A MID FIFTEENTH CENTURY HOARD OF DENIERS FOUND NEAR ROTBAV, BRAŞOV COUNTY

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Abstract

In January 2015 a hoard consisting of 23 medieval coins issued between the years 1443-1444 was brought to the National History Museum of Romania. The hoard was found with a metal detector in the forested area of **Rotbav, Braşov County. The hoard contains coins issued by Vladislaus I, as king** of Hungary, and by John Hunyadi in mints from Transylvania.

Although the archaeological context in which the pieces were found hasn't offered much information, due to the missing of some basic field researches, this hoard could be linked with the military preparations made by John Hunyadi in order to organize an efficient military force for the anti-ottoman campaign that concluded with the battle of Varna.

Key words: deniers, John Hunyadi, Vladislaus I, Rotbav, hoard, counterfeit deniers.

The numismatic evidence for the tumultuous history of Hungary from the middle of the fifteen century indicates that the hoarding phenomenon during the reign of Vladislaus I (1440-1444) and during the regency of John Hunyadi (1441-1456 as voivode of Transylvania and 1446-1452 as regent of Hungary) is not so well represented. This is most probably due to the extremely low value of the coins issued during this period, which had a low content of silver. Therefore, the uncovering of a hoard that contains coins issued by Vladislaus I and John Hunyadi, in Braşov County, is an important historical document that illustrates the struggle of these two to construct a strategy in order to face the ottoman danger.

Concerning the context of the finding, the 23 coins hoard discussed here was recovered in January 2015. The hoard was found with a metal detector on the top of a small hill¹, in the forest area located at a distance of 6 kilometers west from Rotbav, a **village which is part of Feldioara commune, Braş**ov County. According to the finder's explanations, the coins were found scattered on a surface of approximatively two square meters, around a shrub, whose roots probably caused the spreading of the coins on such a large area. Also, it is important to mention that the coins were found at a depth of maximum 10 centimeters. The fact that the coins were preserved near the surface of the soil is proved by the conservation status of the coins. Containing a high

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¹ The hoard was found by Mr. Fănel Şerban, to whom I would like to express my deep gratitude for bringing the coins at the National History Museum of Romania and for trusting the museum specialists.

quantity of copper and covered with a thin silver layer, all the coins present green corrosion products on their surfaces, caused by the humid environment maintained by the forest vegetation. All the coins present also soil traces on the obverse and on the reverse.

From a historical perspective the name of the medieval settlement Rotbav is for the first time mentioned in written documents in 1371 (Nussbacher 1977 6), while Felidioara, the settlement situated near Rotbav has a more complex history, being mentioned in documents since 1240 under the name of Castrum Sancte Marie (Suciu 1967 228), a fortress built by the Teutonic Knights. Alongside the written evidence, the **medieval material found during the archeological researches (Ioniță 2005 217**-228, **Ioniță et alii** 2004 15 - 45, Florea 1996 76-77) indicate the fact that this area was permanently inhabited, since the early medieval times, being also a transit area intensely circulated. Also, it is known that this area was pillaged in 1438, when the Ottoman sultan Murad II led a military expedition on the Transylvanian territory (Decei 1978 215-222, Engel 2011 305).

The hoard consists of a number of 23 small denomination coins issued between the years 1440-1444, bearing the names of Vladislaus I and John Hunyadi, except for one which is issued only in the name of Vladislaus I. The structure of the hoard comprises of three types of Deniers: one denier with the Lithuanian shield issued by Vladislaus I in 1443, probably in the mint of Buda, three commemorative deniers issued by Vladislaus I with the name of John Hunyadi² and 19 deniers issued in Transylvanian mints bearing the name of Vladislaus I and John Hunady, a part of them being probably monetary counterfeits. According to the mint marks the Deniers are issued in four mints: Buda? (+ - ...), Veszprem (W - D), Sibiu³ (B - h) and Sighişoara (I -S). The letters of the Transvlvanian mints, of Sibiu and Sighisoara were reversed by the officer charged with the minting of the coins (*Kammergraf*), a fact described as an honor gesture for John Hunyadi (Pohl 1982 table 93-94). However, the first letter in these cases indicates the name of the mint officers (Velter 1978 33-34). Therefore for the Sibiu the letter **B** came from the name of the mint officer Nikolaus Pfeffersack. unfortunately, for Sighisoara (Schässburg) Artur Pohl does not indicate the name of any mint officer, but it is known that in 1444 John Huniady brought to Sibiu an officer called Jacobus (Pohl 1969-1970 52, Velter 1978 34). Given the fact that the coins bearing the Sighisoara mint marks (I - S) have some special features that gave rise to questions about the official provenance of the pieces, and also given the fact that Sighisoara is a small mint with short periods of minting activity, it is probably that the letter I might indicate the name of the same Jacobus brought to Sibiu by John Hunyadi in 1444.

