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An extraordinary hoard from the first quarter of the 15th century. Contributions to the Moldavian currency system during the reign of Alexander I (1399/1400-1432)

Lilia DERGACIOVA*

Between 2010 and 2011, a hoard of 15th-century coins was discovered in the Republic of Moldova, in a forest not far from the village of Cociulia in the Cantemir District (pl. 1). We have no information about the circumstances of the hoard's discovery or its original size. However, we were able to examine 77 coins from this find, all of which were attributed to the early coinage of Alexander I (1399/1400–1432). Because the Cociulia hoard is unique in its composition and has no analogies, we decided to present it to the numismatic community through a series of articles and presentations[1]. The article concerning the hoard was written in Romanian for the journal *Studii şi cercetări de numismatică*, and its Russian translation was published a year later in the journal *Medieval Numismatics of Eastern Europe*[2]. However, the Romanian version of the article was never published. Below, we present a supplemented and revised version of the Romanian and Russian texts. Additionally, in the same issue of this journal, an article by Roman Croitor on sturgeon species is published; it is directly related to our study and further emphasises the importance of sturgeon in the economic life of medieval Moldavia.

Structure of the Hoard

As mentioned above, we examined 77 epigraphic pieces from the hoard found in Cociulia. Of these, 72 well-preserved specimens belong to three coin-types: Type I – the type with two fleur-de-lys on the

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[1] A total of three presentations were given on the hoard find: at the XXIX National Numismatic Symposium in Bacău, from 15 to 17 June 2012 (Lilia Dergaciova, *Un tezaur de monedă moldovenească din primul sfert al sec. XV. Concluzii preliminare*, Al XXIX-lea Simpozion Național de Numismatică, Programul comunicărilor, Bacău, 2012, p. 11); at the symposium 'Art and Civilisation of the Middle Ages', 19th edition, Suceava, from 23 to 25 November 2012 (Lilia Dergaciova, *Monede moldovenești de tip „premergător" emise de către Alexandru cel Bun. Probleme controversate*; the summary of the talk was not published), and at the 50th International Conference of the Museum of National History and Archaeology Pontica in Constanța, from 11 to 13 October 2017 (Lilia Dergaciova, *Tezaur Cociulia şi importanţa acestuia pentru cunoaşterea sistemului monetar moldovenesc de pe timpul lui Alexandru cel Bun*, Sesiunea Științifică Internațională PONTICA, a 50-a ediție: Istorie şi arheologie în spațiul vest-pontic, Rezumatele comunicărilor, Constanţa, 2017, p. 32).

[2] Лилия Дергачева, *Клад молдавских монет из села Кочулия и молдавско-польские отношения начала XV века*, Средневековая нумизматика Восточной Европы, 6, 2017, p. 213-246.

shield (14 specimens); Type II – the type with a helmet above the shield (47 specimens); Type III – the type with a sturgeon above the shield (11 specimens). The remaining five pieces could not be assigned to a specific type because they were broken or fragmented (nos. 73–77).

Description of Coins by Type

Type I. Coins with two fleur-de-lys on the shield (*cf.* MBR, p. 59, nos. 352–355; Catalogue of the Hoard, nos. 1–14, pl. II and VII)

Fourteen specimens were assigned to Type I. The obverse depicts the head of an aurochs with a star between its converging horns, a six-petalled rose to the right, and a crescent moon combined with a stem bearing a fleur-de-lys protruding from the aurochs' mouth to the left. The obverse with the aurochs' head represents a single general type (fig. 1a). The reverse features a per-pale shield with three bars in the first field and two fleur-de-lys in the second. This side is distinguished by the fleur-de-lys placed at the top, right, and left of the coat of arms (fig. 1b). The legend consists of patterns that are sometimes used to represent different letters (cf. V and U; E and D; L and N). The circular legends contain neither secret nor separation marks, nor do they have a clearly defined starting point (the legend may begin at 12, 1, 5, 7 o'clock, etc.).

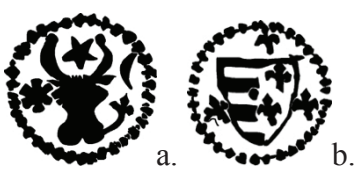

Fig. 1. Type I: example images from the inner dotted circle on the obverse (a) and reverse (b).

Legends on the obverses:
A. SALЧXANDЧRV (SALEXANDERV)
B. SALЧXANDЧR (SALEXANDER)

Legends on the reverses:
a. SMOLDAVIANS (SMOLDAVIENS)
b. SMOLDAVIARS (SMOLDAVIERS)
c. SMODAVIANS (SMODAVIENS)
d. SMONDANDEVS (SMONDANDEVS)

The following specimens correspond to these combinations:

A – a

1. AR ↙ 1.60 g; 21.5 mm.
2. AR ↗ 1.35 g; 21.6 mm.
3. AR ↘ 1.30 g; 22 mm.
4. AR ↘ 1.02 g; 22.5 mm; from the same dies as no. 3.
5. AR ↗ 1.01 g; 21 mm.
6. AR ↙ 0.95 g; 22.5 mm; from the same dies as no. 1.

7. AR → 0.84 g; 20.5 mm.
8. AR ↘ 0.57 g; 23.5 mm, double struck on obverse and reverse; from the same dies as no. 5.

A – b

9. AR ↑ 0.66 g; 22 mm.

A – c

10. AR ↓ 0.77 g; 22 mm.
11. AR ↘ 0.69 g; 21.5 mm.

B – a

12. AR → 1.16 g; 22 mm.
13. AR ↖ 0.95 g; 22 mm; from the same reverse dies as no. 7.

B – d

14. AR ↓ 1.24 g; 21.5 mm.

The obverse legends present a single standard variant, with two sub-variants of writing: **A** (nos. 1–11) and **B** (nos. 12–14). Legend **A**, composed of 11 characters, appears on eleven specimens, while legend **B**, an abbreviated form, appears on three. For the reverse legends, a single standard variant has been identified, with four sub-variants of writing: **a** (nos. 1–8, 12–13), **b** (no. 9), **c** (nos. 10–11), and **d** (no. 14). The correct form is **a**, composed of 11 signs and recorded in ten cases; the remaining legends exhibit omissions of letters (**d**) or errors (**b**, **c**), and occur only rarely.

Obverses **A** correspond to reverses **a** (nos. 1–8), **b** (no. 9), and **c** (nos. 10–11); conversely, reverse legends **a** and **d** correspond to obverses **B** (nos. 12–13 and no. 14, respectively). For the 14 coins, the use of 11 obverse dies and 10 reverse dies was identified. The distribution of dies is as follows: for the obverses – **A**: 8 dies, **B**: 3 dies; for the reverses – **a:** 6 dies, **b**: 1 die, **c**: 2 dies, **d**: 1 die. Small groups of coins struck with the same pair of dies could be identified. Three pairs of dies were recorded for obverses **A**, each pair striking two coins: nos. 1 and 6; nos. 3 and 4; nos. 5 and 8. The reverse of the fourth die pair is coupled with two different obverses, namely nos. 7 and 13 (pl. VII).

From the above, several conclusions may be drawn. The group of coins with reverse legends **a** may be considered not only the most correctly written, but also the dominant group for this type. The reverse legends designated **b, c, and d** – owing to their small number – may be regarded as secondary variants arising from the inattention of the die-sinker. The identified die pairs, used to strike several coins, likewise suggest a relatively **compact group of issues** produced within a relatively short period of time.

Type II. Coins with a helmet above the shield (*cf*. MBR, p. 60, nos. 371–375; Catalogue of the Hoard, nos. 15–61, pl. II–VII)

The catalogue contains 47 pieces attributed to Type II. The obverse features the head of an aurochs with a star between its converging horns, a five-pointed rose to the right, and a crescent to the left. This side corresponds to a single general type (fig. 2a–b). The reverse shows a per-pale shield with three bars in the first field and seven fleur-de-lys in the second. This general type – distinguished by the presence of a closed helmet facing right above the shield – is divided into five subtypes (**I–V**) according to the heraldic elements appearing above, to the right, and to the left of the shield (fig. 3a–e). The five subtypes are:

Subtype I – the letter T on both the right and left sides of the shield (nos. 15–41, 48–58)
Subtype II – the letter T on both sides of the shield, with a dot above the shield (no. 42)

Subtype III – an inverted T on both sides of the shield (nos. 43–47)
Subtype IV – no heraldic elements on the sides, a T above the shield (no. 59)
Subtype V – no heraldic elements on either side of the shield (nos. 60–61)



Fig. 2. Type II: example images from the inner dotted circle on the obverse (a–b).



Fig. 3. Type II reverse: division into five subtypes (I–V), based on the heraldic elements appearing above, to the right, and to the left of the shield (a–e).

