relation...*, published in 1948, was reconstructed basing on the three, then available, manuscripts, namely the Istanbul manuscript *Laleli no 2144*, the Istanbul manuscript *Nuru Osmaniye no 3034* and the manuscript of C. Landberg (*Relation...*, 7), supplemented with a copy of the *Nuru Osmaniye Codex* ordered by an orientalist Ch. Schefer.<sup>29</sup>

The last document is mainly a copy of the *Nuru Osmaniye* manuscript and, according to T. Kowalski, all variants of the Schefer manuscript ‘are either errors or corrections made by the Turkish copyist’ of the original *Nuru Osmaniye Codex* (*Relation...*, 7). The text served as a basis for W. Rozen and A. Kunik, the first publishers of the *Relation...*. It was also used by the famous Dutch orientalist de Goeje (*Relation...*, 7-8).

<sup>25</sup> Kmietowicz 1968, 65-86; Nagrodzka-Majchrzyk 1975, 462 *sqq.*

<sup>26</sup> *Relation...*, 49, and footnote 42, 76.

<sup>27</sup> Craig 1998, 30, fig. 31.

<sup>28</sup> Dziekoński 1963; Kóčka-Krenz 1988.

<sup>29</sup> The work is not precisely dated.

In this study the important information is that included in the already mentioned Schefer manuscript, which was regarded as secondary by T. Kowalski. In the light of the current archaeological research the matter does not seem so explicit, which will be explained later.

At first, it seems necessary to present the heart of the matter from the philological angle, although a stylistic angle would be a more appropriate term here.

The three above mentioned manuscripts in their Arabic version in the fragment "...tin and kinds of fur" referring to the last word give lection *al-'aubār* الأوبار (furs), while one of the manuscripts quoted by Rosen gives lection *al-'abār* الأبار (lead). T. Kowalski, referring to this discrepancy assumes that lection *al-'abār* الأبار (lead) is a simple error of the copyist of the Nuru Osmaniye manuscript (*Relation...*, 76).

The matter is additionally complicated by the fact that the word *al-'abār* الأبار (lead) is a term extremely rarely used in Arabic to denote that metal. In both old and modern Arabic the word most frequently used to denote lead is *rasas* رصاص. The term *al-'abār* الأبار (lead) was included in „*Dictionnaire Arabe – Français 1875*, 2" and „*Supplement aux dictionnaires arabes*, 1927, 4" <sup>30</sup>.

The point is, however, that the term *al-'abār* الأبار (lead) in the context of the Arabic language used in north Africa, the homeland of al-Bekri – the first 'publisher' of Ibrahim ibn Yaqub's account – frequently means so called „black lead" that is genuine lead, as opposed to tin which was defined as white lead. According to T. Lewicki, „*the similarity of both metals and their properties, which was also reflected in the similarity of their names, lead to certain confusion...*" <sup>31</sup>.

It must be noted that the colour differentiation referred also to silver. One of the terms used was „black silver" <sup>32</sup>, the meaning of which has not been discovered. The adjective „silver" was also applied to lead compounds e.g. litharge (PbO) was called rock silver <sup>33</sup>.

Using in the text the source of the term which in a clear and obvious way distinguished between tin, frequently called „white lead", and proper lead called „black lead" in the medieval times, does not seem unjustified. In the *Relation...*, the word proceeding the terms in question is tin. Therefore, depending on the source „...*tin and kinds of furs...*" could be changed into „...*tin and black lead...*", that is proper lead. Listing those two metals next to each other should not surprise since they occur together naturally.

The secondary issue, although very important from the point of view of the history of Lesser Poland, is the question of *Karako* belonging to the Czech state. <sup>34</sup> In both Lesser Poland and Czech there appear similar deposits of lead and silver ore. Perhaps one has to look at the

<sup>30</sup> I have managed to consult both dictionaries thanks to the kind assistance of dr. U. Lewicka – Rajewska and mgr D. Malarczyk.

<sup>31</sup> Lewicki 1967, 69.

<sup>32</sup> In the Book of Henryków the footnote explaining the term *nigri argenti* suggests that it was applied to denarii coins containing low percentage of silver. (Book of Henryków [Księga Henrykowska], volume II, 1/130, Wrocław, 2004, p. 97.

<sup>33</sup> Master Wincenty Kadłubek, *Chronicles of the Kings and Princes of Poland [Kronika polska]*, 2003, 21.

<sup>34</sup> The discussion on the issue of southern Poland belonging to the Czech state in the times of Velika Morava and later, is well recorded. It can be safely assumed that with the research progressing, the problem with be repeatedly discussed, see more recent literature (Unuczek 1994, 26-94). Concentrating on the documented sources, we can assume that the reach of the Czech state in the 10<sup>th</sup> century is known from the account of Ibrahim ibn Yaqub and *The Privilege of the Bishopric of Prague* given by Emperor Henry IV in 1086.

words „...and they carry away [from Prague] slaves, tin (?) and kinds of black lead...” from a different perspective, seeing Prague as the capital of the Czech state and other areas, including Lesser Poland. If, however, tin was confused with lead both in terminology and properties, which is known to have been fairly common in the early Middle Age, we can change this fragment into „... and they carry away [from Prague] slaves, lead and kinds of furs...” All the presented options emphasize the significance of lead rather than tin which was simply unobtainable in this part of Europe.

To sum up this discussion, let us have another look at archaeological sources. In the production settlement in Dąbrowa Górnicza – Łosień sites 2 and 8, there were discovered remains of furnaces used for processing lead ore, which could be dated back between the 2<sup>nd</sup> half / the end of the 11<sup>th</sup> century and 2<sup>nd</sup> half / the end of the 12<sup>th</sup> century<sup>35</sup>. The reconstruction of the technology of reducing lead ore showed that the method of lead precipitation with iron was applied, which has been known in Poland since the 17<sup>th</sup> century<sup>36</sup>. Lead was mass produced in this site, and then used to produce ornaments – burial ground in Strzemieszyce<sup>37</sup>, circles and commercial weights – settlement in Łosień<sup>38</sup> as well as for glazing pottery<sup>39</sup>. In the context of lead processing, it was assumed that silver was removed from it and recovered, however no definite traces of that process were found until 2006. Then, during systematic archaeological excavations a treasure of silver coins was found, including denarii of Bolesław Kędzierzawy [Bolesław IV the Curly] and, more importantly, silver rounds. The latter, as the chemical analyses proved, were obtained on the spot in the process of lead ore reduction.

The site in Dąbrowa Górnicza – Łosień is one of the settlements located in the Strzemieszyce – Łosień area, where lead ores were mined and processed. The question when in the early medieval period the mining and smelting activity started in the given area and what was the range of trade in lead and silver obtained in Dąbrowa Górnicza – Łosień settlement, still remains unanswered.

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<sup>35</sup> Rozmus 2004, 301-305; Rozmus, Bodnar 2004, 9-60; Bodnar, Rozmus, Szmoniewski 2005.

<sup>36</sup> Dziekoński 1963.

<sup>37</sup> Marciniak 1960.

<sup>38</sup> Rozmus, Rybak, Bodnar 2005, 9-40; Bodnar, Rozmus, Szmoniewski 2007.

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