The historical context in which these coins were minted was characterized by political and economic instability. On the one hand, the short reign of Vladislaus I Jagellon was contested by a part of the Hungarian nobility, who wanted as sovereign the young Ladislaus V the Posthumous, a situation that generated a Civil War (Bak 2009 176-183). Moreover, the Hungarian Kingdom was threatened by the Ottoman

² The coins bearing the name of John Hunyadi can be divided in three main groups: the coins issued by Wladislaw I in the name of John Hunyadi, between 1443 and 1444 (there are three types of deniers known), the coins issued by John Hunyadi as regent of Hungary (1446-1452) and the coins bearing the name of John Huniady, issued in 1451 and 1455 by George Brakowich, despot of Serbia, in order to celebrate the engagement of his daughter Elisabeth of Celje with Mathias Corvin, the son of John Hunyadi in 1451, while the coin issued in 1455 commemorated the marriage of the two (Pohl 1969-1970 49-56).

³ Sibiu received the right to mint coins as seat of the Transylvanian Chamber in the late of 1420s (Gyöngyöśsy 2005 61).

military activity in the Serbian area, near the borders of the Kingdom (Engel 2011 303-312, Istoria Românilor IV 2001 340-341). Therefore, due to the political instability the economy of Hungary was shaken. In addition, some of the precious mines owned by the Hungarian kings became less productive⁴, while the financial officers (*Kammergraf*) of Kremnitz and Kaschau, were loyal to Queen Elisabeth, facts that aggravated the economic deficit. In this context, Vladislaus I was able to mint coins only in Buda, therefore in order to supplement the financial resources he was constrained to delegate the minting rights to smaller mints coordinated by some of Vladislav I followers (Pohl **1982 26, Gyöngyöśsy 2005 18). The coinage issued during his reign has an extremely** small quantity of precious metal and the debasement of the value of the currency caused a rapid inflation that reached its peak between 1442-1443 (Pohl 1982 26-28; table 93-94)⁵.

The hoard that this article deals with consists of deniers made almost entirely of copper, the silver traces noticeable on some of them, proving that the coins were silvered rather than containing a valuable quantity of silver. It is important to mention that the deniers Pohl 182/Huszár 682/ CNHt 163 (no. 5-23) were issued in 1443 probably in order to finance the successful military campaign from 1443-1444, known as the "Long Campaign" (Pohl 1969-1970 49-51). However, the others three commemorative deniers Pohl 184/Huszár 627/CNHt 162 (no.2-4) were issued by the king Vladislaus I in the name of John Hunyadi in order to celebrate the victory of Hunyadi in January 1444, when he succeeded to liberate the northern part of Serbia (Pohl 1969-1970 49-51; Muresan 1968 86-92). Also, the weight of these deniers is bigger, weighing between 0.99 g and 1.19 g, in contrast with the rest of the deniers which are weighing between 0.32 and 0.92 g. The iconography of these commemorative deniers has a symbolic meaning; the obverse where the name of John Hunyadi is inscribed depicts the image of a double cross, a symbol of Christianity and also heraldic sign of Hungary, on a three peaked hill. It suggests the victory against the ottomans, emphasizing the Christian aspect of the "Long Campaign". Contrariwise, the iconography of the deniers issued in 1443 is not original at all. Vladislav assumed the iconographical program launched by Sigismund of Luxemburg at the end of his reign for the deniers coined between 1430 and 1437 (denier Pohl 118/Huszár 578/ CNHt 124). The same iconography was also used by Hungarian king Albert for the deniers issued in 1438 (Pohl 126/Huszár 591/ CNHt 134).

Concerning the mints of the 19 deniers issued in 1443, it is important to mention that in the catalogue of the Hungarian coin **mints Pohl doesn't mention Sibiu and Sighişoara as mints for this denier type**⁶, identical mint marks for these two towns being identified for the commemorative deniers issued in 1444. However, given the fact

⁴ In fact, at the middle of the fifteenth century the entire Europe was affected by the exhausting of the old silver mines, this period being known in the historiography as *The silver famine* (Spufford 1988 339-362).

⁵ This extreme situation is shown also in an contemporary document issued by Vlad Dracul, Prince of Wallachia, in 1442-**1443, allowing the citizens of Braşov to do commerce in Wallachia,** a right received with the restriction to import devalued coins after his new ducats (silver coins) will be minted and not to export silver, copper and Florins (gold coins) (Doc. LII, Bogdan 1905 75-77). It is important to mention that Queen Elisabeth, the mother of Ladislaus V Posthumous, had a contribution to the economic strategy that lead to the devaluation of the monetary standard. The coin depreciation imposed some changes in the mintmark system, the fact that the mintmark became collective suggesting the fact that the mints officers **didn't want to be associated anymore with the devalued coins (Gyöngyöśsy 2005 18).**

⁶ Arthur Pohl mentions only the mints from Oradea [V-I] (Várad/Ungvár) and Baia Mare [n-B] (Nagybánya).

that Vladislav and John Hunyadi were in such a need for financial resources in order to be prepared for the upcoming military campaign against the Ottomans, it is not a surprise to see that this type of deniers was also coined in 1443 in the mints of Sibiu and Sighişoara and not only in Oradea (Várad/Ungvár) and Baia Mare (Nagybánya) (Pohl 1982 tabelle 93).