Legends on the obverses:
A. ✱MONE·ALEXANDRI (+MONE•ALEXANDRI)
B. ✱MONE·ALEXANDRV (+MONE•ALEXANDRV)

Legends on the reverses:
a. ✱WD·MOLDAVIENSIS (+WD•MOLDAVIENSIS)
b. ✱WD·MOLDAVENSIS (+WD•MOLDAVENSIS)
c. ✱WD·MOLDAVIENSS (+WD•MOLDAVIENSS)

For the obverse, two forms of legend were identified: the archaic form **B** (nos. 48–61), in which the issuer's name is rendered according to the norms of the preceding type (Type I), and the more developed form **A** (nos. 15–47), written in the genitive case. Each legend consists of 15 signs. The reverses bear three forms of legend: **a** is the complete form consisting of 16 signs (nos. 15–37, 42–47); **b** contains an error (no. 38); and **c** is written with an omission of a letter (nos. 39–41, 48–61).

The following specimens correspond to these combinations:

A – I a

15. AR ↘ 1.40 g; 22 mm, double struck on obverse and reverse.
16. AR ↑ 1.34 g; 21,5 mm, double struck on obverse and reverse.
17. AR ↙ 1.18 g; 22,5 mm.
18. AR ↖ 1.06 g; 21 mm.
19. AR ↙ 1.04 g; 21,5 mm.
20. AR ↗ 1.04 g; 20,5 mm.
21. AR ↙ 1.03 g; 21,5 mm.
22. AR ↙ 1.02 g; 21,6x22,6 mm.

23. AR ↗ 0.99 g; 22 mm, double struck on obverse and reverse.
24. AR ↘ 0.99 g; 22 mm, broken; from the same reverse die as no. 19.
25. AR ↙ 0.99 g; 22 mm.
26. AR ↙ 0.89 g; 20,5 mm.
27. AR ↑ 0.88 g; 22 mm.
28. AR ↙ 0.88 g; 21,5 mm.
29. AR ↙ 0.87 g; 22 mm.
30. AR ↘ 0.81 g; 21,5 mm.
31. AR ↙ 0.70 g; 20,6 mm, from the same dies as no. 23.
32. AR (?) ↘ 0.57 g; 21 mm.
33. AR ← 0.54 g; 21,7 mm, double struck on obverse and reverse.
34. AR ← 0.52 g; 20 mm, broken; from the same reverse die as no. 23.
35. AR ↙ 0.51 g; 21,9 mm, broken.
36. AR ↓ 0.46 g; 19,3 mm, broken.
37. Bi (?). ↖ 0.33 g; 21,6 mm, broken.

A – I b

38. AR ↖ 0.98 g; 22,5 mm, double struck on obverse and reverse.

A – I c

39. AR ↓ 1.12 g; 21,5 mm, from the same obverse die as no. 25.
40. AR ↗ 1.08 g; 22 mm.
41. AR ↓ 0.23 g; 13 mm, broken; from the same obverse die as no. 25.

A – II a

42. Bi (?) ↓ 0.55 g; 21 mm.

A – III a

43. AR ↙ 1.19 g; 20,5 mm.
44. AR ↓ 1.13 g; 20,5 mm.
45. Bi (?) ↖ 0.86 g; 20,5 mm.
46. AR ↗ 0.74 g; 22 mm, double struck on obverse and reverse.
47. Bi (?) ↙ 0.58 g; 18,6 mm.

B – I c

48. AR ↖ 1.16 g; 21 mm.
49. AR ↗ 0.99 g; 22 mm.
50. AR ↖ 0.99 g; 21 mm; from the same dies as no. 49.
51. AR ↓ 0.90 g; 21,5 mm.
52. AR ↗ 0.88 g; 21,5 mm; from the same reverse die as no. 49.
53. AR ↗ 0.83 g; 22,5 mm; from the same reverse die as no. 51.
54. AR ↗ 0.69 g; 22,5 mm.
55. Bi (?) ↙ 0.67 g; 22 mm.
56. AR ↗ 0.63 g; 21 mm.
57. AR ↘ 0.61 g; 21,5 mm; from the same reverse die as no. 51.
58. AR ← 0.58 g; 21,7 mm, broken; double struck on obverse and reverse.

B – IV c

59. AR ↗ 0.79 g; 22 mm.

B – V c

60. AR ↖ 1.00 g; 22,5 mm.
61. AR ↙ 0.77 g; 21,6 mm.

A large group of pieces, consisting of 29 specimens, is characterised by the use of legend **A** on the obverse and legend **a** on the reverse. Die-couplings were identified for reverses belonging to subtypes I (nos. 15–37), II (no. 42), and III (nos. 43–47). The obverses **B** combined with reverse **c** form another group of 14 specimens occur in coins of subtypes I (nos. 48–58), IV (no. 59), and V (nos. 60–61). Conversely, the reverse legends **I c** couple with obverses bear both legend **A** (nos. 39–41) and legend **B** (nos. 48–58). A single specimen attests the coupling of obverse **A** with reverse **b** (no. 38).

Thus, the coins with obverse legends **B** appear to have been produced during a period in which they continued to copy the legend of the preceding type (namely *ALEXANDERV* / *ALEXANDRV*). By analogy with the obverses, the reverse legend **c**, which lacks a separation mark, was influenced by earlier issues of Type I; thus, the name of the country shows a doubled S and could be read *MOLDAVIENSS* or *SSMOLDAVIEN*. This group of pieces does not represent an isolated error that was quickly replaced, but rather a complete series produced over a certain period.

The legends of obverse **A** (*+MONE•ALEXANDRI*) and reverse **a** (*+WD•MOLDAVIENSIS*) attest the emergence of a new type of legend. In turn, the reverse legends **I c**, which couple with both obverses **A** and **B**, indicate the transition from the archaic version of reverse legend **c** to the elaborated form **a**. This leads to the conclusion that reverse subtypes IV and V were issued earlier than subtypes II and III. Subtype I, however, was employed simultaneously with both the earlier subtypes IV and V and the later subtypes II and III, ensuring continuity during the transition from archaic to elaborated legend variants.

Thus, we believe that the pieces of subtype I (with the letter T to the right and left of the shield) may be regarded as the basic subtype of monetary Type II, while subtypes II and III represent variants of it. Subtypes IV, and especially V, may be considered exceptions within this coin type owing to their rarity. The reverse legend **a** (*+WD•MOLDAVIENSIS*), which appears on most coins of subtype I, together with the obverse legend **A** (*+MONE•ALEXANDRI*), demonstrates that these forms were used only in the second half of the emission period of Type II. From this point onward, this legend type becomes a kind of base form, continuing to be employed in subsequent types (for example, the type with the sturgeon)[3].

For the 47 coins in our catalogue, the use of 43 obverse dies and 39 reverse dies was identified. Obverse legend **A** was struck with 30 dies, and legend **B** with 13; reverse subtype I used 30 dies, subtype II one die, subtype III five dies, subtype IV one die, and subtype V two dies. We were therefore able to identify several pieces struck with the same die pairs; all of these belong to subtype I and are shown on plate 7.

Obverses A: coins 19 and 24, struck with the same reverse die, were produced with two different obverse dies; coins 23, 31, and 34, struck with the same reverse die, attest the use of two obverse dies (one for 23 and 31, and another for 34). The most significant observation comes from the third die coupling: coins 25, 39, and 41, struck with a single obverse die, are coupled with two reverse dies belonging to subtypes **I a** (no. 25) and **I c** (nos. 39, 41). This confirms the transition from one subtype to another.

[3] See the discussion below.

Obverses B: coins 49, 50, and 52, struck with a single reverse die, were produced with two obverse dies (one for 49 and 50, and another for 52); coins 51, 53, and 57, struck with a single reverse die, were produced with three obverse dies.

The remaining specimens do not attest multiple die couplings and therefore, for the moment, do not contribute to establishing the relative chronology of the pieces. Nevertheless, we believe that the presence of several pieces struck with the same die pairs may indicate – just as in the case of the previous type – that these pieces were acquired directly from the place of coin production.

Type III. Coins with a sturgeon above the shield (*cf*. MBR, p. 58–65, unpublished type; Katiușa Pârvan, *Monede moldovenești rare din secolele XIV–XV*, CN, 8, 2002, p. 189–195; Catalogue of the Hoard, nos. 62–72, pl. VI and VII)

Eleven pieces from our catalogue were attributed to this type. Their obverses are characterised by the presence of an aurochs' head with a star between its converging horns, a five-pointed rose to the right, and a crescent to the left. As with the pieces of the preceding type, they belong to a single general obverse type (fig. 4a). The reverses differ by the appearance of a per-pale shield with three bars in the first field and seven fleur-de-lys in the second, surmounted by a fish; the letter T appears to the right and left of the shield. No additional sub-variants were identified for this reverse type (fig. 4b). On both the obverse and the reverse, a single form of legend appears – **A** and **a**, respectively. They consist of 15 and 16 signs, respectively.


a. b.

Fig. 4. Type III: example images from the inner dotted circle on the obverse (a) and reverse (b).

Legend on the obverse:
A. ✱MONE·ALEXANDRI (+MONE•ALEXANDRI)

Legend on the reverse:
a. ✱WD·MOLDAVIENSIS (+WD•MOLDAVIENSIS)

A – a

62. Bi (?) ↘ 1.30 g; 21 mm.
63. Bi (?) ↗ 1.21 g; 22 mm; from the same reverse die as no. 62.
64. AR ← 1.04 g; 21,5 mm.
65. Bi (?) ↖ 1.03 g; 20,5 mm.
66. AR ↗ 1.03 g; 20,5 mm.
67. Bi (?) ↗ 0.90 g; 20,5 mm.
68. AR ↗ 0.89 g; 21,5 mm; from the same reverse die as no. 62.
69. Bi (?) ↙ 0.73 g; 21 mm, double struck on obverse and reverse; from the same reverse die as no. 62.
70. Bi (?) ↗ 0.71 g; 19 mm; from the same reverse die as no. 64.
71. Bi (?) ↘ 0.67 g; 20 mm; from the same reverse die as no. 62.
72. AR ↖ 0.57 g; 18,3x13 mm, broken.

Eleven pieces in our catalogue, bearing a single form of legend on both obverse and reverse, were struck with several pairs of dies. For the obverse, the use of ten dies was identified, while the reverse shows only six (pl. VII). Among the specimens in this situation are coins nos. 62, 63, 68, 69, and 71, which have reverses struck with a single die, while their obverses were minted with four different dies; likewise, coins 64 and 70 share reverses struck with the same die but were produced with different obverse dies.

The analysis of the pieces shows that the dies for this coin type were carefully executed; they exhibit no errors or omissions in the legends. Moreover, the form of the legends preserves the same basic pattern used in subtype I of the preceding Type II (with helmet above the shield). The eleven specimens in our catalogue form a highly compact group, which – along with their iconographic and linguistic similarities – does not suggest the existence of additional subtypes. All of this supports the idea that the coins with a sturgeon were produced over a relatively short period and were most likely struck **contemporaneously with the pieces of subtype I of Type II**. Nevertheless, we found no die-coupling between the obverse dies of Types II and III, which likewise supports the conclusion that they were struck separately, using different sets of dies.

We should next focus our attention on the heraldic element surmounting the shield. This feature was first noted by Constanța Știrbu in the 1980s[4]. Publishing two coins from the collection of Rudolf Gassauer and being familiar with Octavian Iliescu's typology – which at that time consisted of six monetary types and did not include the type with the sturgeon – she attributed them to Type VII.[5] She dated them to the end of the reign of Alexander I, between 1420 and 1431. Știrbu argued that the element above the shield, considered to be a dolphin or a sturgeon, was an allusion to Moldavia's dominion over the territories at the mouths of the Danube. It symbolised the battles fought by Moldavia against the Turks around 1420 in defence of that territory.

Constanța Știrbu's hypothesis was criticised by Octavian Iliescu, who argued that she must have been mistaken and that, in fact, the pieces in question were not a new type but only coins with a helmet above the shield – coins he had previously published and attributed to the transitional period of 1408–1409.[6] However, a recent study by Katiușa Pârvan demonstrated that Știrbu was correct and that a distinct group of coins marked by a new heraldic element does indeed exist. Examining five pieces of this type from another numismatic collection and analysing them by XRF, Katiușa Pârvan found that the silver content of such pieces varied significantly: sometimes very low (only 170‰), sometimes rising to 880‰ of pure metal[7]. She also dated the type to around the year 1408[8].

The key symbol above the shield, however, has remained ambiguous, still being described as either a dolphin or a sturgeon. Examining the eleven pieces in our catalogue, together with the technical drawing, we believe that the figure represents a sturgeon. It displays all the typical features of a fish – tail, fins, and an elongated body with a pointed head (fig. 4b). Although it somewhat resembles a dolphin, it is not one. In our view, it is difficult to assume that the dolphin could have had such a significant influence on Moldavian state life that it would have been introduced into Moldavian heraldry. We are inclined to emphasise that fish played a much more important role in the economy of medieval Moldavia, and that

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[4] Constanța Știrbu, *Colecția de monede medievale românești Dr. Rudolf Gassauer*, BSNR, 75-76 (1981-1982), 1983, p. 315-349.

[5] *Ibidem*, p. 317, 333, no. 41-42.

[6] O. Iliescu, *Aspecte ale economiei monetare în Moldova sub domnia lui Alexandru cel Bun*, RI, 11, 2000, p. 83-84, note 82.

[7] Katiușa Pârvan, *Monede moldovenești rare din secolele XIV-XV*, CN, 8, 2002, p. 193-194.

[8] *Ibidem*, p. 191-192.

the export of sturgeon-family species was well known both within the country and abroad. Supporting this view is the article by the archaeozoologist Roman Croitor included in the present volume[9].

Thus, the arguments above support the idea that the "sturgeon coins" are closely linked to the "helmet coins". This, in turn, leads to the conclusion that the "sturgeon coins" should be designated as **Type III**, and that the typology of the coinage of Alexander I – previously consisting of six main types according to O. Iliescu – must be extended and completed accordingly.

Fragmented coins of unknown type

73. Bi (?) ↖ 0.45 g; 17.4 mm, helmet or sturgeon above the shield, the letter T to the right and left of the shield.
Av. …L…XANDRI
Rv. …OLDAVIENSI…

74. Bi (?) ↑ 0.32 g; 19,4 mm, broken.
Av. …
Rv. …

75. Bi (?) ↓ 0.14 g; 11,3 mm, broken, T to the left of the shield.
Av. …
Rv. …

76. Bi (?) ↘ 0.13 g; 11.1 mm, T to the left of the shield.
Av. …NE·…
Rv. …MOLD…

77. AR 0.03 g; 6.3 mm, broken.
Av. …AL…
Rv. …N…

Metrology of the Coins

Type I. The 14 specimens are in very good condition, showing no signs of intense circulation. Their weight ranges from 0.57 to 1.60 grams, with an **average of 1.00 gram**; the diameter varies between 20.5 and 23.5 mm, with an **average of 21.8 mm**. The median weight cannot be precisely determined (fig. 5). Even excluding the extreme values of 0.57 and 1.60 grams, the interval remains quite broad, fluctuating between 0.60 and 1.40 grams.

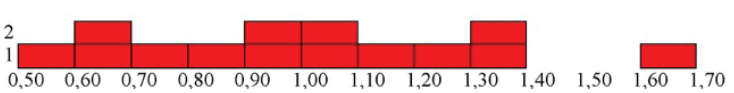

Fig. 5. Weight diagram for Type I coins.

Type II. Of the 47 pieces presented in the catalogue, the weight could be measured for 32 specimens, ranging between 0.54 and 1.40 grams, with an **average of only 0.95 grams**. The diameter, calculated for

[9] See Roman Croitor's article in this volume (R. Croitor, *Sturgeons in Medieval Moldova*).

41 pieces, varies between 20.5 and 22.5 mm, with an **average of 21.6 mm**. The median weight may be placed between 0.80 and 1.10 grams and generally corresponds to the calculated average (fig. 6).

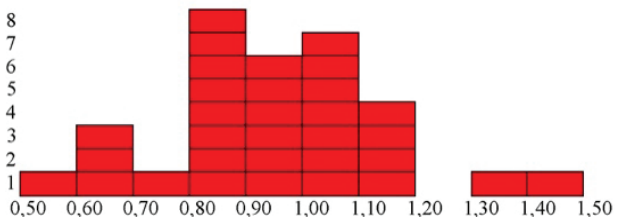

Fig. 6. Weight diagram for Type II coins.

Type III. The weight was calculated for **nine pieces** from the tranche of eleven specimens. It ranges between 0.67 and 1.30 grams, with an **average of 0.97 gram**. The diameter fluctuates between 20 and 22 mm, with an **average of 20.9 mm**. The median weight is slightly higher, situated between 1.00 and 1.10 grams, and is recorded in three specimens (fig. 7).

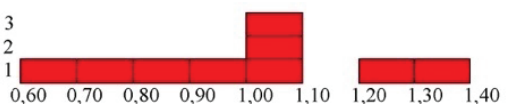

Fig. 7. Weight diagram for Type III coins.

Metrological data for these three types have been summarised only in a few works, among which we may mention the numismatic catalogue MBR[10] for Types I and II; the synthesis by O. Iliescu[11] likewise for Types I and II; and the article by Katiușa Pârvan,[12] which addresses only Type III. These studies provide the following data:

MBR:

- Type I – 1½ groat – 22–23 mm, 1.3–1.8 g
- Type II – 1½ groat – 20–22 mm, 1.13–1.25 g
  – 1 groat – data missing
- Type III – specimens not known

Iliescu 2000:

- Type I – 1½ groat – avg. 21 mm, avg. 1.35 g
- Type II – 1½ groat – avg. 21 mm, avg. 1.35 g
  – 1 groat – avg. 18 mm, avg. 0.90 g
- Type III – specimens not known

Pârvan 2002:

- Type III – 1½ groat – 19–22 mm, 0.98–1.46 g, median 1.35 g

[10] MBR, p. 59.
[11] O. Iliescu, *op. cit.,* p. 79-80.
[12] Katiușa Pârvan, *op. cit.,* p. 191-193.