At a first glance I was able to observe a series of differences between the coins presented in the Hungarian coins catalogues and the deniers that compose the Rotbav hoard. The obverse legend of the deniers coined in Sighisoara (no. 5-19) drew my attention due to the fact that it starts with an \times instead of a cross (+). In contrast to the coins bearing the mintmarks of Sibiu (no. 20-23) the legend letters of the coins issued in Sighisoara are well depicted but a little bit more rough, the letters of the Sibiu deniers being finely reproduced. Furthermore, some letters of the Sighisoara deniers legends are misplaced, being arranged outside of the circular legend as you can see the letter I from the beginning of the obvers legend of the coin no. 7 or the letter V from the end of the obverse legend of the coin no. 12. In the case of coin no. 8, the letter I of the reverse legend word **R&GIS** is missing. On some coins the middle point (•) that separates the words of the reverse legend as here: **M·WLADIS** LAIRAGIS are missing (no. 5, 8, 12, 14, 15, 17).⁷ The obverse and reverse legends of the commemorative denier issued in Sighișoara mint (no. 3) are made of letters arranged without any specific order, therefore instead of the clear obverse legend +m·wLADISLAIRAGISA the letters are: +WLANIASV[...]AWANSAA[...] and instead of the reverse legend IOHANAS DA HVNIAD the readable letters of the legend are [...]NI[...]+[...]SEL[...], indicating that these letters have almost nothing in common with the mentioned legend. Another important difference for the commemorative coins issued in Sighisoara can be seen on the reverse of the denier no. 4, where the mintmarks (I-S) aren't displayed in the same place, but in a lower area, on the both sides of the middle peak of the hill, instead of the space available between the two horizontal crossbars. Concerning the coins issued in another mint than the Sighisoara one I was able to observe only one unusual aspect. The obverse legend of coin no. 22, which bears **Sibiu's mintmark**, starts with a small rhomb (•), instead of the letters **IO**.

As Huszár mentioned in his catalogue, these deniers might be counterfeits (Huszár 1979 100-101). But considering the fact that due to the intense political and economic pressure that characterized this period Vladislav I and John Hunyadi were forced to allow the small local workshops like Sighisoara to mint coins, it might have been difficult to exercise a strict control over these small mints. Therefore, I consider that these type of deniers issued during the interregnum period must not be considered from the start as counterfeits; it is possible that a larger study that could include a larger number of devalued coins issued during the reigns of Vladislav I and Ladislaus V Posthumous could put in a different light what we consider now to be counterfeit deniers. An uncommon coin was found in the Turda hoard. This specific denier has the obverse of the denier CNH 124 B issued by Sigismund of Luxemburg, while the reverse belongs to the denier CNH 156 issued by John Hunyadi (Venter 1978 32). Among the 41 coins that constitute this hoard, there are 14 counterfeits coins after the deniers CNH 124 of Sigismund of Luxemburg. The importance of this hoard resides in the fact that it illustrates the forgery phenomenon, offering a good base needed in order to compare different types of counterfeits. For example, in contrast with the Rotbav hoard deniers that could be considered counterfeits, the deniers of the Turda hoard have an incomprehensible legend, the obverse shield and the reverse double cross are roughly

⁷ Unfortunatly the coins aren't yet cleaned, some of them being covered with soil, therefore it is a little bit hard to identify all the letters of the legends.

drawn, the deniers being also badly coined. In this context, the Rotbav deniers are incredibly well coined, the drawing of the iconographical elements of the coins is identical with the original deniers, the coins have been silvered in the same way as the deniers issued in the Sibiu mint, all these elements indicating that the persons who **worked in the Sighişoara mint and also the engraver of the dies used at the Sighişoara** mint were familiar with the coining activity performed in official mints.

Another aspect that called to my attention is the fact that in their medieval Hungarian coins catalogues Pohl and Huszár used the same coin in order to illustrate the denier type Pohl 182/Huszár 628/CNH 163⁸, but only Huszár offers a transliteration of the legend. However, the coin presented by Huszár has on the obverse the legend **+M·WLADIS LAIREGIS** and on the reverse the legend **IOhAPAS D hVNIA**. Furthermore, Huszár mentions the fact that there are coins with the legend changed, as are the Rotbav hoard deniers (no. 5-23). Therefore, the name of John Hunyadi is inscribed on the obverse, while the name of Vladislav I is inscribed on the reverse. The same aspect can be seen at the commemorative denier no. 4, too. A hypothesis regarding the fact that the name of John Hunyadi is inscribed on the reverse instead of being inscribed on the reverse, even if he was a loyal supporter of the king Vladislav, is **that the mints of Sibiu and Sighişoara were under John Hunyadi's direct control.**

The X-Ray Fluorescence investigations performed on the Rotbav coins point out that we are dealing with a uniform batch of coins (Annex)⁹. The two main elements found in the metalographic composition of the coins are the copper (Cu) and the silver (Ag). Therefore, the copper content ranges between 57.20 % and 73.46 %, while the silver content ranges between 23.09 % and 38.96 % (Chart 1).

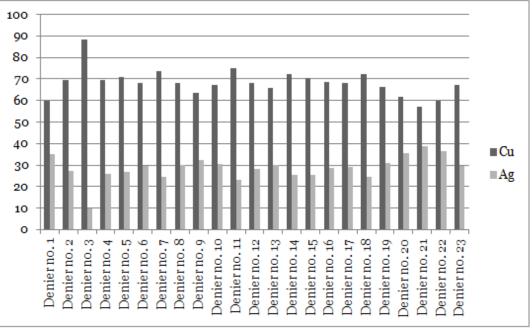


Chart 1 – Copper/Silver content of the Rotbav hoard deniers

⁸ It is a denier issued in the mint of Oradea bearing the mintmark V-I.

⁹ The analyses were performed with a portable spectrometer Innov-X Systems Alpha Series, with **W** anticathode tube; SiPIN diode; Peltier cooling effect; work parameters 40 kV tension, 35 μ A intensity, acquisition time 120". The investigated areas of the coins were the central areas of the obverses.

Of all the coins, the commemorative denier no. 3 stands out with a content of 88.34 % copper and 9.93 % silver (Chart 1), but it should be taken in consideration that the coin is extremely corrodated in the central area, on the obverse (Plate 1/3), the area where the analyses were performed for all the coins. Therefore, I assume that the analyses are not so relevant for this specific coin and most probably the real ratio between the silver and copper contents is similar with the rest of the results.

The relatively uniform content of copper and silver in the metallographic composition of the Rotbav coins might indicate that we are not dealing with a group of forgeries, considering forgeries **don't contain so much precious metal in their composition. These results indicate that the coins aren't just silvered, but that they have** a certain quantity of silver in their composition as well. Therefore, these deniers are devalueded coins, minted in an official mint, where the quantity of the precious metal used in the process of minting coins was strictly controlled.

As you can see in the chart from below, the percentage of the following elements: zinc (Zn), antimony (Sb), gold (Au), lead (Pb) and bismuth (Bi) is mostly uniform. It is important to mention that these elements could help with the identification of the silver ore sources. For exemple, bismuth, lead, zinc and gold are trace elements found in the Transylvanian silver ores (Constantinescu *et alii* 2009 486). An important argentiferous area exploited during the middle of the Fifteenth century was located around Baia Mare (Nagybanya), which was one of the most important coin mints from Transylvania. In 1411 Sigismund of Luxemburg offered the city to the Serbian Despot Stephen Lazarevich. The city, including the silver and gold mines and the mint were later inherited by Lazarevich's successor, George Brankovich, but in 1444 John Hunyadi recovered the mint (Gyöngyöśsy 2005 58). It is very probable that the Baia Mare mines were the source of the silver used for minting the Rotbav hoard coins, but the information known until now about the silver exploited from Baia Mare is not enough to draw some clear conclusions.

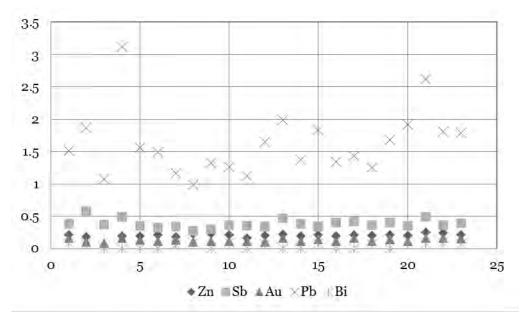


Chart 2 – Zinc, Antimony, Gold, Lead, Bismuth content of the Rotbav hoard deniers

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The presence of titanium (Ti) and iron (Fe) (Annex) do not offer any numismatic information (Constantinescu *et alii* 2009), due to the fact that they are elements coming from the soil traces that cover larges area of the coins obverse.