Our data:

- Type I from the Cociulia hoard: avg. diameter 21.8 mm, avg. weight 1.00 g
- Type II from the Cociulia hoard: avg. diameter 21.6 mm, avg. weight 0.95 g
- Type III from the Cociulia hoard: avg. diameter 20.9 mm, avg. weight 0.97 g

A comparative analysis of the literature and the hoard data shows that the average weight of the coins in the Cociulia hoard is significantly lower than the weights published in earlier works. In practice, it represents an average weight located between that of the so-called 1½-groats and the 1-groats. Why this is the case remains difficult to explain, and any interpretation is inevitably somewhat speculative. It is clear, however, that these fluctuations are *not* connected with the minting technique itself.

Unfortunately, we were unable to carry out metal analyses. We merely note that the visual quality of the pieces varies markedly. The coins of Type I appear to be made of a relatively resistant material, while most pieces of Type III and some of those of Type II have a core of dark silver-coloured alloy (billon?), covered with a light silver-coloured metal that seems to form a thick and more resistant surface layer (silvering?). Such pieces are very fragile, and their edges break easily. We cannot exclude the possibility that their current state of preservation is directly linked to the conditions under which they were stored.

Nevertheless, we cannot overlook the fact that all three types in our hoard are metrologically very similar. The average weight fluctuates between **0.95** and **1.00 gram**, with a diameter of roughly **21–22 mm**, which may indicate that **they all represent coins of the same nominal value**. We shall discuss this below. For now, however, we would like to focus on analogies in the weight standards of Moldavian coins.

Certain analogies may be identified in the **Polish monetary system**. Under Władysław II Jagiełło (1386–1434), the Polish system comprised several denominations, in which 1 grossus = 2 *quartense* (medium grossi) = 4 *quartergrossi* = 16 denarii = 32 oboli[13]. Between 1394 and 1406, the Cracow mint struck half-groats weighing 1.57–1.72 g, with a silver fineness of 0.320–0.493. Lwów (Lviv), one of Moldavia's principal commercial partners, also produced half-groats under Władysław Jagiełło.

Andrzej Kryżanivski distinguishes three phases in early 15th-century Lwów coinage: 1399–1403 with an average weight of 1.55 g; 1403–1404 with an average weight of 1.50 g; and 1404–1408 with an average weight of 1.48 g[14]. A. Mikołajczyk notes that between 1394 and ca. 1414 (with a brief interruption in 1408, when the mint burned), Lwów half-groats weighed on average 1.51 g, with a silver fineness of 0.392–0.420 before 1400, followed by a slight reduction to 1.47 g and a fineness of 0.383–0.476[15].

The values cited by Kryżanivski and Mikołajczyk are significantly higher than those published by the Polish numismatist Józef Szwagrzyk, a discrepancy we cannot presently explain.[16] According to Szwagrzyk, the Lwów half-groats issued between 1399 and 1414 weighed between 0.715 and 1.40 g, with an average diameter of 20.5 mm[17]. Thus, the weight of Lwów half-groats fluctuated considerably, showing a slight decrease.

Whatever the average values of Polish and Lwów coins may have been, it appears that the Moldavian issues sought to follow them, initially reducing their own weight slightly. The production of Moldavian coins of a reformed type – closely matching the weight of the Lwów coins of Władysław II – could have

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[13] A. Mikolajczyk, *Moldavian Coins in the 15th Century Poland*, ArhMold, 12, 1988, p. 263.

[14] A. *Крижанівський, Львівський монетний двір у XIV-XV століттях*, Львів, 2007, p. 113-125, 128, 200-206.

[15] A. Mikolajczyk, *op. cit.,* p. 263.

[16] For his study, A. Kryżanivski selected and analyzed 395 specimens. It is possible that complete and best-preserved specimens were chosen. Unfortunately, the publication did not include a catalogue of the coins with individual weight data for each specimen (*cf.* A. *Крижанівський*, *op. cit.,* p. 113-125, 128, 200-206).

[17] J. Szwagrzyk, *Pieniądz na ziemiach polskich X–XX w.*, Wrocław, Warszawa, Kraków-Gdańsk, 1973, p. 60.

ensured a favourable exchange rate for Moldavian currency and effectively "joined" the Moldavian state to the Polish monetary and economic sphere.

Some considerations concerning the monetary system under Alexander I and the denomination of the pieces from the Cociulia hoard

According to previously published data, Moldavian coins with two fleur-de-lys in the shield were struck between 1400 and 1408[18] in three denominations: the 1½-groat (AR, 1.3–1.8 g, 22–23 mm)[19], the 1-groat (AR, AE, 0.58–1.04 g, 18–19 mm)[20] and the ½-groat (AR, 0.3–0.56 g, 12–14 mm)[21]. These issues are generally referred to as **"pre-reform coins"** or **Phase I** coins[22].

The epigraphic emissions of the 1½-groat and 1-groat bore the inscriptions S ALEXANDER or S ALEXANDRV[23] on one side and S MOLDAVIENS[24] or S MOLDAVIENSIS[25] on the other, which may be interpreted as *Signum or Sigillum Alexandri* and *Signum or Sigillum Moldaviae.*[26] The order in which these denominations were issued within the Phase I has not been established, and earlier studies have suggested that all three were minted simultaneously[27].

The minting period of the 1-groat pieces was narrowed in Katiușa Pârvan's study, where she argued that these emissions were struck between 1399/1400 and approximately 1402.[28] The silver content of such coins was very low, ranging from 19.5‰[29] to 72‰[30]. The other two denominations – the larger epigraphic coin referred to as the 1½-groat, and the anepigraphic ½-groat, which had a higher silver content and also differed iconographically – were considered pieces introduced after a monetary reform. Through this reform, the traditional Moldavian system, consisting of two denominations (1-groat and ½-groat), was supplemented by a third denomination: the 1½-groat, previously termed the "double groat". No precise dating, apart from the general one proposed by Octavian Iliescu (between 1400 and 1408), had been suggested for the coins of these two denominations. The larger epigraphic denomination (also represented in the Cociulia hoard) may be included in the monetary emissions of Alexander I, Phase I (according to Iliescu's recently revised typology)[31], but only if it is specified that these coins represent a relatively later issue than the copper groats of the same type.

It may be assumed that the striking of the larger epigraphic and the smaller anepigraphic denominations of Type I could have taken place after 12 March 1402, when Alexander I swore fealty to the Polish king

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[18] O. Iliescu, *Moneda în România (491–1864)*, București, 1970, p. 27.

[19] MBR, p. 59, under the name of double groat.

[20] *Ibidem*.

[21] *Ibidem*.

[22] O. Iliescu, *Aspecte ale economiei…,* p. 79.

[23] *Ibidem*, p. 77.

[24] O. Iliescu, *Îndreptări și întregiri mărunte cu privire la unele emisiuni monetare feudale ale Țărilor Române*, SCN, 1, 1957, p. 221; idem, *Aspecte ale economiei…*, p. 71, 79.

[25] *Ibidem*, p. 79.

[26] *Ibidem*, p. 78.

[27] O. Iliescu, *Numismatica medievală și modernă a țării noastre, oglindită în colecțiile restituite de la Moscova*, in *Studii asupra tezaurului restituit de U.R.S.S.*, București, 1958, p. 23; C. Kirițescu, *Sistemul bănesc al leului și precursorii lui*, I, București, 1997, p. 84; O. Iliescu, *Aspecte ale economiei…*, p. 66, etc.

[28] Katiușa Pârvan, *Monede moldovenești descoperite în Dobrogea*, in *Istro-Pontica. Muzeul tulcean la a 50-a aniversare 1950-2000*, Tulcea, 2000, p. 563-572.

[29] *Ibidem*, p. 565, no. 5.

[30] *Ibidem*, p. 564, no. 2.

[31] O. Iliescu, *Aspecte ale economiei…,* p. 80.

Władysław II, or after 1404, during Alexander's visit when he renewed this oath in person. We also do not exclude the possibility that the beginning of the reformed coinage occurred only after the reconfirmation of Moldavia's vassal obligations to the Polish Crown in 1407[32]. This development may likewise have been connected to the commercial privileges granted between 3–8 October 1408[33].

The "helmet type" (Type II). The type with a helmet above the shield has been described as a transitional type,[34] although it – like the "sturgeon type" – actually marks a new stage in the iconographic and heraldic development of Moldavian coinage. From this moment onward, these forms of legend become standard for the issues of Alexander I and are widely employed in subsequent types (*e.g.*, the type with the aurochs' head[35], the type with the rose[36] above the reverse shield). In our view, this change represents a significant **heraldic shift** and should not be confused with the earlier weight-related changes in Alexander's monetary system. At this new stage, the aurochs' head on the obverse is accompanied by the inscription MONEta ALEXANDRI, while the shield on the reverse is accompanied by the legend WaiwoDae MOLDAVIENSIS.

The radical change in the inscriptions may also relate to the process of "joining" the Polish monetary sphere. The earlier legends S ALEXANDERV and S MOLDAVIENS, composed of 10–11 letters, lacking separators and arranged somewhat chaotically, were abruptly replaced by a **well-structured, carefully designed inscription** with clearly indicated abbreviations that cannot be misread. For the first time, Alexander's name appears together with a title, and the inscription unambiguously states that the coin belongs to the issues of the Moldavian voivode.