The deniers types present in the Rotbav hoard are not often found in archeological excavations or as isolated finds in Transylvania. It is clear that due to their low value the deniers issued during the interregnum period were not hoarded or kept as valuable coins. Similar coins were found in Caraşova and in Pescari, medieval settlements from Banat region. Therefore, in 1973, inside the Caraşova settlement two deniers were found issued during the interregnum years (1440-1444), two deniers issued during the same period, type Pohl 182/Huszár 628/CNHt 163 being found in 1979 at the point called "Culă", from Pescari (Bălănescu, Chirilă 1994-1995 276-277)¹⁰. Also, Berkeszi Istvan mentions in his study *Délmagyarország éremleletei*, three hoards that have in their composition coins issued by Vladislav I or/and John Huniady, but without mentioning details about these specific numismatics pieces; the hoard from Becicherecul Mic¹¹ (Bereksi 1907 9, Pap 2002 37), the hoard from Gad¹² (Bereksi 1907 19, Pap 2002 81) and the hoard from Timisoara (Bereksi 1907 40/3, Pap 2002 171)¹³. As you can see the number of similar coins as those from the Rotbav hoard is extremely limited, a fact which indicates on the one hand that the coins issued during interregnum period were not of interest as valuable coins desired to be preserved in hoards and, on the other hand, that most probably these coins were not issued in large quantities in order to serve the local market, being immediately removed from circulation.

Given that the fact that this small hoard consists of only small denomination coins which were issued in a narrow period of time (1443 - 1444) I am assuming that we are dealing with a group of coins which should have been used for daily transactions. Therefore, this hoard might represent a sample of coins which had circulated in this area at the middle of Fifteenth century. Besides, there are some known documents that illustrate the fact that in 1443 John Hunyadi bought canons, carts and gun powder from Braşov (Pall 1966 63-84; Mureşan 1968 86-87)¹⁴. Therefore, it is understandable to have such a find in this area. Returning to the structure of the hoard, one can deduce that it is most probably that this group of coins didn't belonged to a rich person and it wasn't supposed to be hoarded, the coins being probably hiden due to an unexpected event.

¹⁰ Dating from the interregnum period, but different types of coins were also found during the arheological campaign from 1978 in the Pescari settlement (2 obolus – see Bălănescu 1984 194). During the 1993 archeological campagin from Orăștie a small hoard containing 28 deniers was found (Pohl 140/CNH 147-148) issued between 1440-1441 by Wladislaw I, mot of them being coined in the mint of Weszprém (Pinter *et alii* 1996 501-502).

¹¹ The hoard from Becicherecul Mic (Timis County) consists of 12 coins, minted in the name of Sigismund of Luxemburg and John Hunyadi (Bereksi 1907 9, Pap 2002 37).

¹² The hoard from Gad (Timiş County) consists of 100 deniers, minted in the name of the following hungarian kings: Sigismund of Luxemburg, Albert, Vladislav I, Ladislaus V (Bereksi 1907 19, Pap 2002 81).

¹³ The hoard from Timişoara (Timiş county) was found in 1895 and consists of more than 185 coins, issued during the reign of Sigismund of Luxemburg Albert and during the interregnum (Bereksi 1907 40/3, Pap 2002 171).

¹⁴ Even Vlad Dracul, Prince of Wallachia, bought weapons and ammunition from Braşov (Doc. LV, Bogdan 1905 80).

The main conclusion that can be drawn at this point of the research of the Rotbav hoard are that the dinars issued by Vladislav I bearing the name of John Huniady are a reflection of the Hungarian monetary crisis from the middle of the Fifteenth century. Such devalued coins are extremely rare findings because, due to their low silver content, they might not have been regarded as very valuable coins and therefore not hoarded. We must be taken into consideration the fact that the best part of the deniers were issued in order to finance the expenses for the preparing for the military campaign against the Ottomans from 1443-1444, while three of the Rotbav hoard deniers are coins issued in order to celebrate the victory of John Huniady in the **"Long Campaign". In this context, the finding of this hoa**rd in the area of Burzeland is **not a surprise, given the fact that it is known that John Huniady bought from Braşov** weapons and gun powder.

An important characteristic of this hoard that must be emphasized is the presence of some coins in the content of the treasure that due to some uncommon details of the legends are considered counterfeits in the numismatic literature. Nevertheless, the overall shape of the presumed counterfeits indicates that the dies were engraved by an experienced person and the coins were also hammered in an official workshop. This may indicate that these deniers are not in fact forgeries, therefore I consider that an alternative approach regarding the interpretation of the medieval counterfeits must be adopted, an approach that surely will require a more in depth research. The X-Ray Fluorescence investigations performed on the coins that this article deals with highlights the fact that the copper/silver content of the coins is relatively uniform and that the silver content is pretty high as well (Annex), facts that suggest that the coins might have been issued by an official mint, where the content of the precious metal was strictly controled. Therefore, the XRF investigations might be a first argument that can prove the fact that these deniers are not forgeries.

Although more numismatic evidence is needed in order to have a clearer image of the coinage issued during the interregnum period, the Rotbav hoard offers a first image of these turbulent times.

Catalogue

Denier – issued in 1443
 Hungary
 Wladislaus I (1440-1444)
 Ob. The crowned coat of arms of Hungary. The mint marks in the left side and in the right side of the shield.
 Legend: M·[...]SLAI·D&I
 Rv. The Lithuanian cavalryman in a shield.
 Legend: +R&GIS·VNGARI&C
 Mint: + [...] – probably Buda
 Silvered copper – 0.51 g; ✓; 16.20 x 14.65 mm.
 Ref. Pohl 145-26; Huszár 607; CNH 145A.

 Denier – Commemorative issue – 1444
 Hungary
 Vladislaus I with John Hunyadi (1443-1444)
 Ob. Shield with four stripes in the lower part and an open crown in upper part. Legend: +M·WLADIS[LFII·]R&GI·S& Rv. Double-cross on a three pick hill. The mint marks in the left side and in the right side of the cross.

Legend: [I]OhARAS[...]hVNA·Đ Mint: W-D - Veszprém; Kammergraf – Civitas Silver, 1.19 g; \sigma; 19.30 x 18.50 mm. Ref. Pohl 184-5; Huszár 627; CNH 162.

3. Denier – Commemorative issue – 1444 Hungary Vladislaus I with John Hunyadi (1443-1444) Ob. Shield with four stripes in the lower part and an open crown in upper part. Legend: +WLaniasv[...]awansaa[...] Rv. Double-cross on a three pick hill. The mint marks in the left side and in the right side of the cross. Legend: [...]NI[...]+[...]S&L[...] Mint: I - S- Sighişoara (Schässburg). Silvered copper, 1.17 g; **†**; 20.55 x 19.37 mm. Ref. Pohl 184; Huszár 627; CNH 162. 4. Denier – Commemorative issue – 1444 Hungary Vladislaus I with John Hunyadi (1443-1444) Ob. Shield with four stripes in the lower part and an open crown in upper part. Legend: [...]IOhAN[...]&S[...]&NWLA[...] Rv. Double-cross on a three pick hill. The mint marks in the left side and in the right side of the hill. Legend: [...]ADIS[...]AGIS A Mint: I-S; Sighisoara (Schässburg). Silvered copper, 0.99 g; ↓; 19.75 x 19.30 mm. Ref. Pohl 184-2; Huszár 627; CNH 162. 5. Denier - issued in 1443/1444 Hungary Vladislaus I with John Hunyadi (1443-1444) Ob. Shield with four horizontal stripes (barry of eight). Point in the middle of the shield. Legend: ×IOhA[...]&·hVNIA Rv. Double-cross with the mint marks in the left and right sides of the cross. Legend: M·WLADIS LAIREGIS Mint: I - S Sighisoara. Silvered copper 0.81 g; 1; 15.30 x 14.50 mm. Ref. Pohl 182; Huszár 628; CNH 163. 6. Denier - issued in 1443/1444 Hungary Vladislaus I with John Hunyadi (1443-1444) Ob. Shield with four horizontal stripes (barry of eight). Point in the middle of the shield.

Legend: ×IOhAnas·Da·[...]VNIA

Rv. Double-cross with the mint marks in the left and right sides of the cross.

Legend: M·WLADIS LAIRAGIS Mint: I - S Sighişoara. Silvered copper 0.73 g; \downarrow ; 16.65 x 16 mm. Ref. Pohl 182; Huszár 628; CNH 163. 7. Denier – issued in 1443/1444 Hungary Vladislaus I with John Hunyadi (1443-1444) Ob. Shield with four horizontal stripes (barry of eight). Point in the middle of the shield. Legend: ×IOhA[...] Rv. Double-cross with the mint marks in the left and right sides of the cross. Legend: [...]GIS Mint: I - S Sighisoara. Silvered copper 0.70 g; ↗; 14.85 x 13.70 mm. Ref. Pohl 182; Huszár 628; CNH 163. 8. Denier - issued in 1443/1444 Hungary Vladislaus I with John Hunyadi (1443-1444) Ob. Shield with four horizontal stripes (barry of eight). Point in the middle of the shield. Legend: [...]hAN@S[...]VN[...] Rv. Double-cross with the mint marks in the left and right sides of the cross. Legend: **M[...]@GS** Mint: I - S Sighişoara. Silvered copper 0.68 g; ∠; 16.30 x 15.75 mm. Ref. Pohl 182; Huszár 628; CNH 163. 9. Denier - issued in 1443/1444 Hungary Vladislaus I with John Hunyadi (1443-1444) Ob. Shield with four horizontal stripes (barry of eight). Legend: [...]ANGS[...] Rv. Double-cross with the mint marks in the left and right sides of the cross. Legend: [...]DIS LAIREG[...] Mint: I - S Sighişoara. Silvered copper 0.67 g; ↗; 14.50 x 15.95 mm. Ref. Pohl 182; Huszár 628; CNH 163. 10. Denier – issued in 1443/1444 Hungary Vladislaus I with John Hunyadi (1443-1444) Ob. Shield with four horizontal stripes (barry of eight). Point in the middle of the shield. Legend: ×IOh[...] Rv. Double-cross with the mint marks in the left and right sides of the cross. Legend: [...]WLADIS LAIRE[...] Mint: I - S Sighişoara. Silvered copper 0.66 g; ↗; 14.95 x 15.10 mm. Ref. Pohl 182; Huszár 628; CNH 163.