Interestingly, the legends of the reformed Moldavian coins are essentially adapted forms of contemporary Polish and Lwów legends. For example, Cracow half-groats bear MONEta WLADISLAI on the obverse and REGIS POLONIE on the reverse; Lwów half-groats bear MONETA LEMBVRGensis/ MONETA LEMBVRgensis on one side and WLADISLAVS REX/ WLADISLAI REGIS on the other.

Our conclusions, based on these data and on the Cociulia hoard, are as follows. Shortly after 1402, Alexander I implemented a **monetary reform** that unfolded in several stages.

Stage 1 (c. 1407–1408): Improvement of alloy quality. The copper, silvered 1-groats (0.58–1.04 g; 18–19 mm), issued until 1402, were replaced by higher-quality reformed 1-groats corresponding to the Lwów half-groats of Władysław II.

Stage 2 (c. 1408–1409): Issue of the new Types II and III. Two subsequent types – Type II (with a helmet) and Type III (with a sturgeon) – both of the same nominal value (1-groats), were issued shortly thereafter. They preserve the metrology of the reformed Type I groats while fully adhering to the heraldic and inscriptional conventions of the Polish and Lwów half-groats.

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[32] C. Giurescu, D. *Giurescu, Istoria Românilor*. Vol. II. *De la mijlocul secolului al XIV-lea până la începutul secolului al XVII-lea*, București, 1976, p. 96; D. Dragnev (ed.), *Domnii Țării Moldovei. Galeria voievozilor. Studii*, Chișinău, 2005, p. 63-64; C. Rezachevici, *Cronica Moldovei de la Cracovia*, București, 2006, p. 61 etc.

[33] M. Costăchescu, *Documente moldovenești înainte de Ștefan cel Mare. Documente interne. Urice (Ispisoace), Surete, Regestre, Traduceri 1438–1456.* Volumul II. *Documente externe. Acte de împrumut, de omagiu, tractate, solii, privilegii comerciale, salv-conducte, scrisori 1387–1458*, Iași, 1932, no. 176; *Л. Н. Пушкарев* (отв. ред.), *Исторические связи народов СССР и Румынии в XV – начале XVIII в. Документы и материалы в трех томах, I (1408–1632)*, Москва, 1965, no. 1.

[34] O. Iliescu, *Aspecte ale economiei…,* p. 80.

[35] MBR, p. 61.

[36] *Ibidem*, p. 60.

Indirectly, this conclusion is supported by the **countermarked Juchid Ulus coins** that continued to circulate locally. According to Eugen Nicolae[37], the countermarking (a schematised building or a chi-rho monogram) and reuse of Juchid coins as small change occurred in the first decade of the 15th century, corresponding to the period in which the 1-groat coins were issued. This reuse likely diminished after the Moldavian monetary reform, when alloy coins were withdrawn from circulation and higher-value precious-metal coins were introduced.

Additional clarifications for Type II ("helmet type"). For the coins known to us, including those from the Cociulia hoard, there are significant deviations from the average weight. Their metrological data indicate that the issuer of this type struck only a single denomination. Although the type comprises five subtypes, none displays heraldic features that would support the hypothesis of two distinct denominations (1½-groat and 1-groat), as O. Iliescu proposed on purely theoretical grounds[38]. For this reason, we believe that Type II coins, as well as those of Type III were issued in only one epigraphic denomination – 1-groat, and that Iliescu's theory lacks a firm basis.

Why were such changes necessary in the Moldavian monetary system?

It is likely that Alexander I, as a vassal of the Polish Crown and in the context of his increasingly close relations with Władysław II Jagiełło, reformed the Moldavian monetary system for several reasons. On the one hand, improving the quality of Moldavian coinage was necessary and helped establish a favourable exchange rate between Moldavian and Lwów issues. On the other hand, the iconographic changes and clearly formulated legends likely facilitated the recognition of Moldavian coins on the Polish market. We should also not exclude the possibility that these changes were imposed by the Polish Crown as one of the conditions following the vassal oath.

Moreover, the exceptional heraldic elements on the reverses of the two types (II–III), elements not characteristic of Moldavian heraldry, together with the absence of other denominations (no ½-groats attributable to Types II or III are known), and their conformity with Polish minting standards, all suggest that these two types were created for a specific purpose.

The most plausible context is the series of military conflicts between Poland and the Teutonic Order. Following the Teutonic occupation of Lithuanian territories and commercial centres, numerous armed conflicts took place, culminating in the peace agreement of 8 October 1409. Although this agreement formally remained in force until 21 June 1410, both sides prepared for war from the moment it was signed, leading up to the Battle of Grunwald on 15 July 1410[39].

According to the vassal agreement between Władysław II and Alexander I, the Moldavian ruler was obliged to support the Polish king in the event of military danger. Alexander indeed fulfilled this obligation by sending a contingent of Moldavian troops to assist the Polish forces. Some historians even suggest that this contingent was led by Alexander himself[40].

It is possible that, being informed of the ongoing military preparations and aware of his obligations to Władysław II, Alexander I implemented changes in the monetary system and ordered the striking of the new types. They were produced according to Polish standards, likely with the help of Polish die

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[37] E. Nicolae, *Date noi privind monedele și contramărcile de tip Asprocastron*, in *Studia varia in Honorem Professoris Ștefan Ștefănescu Octogenarii*, București-Brăila, 2009, p. 221.

[38] O. Iliescu, *Aspecte ale economiei…*, p. 80.

[39] D. Dragnev (ed.), *op. cit.*, p. 64-65, with references.

[40] Ș. Gorovei, *Mușatinii*, Chișinău, 1991, p. 38.

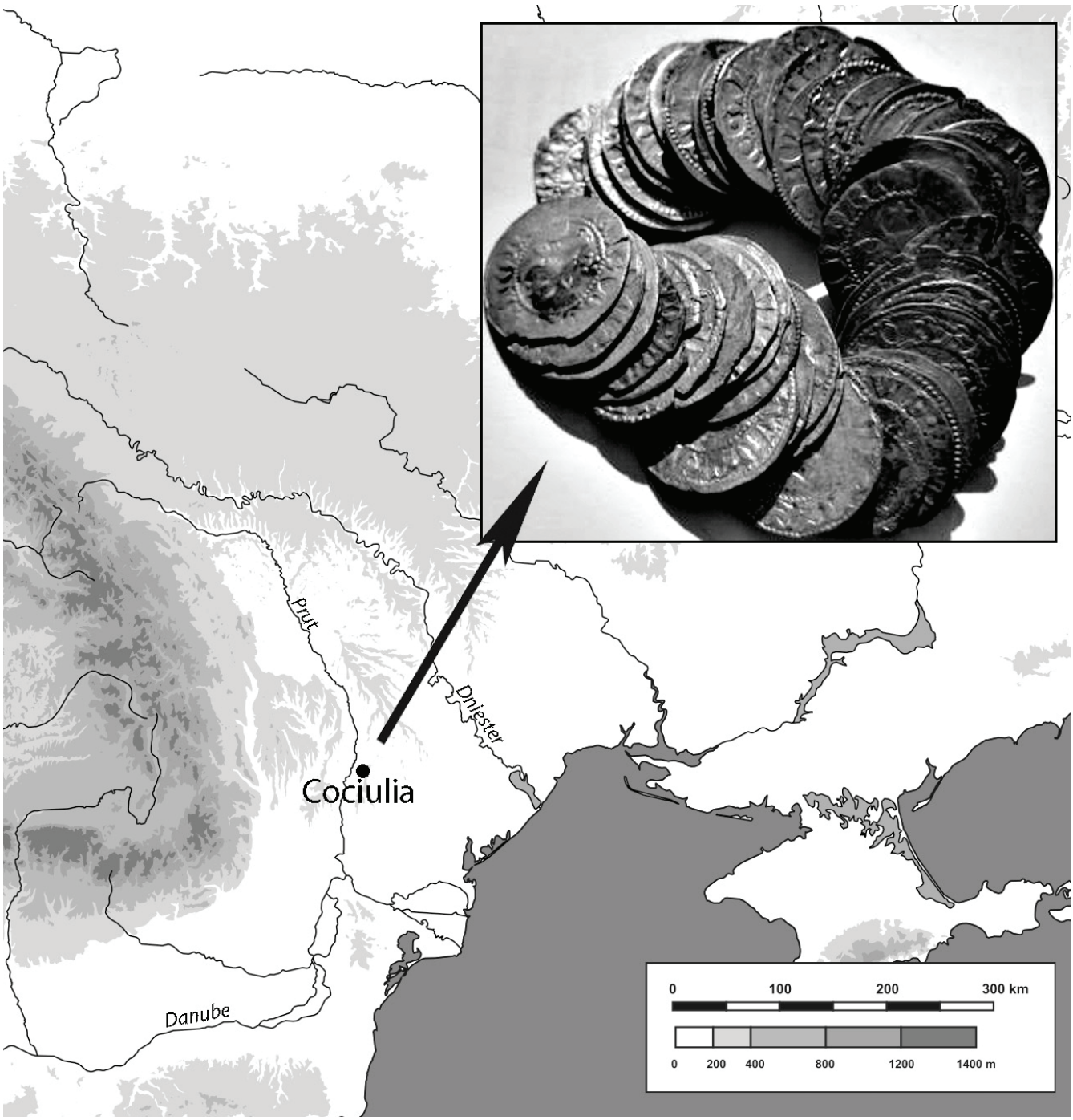
engravers[41]. Although they adhered to Moldavian heraldic canons, the types were marked with exceptional symbols – the helmet and the sturgeon. Issued most probably under exceptional conditions, the coins of these two types may have been intended primarily for the payment of soldiers and/or mercenaries, and possibly as a form of political messaging, rather than as pieces meant for broader international circulation. This hypothesis is indirectly supported by the absence of small anepigraphic denominations corresponding to these two types.