11. Denier - issued in 1443/1444 Hungary Vladislaus I with John Hunyadi (1443-1444) Ob. Shield with four horizontal stripes (barry of eight). Point in the middle of the shield. Legend: ×IO[...]hVNIAD Rv. Double-cross with the mint marks in the left and right sides of the cross. Legend: [...]LADIS LAI[...] Mint: I - S Sighişoara. Silvered copper 0.60 g; ∠; 15.15 x 15.85 mm. Ref. Pohl 182; Huszár 628; CNH 163. 12. Denier - issued in 1443/1444 Hungary Vladislaus I with John Hunyadi (1443-1444) Ob. Shield with four horizontal stripes (barry of eight). Point in the middle of the shield. Legend: ×IOhAN@S·D@·hVNIA Rv. Double-cross with the mint marks in the left and right sides of the cross. Legend: M·WLADIS LAI·RAGIS Mint: I - S Sighişoara. Silvered copper 0.60 g; >; 15.80 x 15.60 mm. Ref. Pohl 182: Huszár 628: CNH 163. 13. Denier - issued in 1443/1444 Hungary Vladislaus I with John Hunyadi (1443-1444) Ob. Shield with four horizontal stripes (barry of eight). Point in the middle of the shield. Legend: [...]D&hVN[...] Rv. Double-cross with the mint marks in the left and right sides of the cross. Legend: [...]WLADIS LAIREGIS Mint: I - S Sighişoara. Silvered copper 0.57 g; \rightarrow ; 15.50 x 14.85 mm. Ref. Pohl 182; Huszár 628; CNH 163. 14. Denier - issued in 1443/1444 Hungary Vladislaus I with John Hunyadi (1443-1444) Ob. Shield with four horizontal stripes (barry of eight). Legend: [...]N@S·D@·[...]hVN[...] Rv. Double-cross with the mint marks in the left and right sides of the cross. Legend: [...]LADIS[...]GIS Mint: I - S Sighişoara. Silvered copper 0.52 g; \rightarrow ; 16.70 x 15.65 mm. Ref. Pohl 182; Huszár 628; CNH 163.

15. Denier – issued in 1443/1444 Hungary Vladislaus I with John Hunyadi (1443-1444) Ob. Shield with four horizontal stripes (barry of eight). Point in the middle of the shield. Legend: ×IOhAnas·Da·hVn[...] Rv. Double-cross with the mint marks in the left and right sides of the cross. Legend: **M·WLADIS LAIR**[...]GIS Mint: I - S Sighişoara. Silvered copper 0.52 g; >; 15.60 x 14.75 mm. Ref. Pohl 182; Huszár 628; CNH 163. 16. Denier - issued in 1443/1444 Hungary Vladislaus I with John Hunyadi (1443-1444) Ob. Shield with four horizontal stripes (barry of eight). Point in the middle of the shield. Legend: [...]hAN&S·D&[...] Rv. Double-cross with the mint marks in the left and right sides of the cross. Legend: M·WLA[...]R&GIS Mint: I - S Sighişoara. Silvered copper 0.48 g; ∠; 15.45 x 14.25 mm. Ref. Pohl 182: Huszár 628: CNH 163. 17. Denier - issued in 1443/1444 Hungary Vladislaus I with John Hunyadi (1443-1444) Ob. Shield with four horizontal stripes (barry of eight). Point in the middle of the shield. Legend: IOhAnas·Da·hVNIA Rv. Double-cross with the mint marks in the left and right sides of the cross. Legend: **M·WLADIS LAIREGIS** Mint: I - S Sighişoara. Silvered copper 0.44 g; ∠; 15.40 x 14.70 mm. Ref. Pohl 182; Huszár 628; CNH 163. 18. Denier – issued in 1443/1444 Hungary Vladislaus I with John Hunyadi (1443-1444) Ob. Shield with four horizontal stripes (barry of eight). Point in the middle of the shield. Legend: [...]ANGS·DG·hV[...] Rv. Double-cross with the mint marks in the left and right sides of the cross. Legend: **M**[...]**RGIS** Mint: I - S Sighișoara. Silvered copper 0.39 g; ∧; 15.70 x 14.15 mm. Ref. Pohl 182; Huszár 628; CNH 163. 19. Denier - issued in 1443/1444 Hungary Vladislaus I with John Hunyadi (1443-1444) Ob. Shield with four horizontal stripes (barry of eight). Point in the middle of the shield.

Legend: [...]S·DA·hVNI[...] Rv. Double-cross with the mint marks in the left and right sides of the cross. Legend: M·WL[...]IS[...]R&GIS Mint: I - S Sighişoara. Silvered copper 0.32 g; ↘; 14.55 x 15.60 mm. Ref. Pohl 182; Huszár 628; CNH 163.

20. Denier – issued in 1443/1444 Hungary Vladislaus I with John Hunyadi (1443-1444) Ob. Shield with four horizontal stripes (barry of eight). Legend: **+IO[...]N&S[...]W[...]** Rv. Double-cross with the mint marks in the left and right sides of the cross. Legend: **M·WLADIS LAI[...]** Mint: **B** - **h** Sibiu (Hermanndstadt). Silvered copper 0.92 g; **1**; 15.40 x 14.70 mm. Ref. Pohl 182; Huszár 628; CNH 163.

21. Denier – issued in 1443/1444
Hungary
Vladislaus I with John Hunyadi (1443-1444)
Ob. Shield with four horizontal stripes (barry of eight). Point in the middle of the shield.
Legend: +IOhFI[...]D·[...]
Rv. Double-cross with the mint marks in the left and right sides of the cross.
Legend: [...]LFII-RG[...]
Mint: B - h Sibiu (Hermanndstadt).
Silvered copper 0.62 g; \; 15.60 x 15.15 mm.
Ref. Pohl 182; Huszár 628; CNH 163.

22. Denier – issued in 1443/1444
Hungary
Vladislaus I with John Hunyadi (1443-1444)
Ob. Shield with four horizontal stripes (barry of eight).
Legend: +♦hAn·D[...]WV
Rv. Double-cross with the mint marks in the left and right sides of the cross.
Legend: [...]WLADI[...]LAI·R&GIS
Mint: B – [...] probably Sibiu (Hermannstadt).
Silvered copper 0.51 g; <; 15.35 x 14.65 mm.
Ref. Pohl 182: Huszár 628: CNH 163.

23. Denier – issued in 1443/1444
Hungary
Vladislaus I with John Hunyadi (1443-1444)
Ob. Shield with four horizontal stripes (barry of eight). Point in the middle of the shield.
Legend: +IOhAN[...]DI
Rv. Double-cross with the mint marks in the left and right sides of the cross.
Legend: M·WLA[...]GGIS
Mint: B - h Sibiu (Hermannstadt).

Silvered copper 0.41 g; †; 14.45 x 15.20 mm. Ref. Pohl 182; Huszár 628; CNH 163.

Description	Ti	Fe	Ni	Cu	Zn	Ag	Sb	Au	Pb	Bi
Denier no. 1	0.32	2.20	0.001	59.95	0.21	35.15	0.38	0.16	1.51	0.09
Denier no. 2	0.11	0.52	0.05	69.43	0.18	27.11	0.58	0.10	1.87	0.07
Denier no. 3	-	0.16	0.05	88.34	-	9.93	0.37	0.08	1.08	0.001
Denier no. 4	0.11	0.86	0.001	69.33	0.19	25.76	0.49	0.16	3.12	0.001
Denier no. 5	-	0.20	0.05	70.70	0.19	26.82	0.35	0.13	1.56	0.001
Denier no. 6	-	0.10	0.001	68.32	0.21	29.46	0.32	0.11	1.49	0.001
Denier no. 7	-	0.19	0.14	73.46	0.18	24.34	0.34	0.13	1.16	0.06
Denier no. 8	-	0.12	0.001	68.11	0.22	30.10	0.27	0.10	0.99	0.09
Denier no. 9	0.35	1.59	0.001	63.68	0.23	32.42	0.30	0.11	1.32	0.001
Denier no. 10	-	0.21	0.04	67.02	0.21	30.69	0.36	0.11	1.26	0.09
Denier no. 11	-	0.14	0.03	74.98	0.16	23.09	0.35	0.11	1.13	0.001
Denier no. 12	-	1.40	0.05	68.08	0.20	28.10	0.34	0.10	1.65	0.07
Denier no. 13	-	1.28	0.06	65.70	0.22	30.12	0.47	0.16	1.99	0.001
Denier no. 14	-	0.08	0.07	72.31	0.19	25.49	0.38	0.11	1.37	0.001
Denier no. 15	-	1.48	0.07	70.22	0.21	25.63	0.34	0.14	1.83	0.07
Denier no. 16	-	0.85	0.001	68.39	0.19	28.72	0.40	0.11	1.34	0.001
Denier no. 17	-	0.17	0.001	68.30	0.21	29.29	0.42	0.16	1.43	0.001
Denier no. 18	0.12	1.06	0.001	72.16	0.20	24.68	0.36	0.11	1.25	0.07
Denier no. 19	-	0.21	0.05	66.16	0.21	31.15	0.40	0.14	1.68	0.001
Denier no. 20	-	0.06	0.001	61.64	0.20	35.62	0.35	0.11	1.92	0.1
Denier no. 21	-	0.19	0.04	57.20	0.25	38.96	0.49	0.16	2.62	0.08
Denier no. 22	0.13	0.99	0.04	59.79	0.24	36.40	0.36	0.16	1.81	0.09
Denier no. 23	-	0.47	0.05	67.31	0.21	29.57	0.39	0.15	1.79	0.07

Annex X-Rays Fluorescence investigation

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