Final remarks

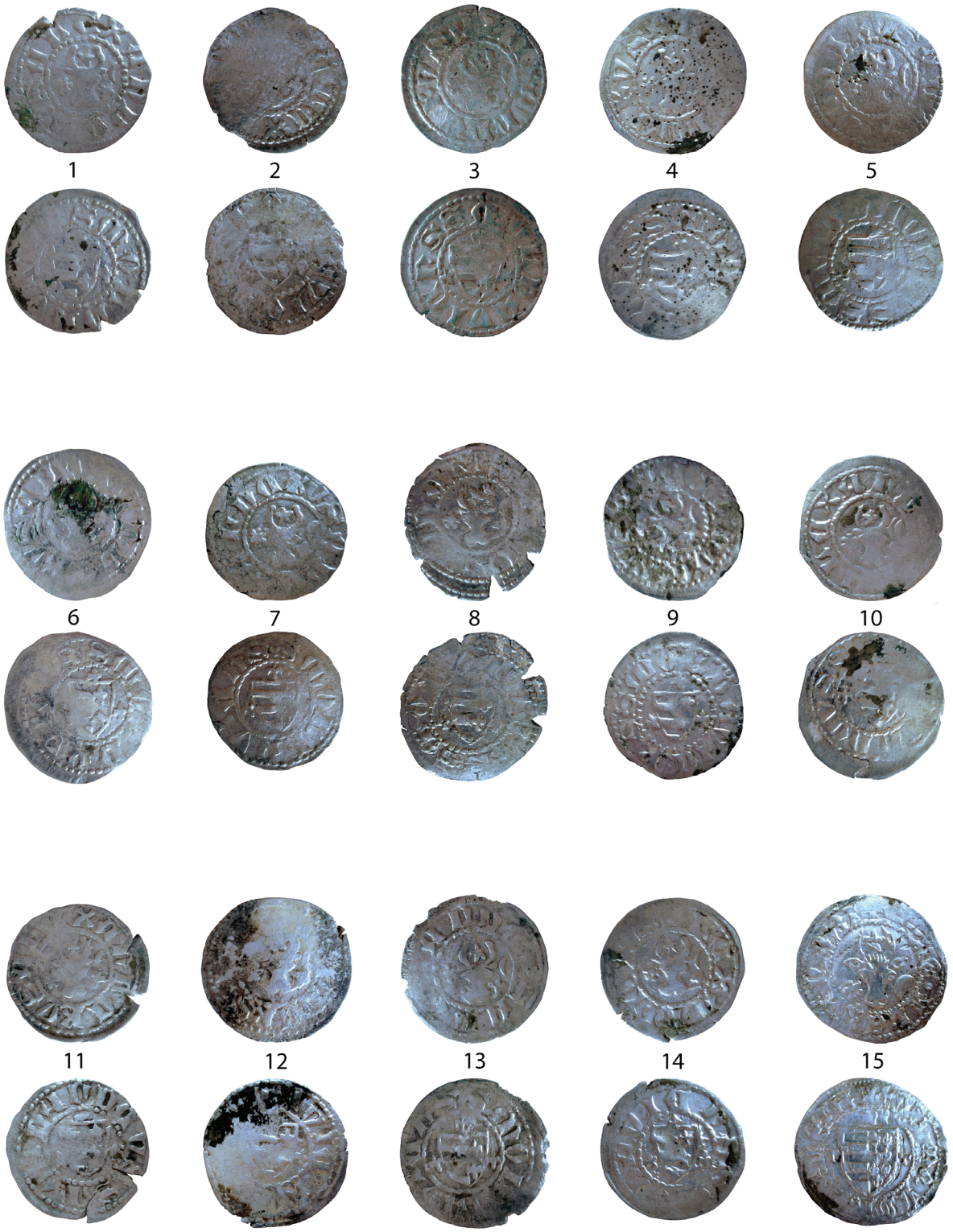
The Cociulia hoard is exceptional in several respects. Comparable deposits are unknown both within the territory of historical Moldavia and beyond it, and an assemblage combining coins of Types I, II, and III has not previously been recorded[42]. The occurrence of specimens from all three types struck with identical die pairs permits the inference that at least a part of the hoard was acquired directly from the mint, whether as payment or as a loan. The excellent state of preservation, with minimal evidence of wear, further indicates that another portion of the coins circulated only briefly prior to concealment. At the current stage of research, we do not associate the deposition of the hoard with any particular events.

[41] This concerns the letter T, which appears on the coins in our hoard and may be attributed to Simon de Talentis, a mint engraver who worked at the Cracow mint (Katiușa Pârvan, *Monede moldovenești rare…*, p. 192).

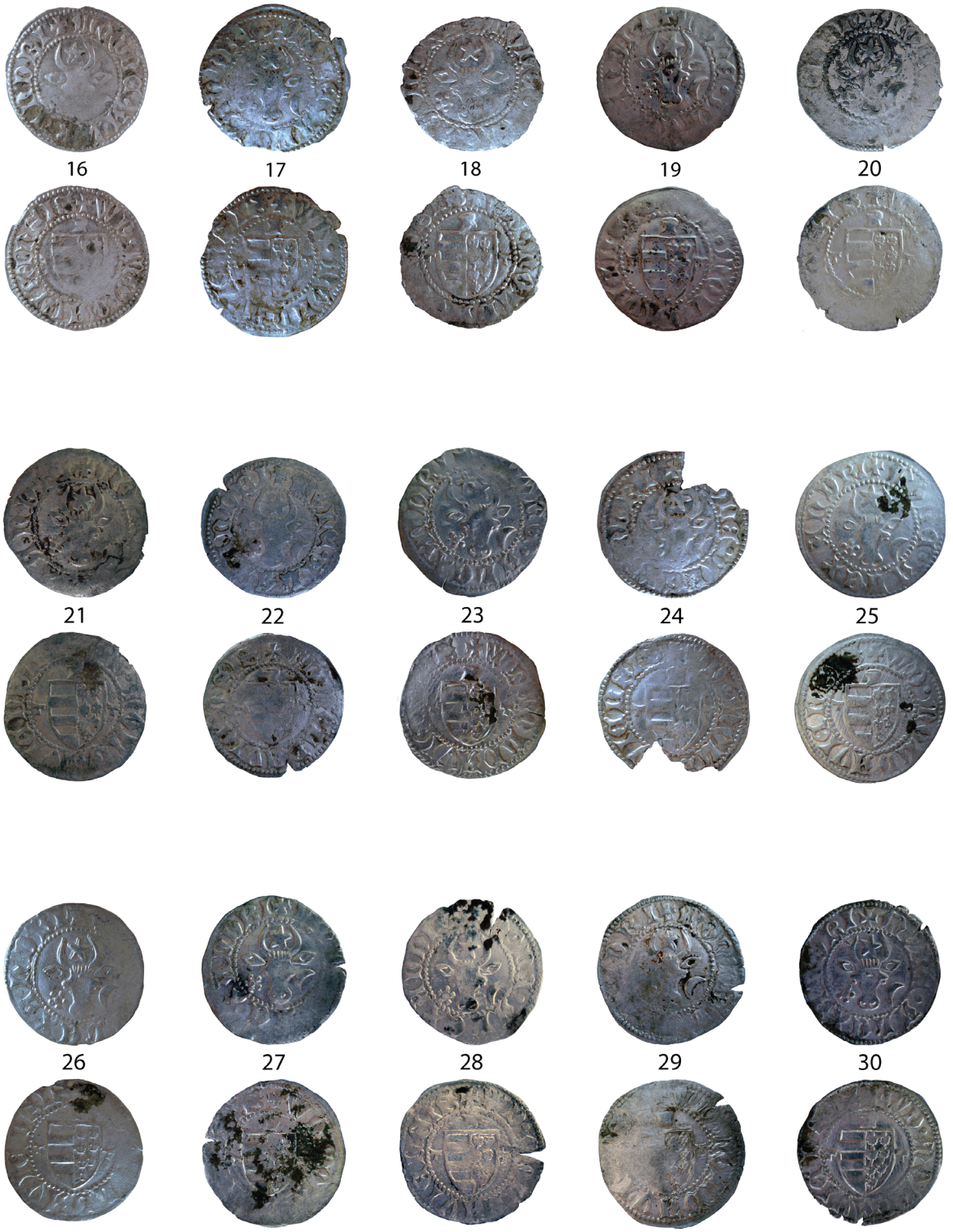
[42] Reformed Type I coins have been discovered at the Princely Court of Suceava, Suceava County (1 specimen: Monica Gogu, *Monede medievale și moderne descoperite la Curtea Domnească din Suceava*, Simpozion Chișinău 2002, p. 202, no. 3); in the necropolis of Dărmănești, Neamț County (2 specimens: L. Munteanu, *Monede descoperite în cimitirul de la Piatra-Neamț – Dărmănești (jud. Neamț)*, in D. Garvăn, S.-C. Ceaușu, G.-D. Hânceanu, V.-M. Groza, L. Munteanu*, Cimitirul medieval de la Piatra-Neamț – Dărmănești, Cercetările preventive din anul 2012*, Buzău, 2015, p. 56-57, no. 10-11); in the commune of Capaclia, Cantemir District, Republic of Moldova (1 specimen: unpublished, information provided by the author); and sporadically in Ukraine (2 specimens: unpublished, information provided by the author). Type II specimens are encountered more frequently. They have been found in the Prut–Dniester region (1 specimen: unpublished, information provided by the author), in the Chernivtsi region (1 specimen: unpublished, information provided by the author), in the medieval necropolis of Hudum, Mihai Eminescu commune, Botoșani County, where one specimen was discovered in the mouth of the deceased (1 specimen: V. Spinei, Rodica Popovici, *Cercetări arheologice din necropola medievală de la Hudum, jud. Botoșani*, ArhMold, 10, 1985, p. 74-88), and in the cultural layers of Cetatea Albă (1 specimen: unpublished, kept at the Archaeological Museum in Odesa without an inventory number). For Type III, the seven specimens discussed above are known, as well as a single specimen originating from the Dărmănești necropolis in Neamț County (L. Munteanu, *op. cit*, p. 57, no. 12).



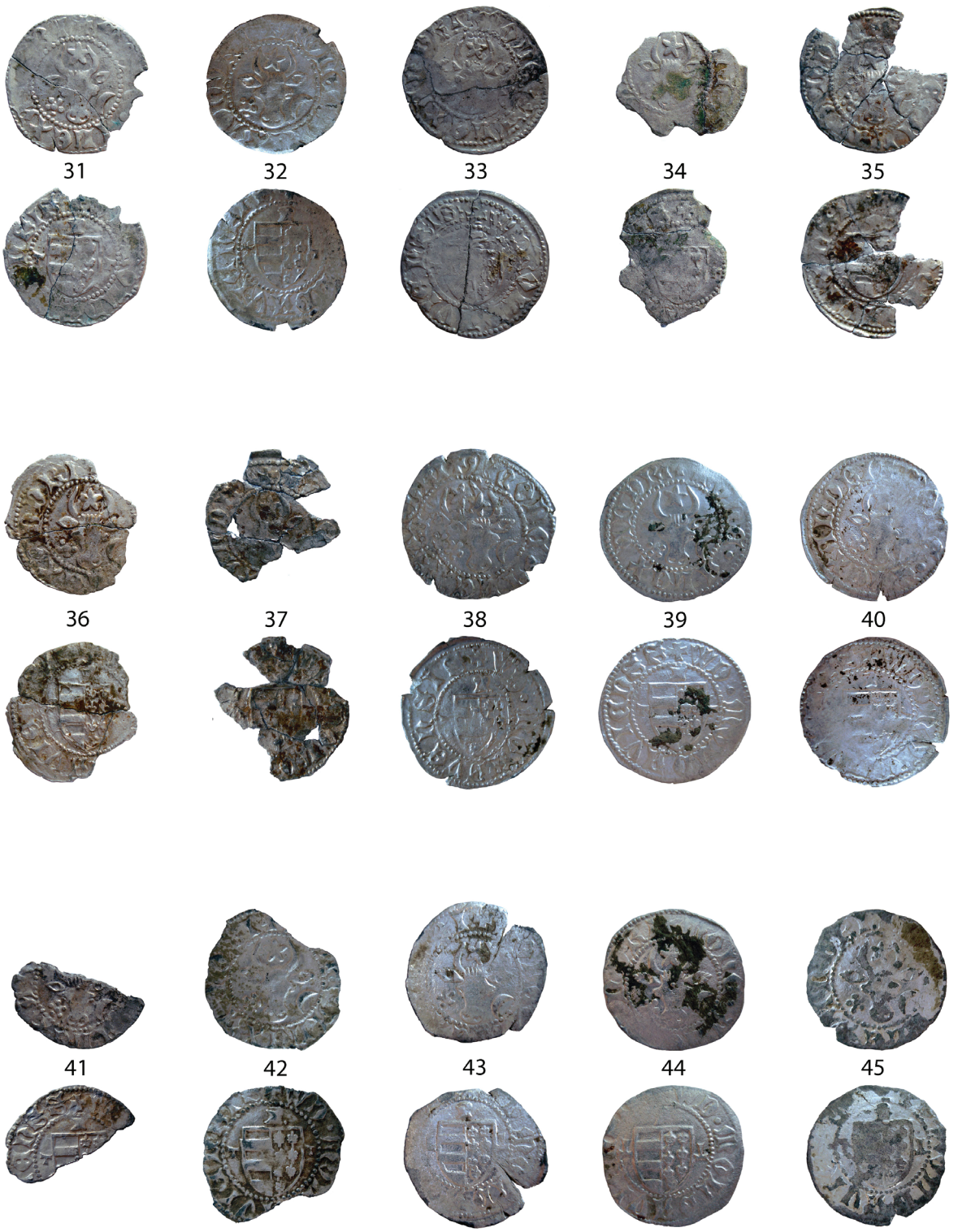
Pl. I. Findspot of the Cociulia coin hoard and composite image of the coins.



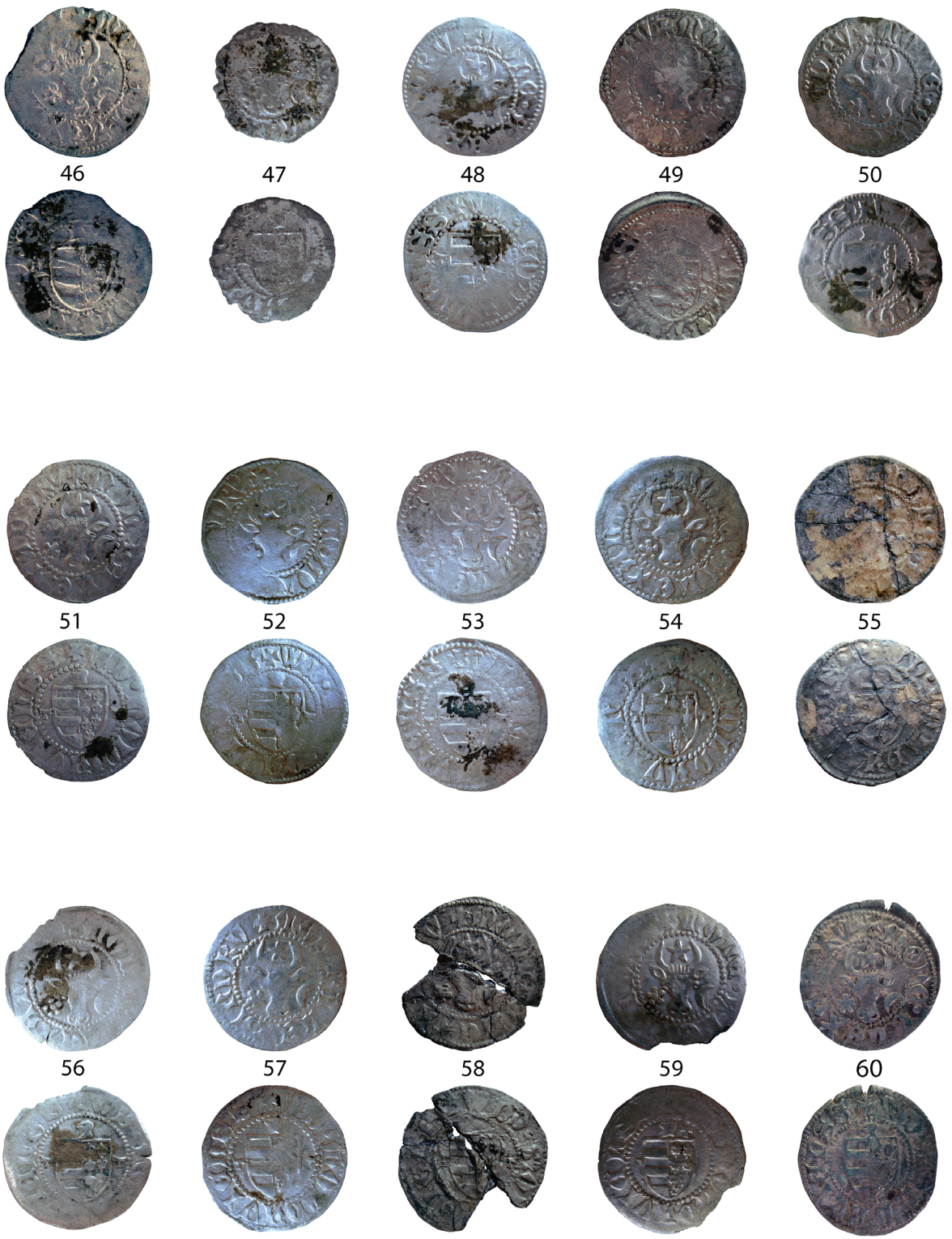
Pl. II. Coins of Alexander I from the Cociulia Hoard. Type I (nos. 1–14), and Type II (no. 15).



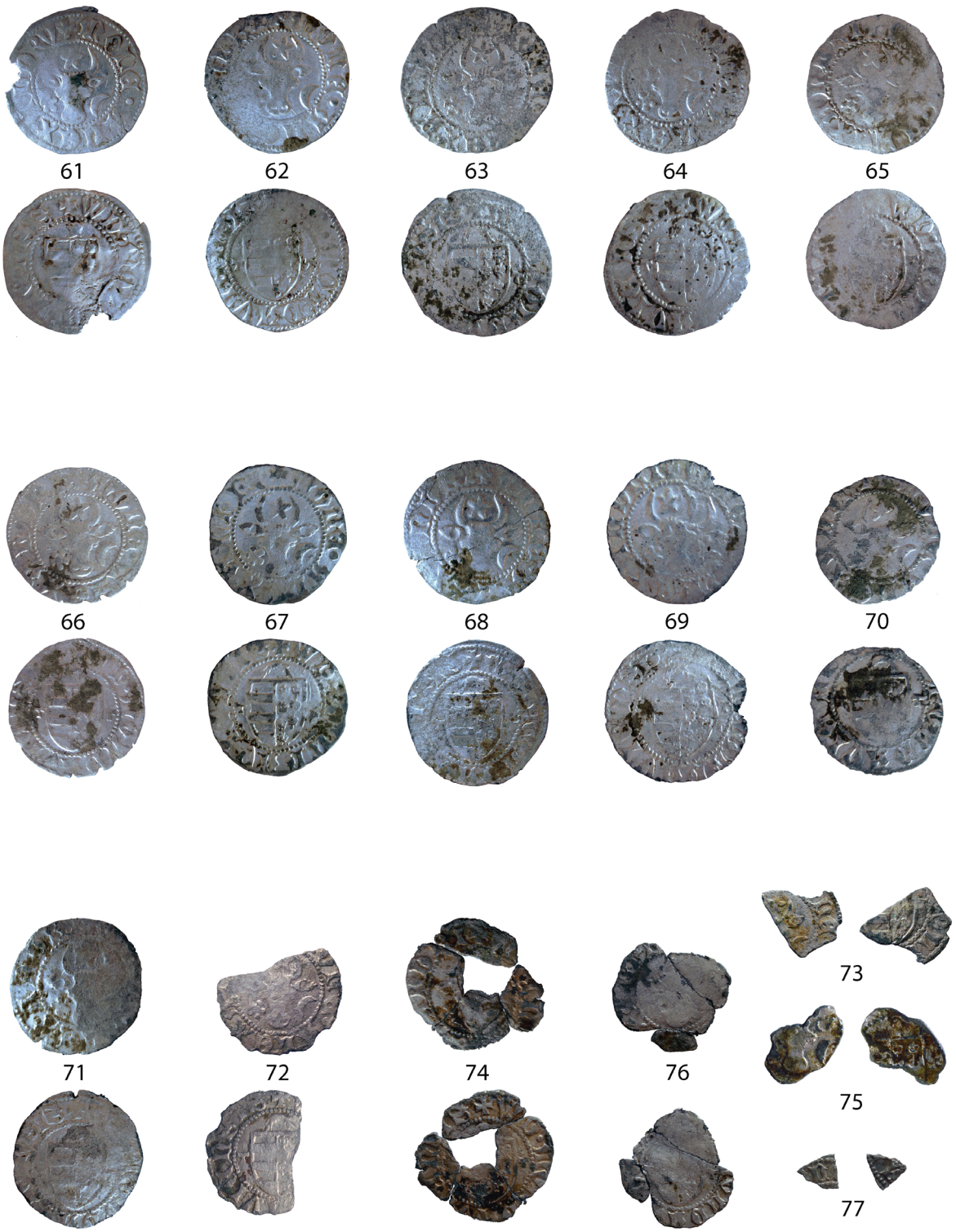
Pl. III. Coins of Alexander I from the Cociulia Hoard. Type II.



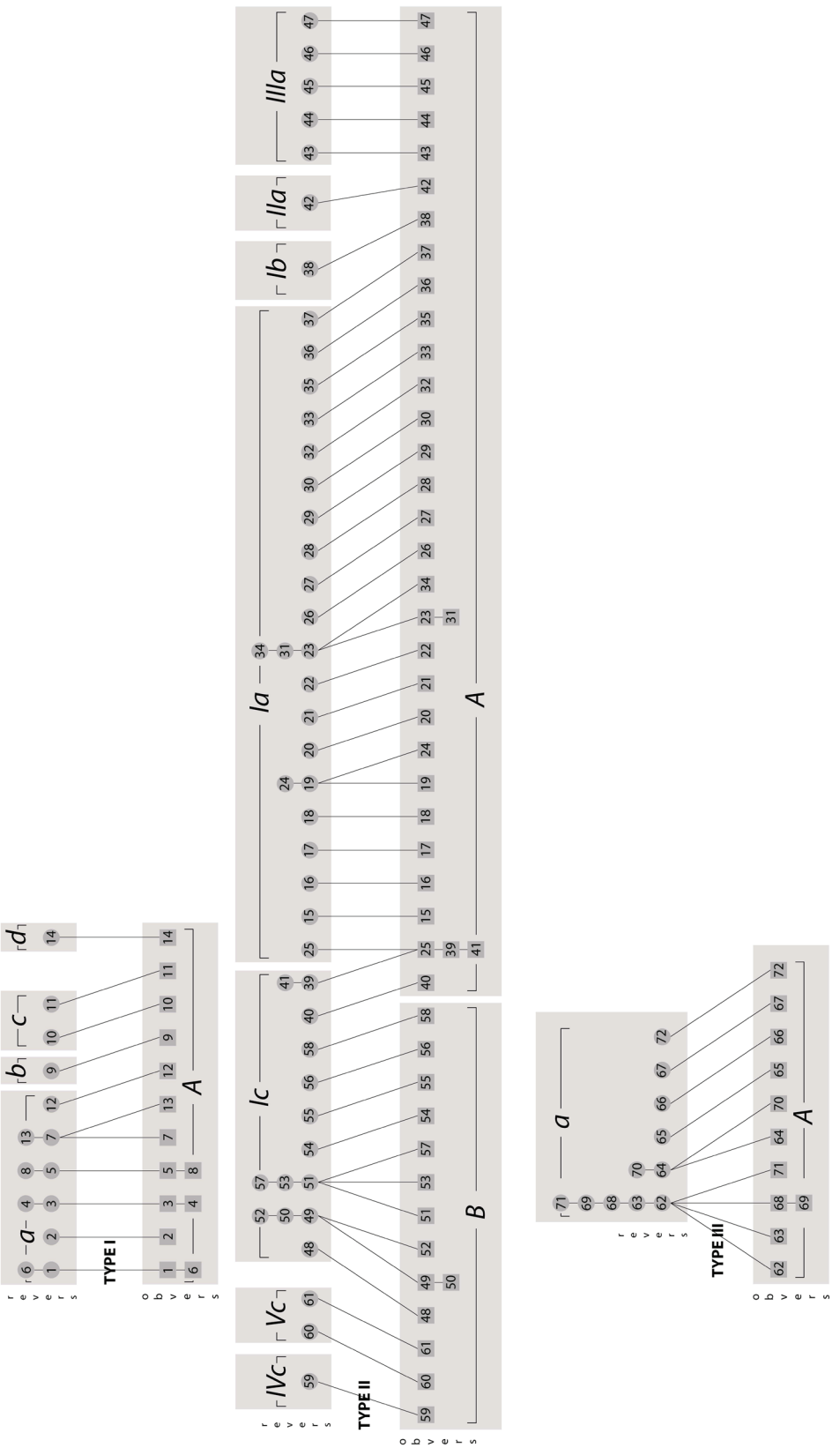
Pl. IV. Coins of Alexander I from the Cociulia Hoard. Type II.



Pl. V. Coins of Alexander I from the Cociulia Hoard. Type II.



Pl. VI. Coins of Alexander I from the Cociulia Hoard. Type II (no. 61) and Type III (nos. 62–72); fragmented coins (nos. 73–77).



Pl. VII. Diagram showing die-link relationships among coins of Types I–III in their presumed chronological order.

Abrevieri

ActaMN	Acta Musei Napocensis, Cluj-Napoca
AÉ	L'Année épigraphique, Paris
AJN	American Journal of Numismatics, New York
ANRW	Aufstieg und Niedergang der römischen Welt
ANS	American Numismatic Society, New York
ARA	Asociația Arhitectură. Restaurare. Arheologie
ArhMold	Arheologia Moldovei, Iaşi-Bucureşti
BAR, I.S.	*British Archaeological Reports*, *International Series,* Oxford
BAR, S.S.	British Archaeological Reports, Supplementary Series, Oxford
BMC	*Coins of the Roman Empire in the British Museum*, Londra: I, *Augustus to Vitellius*, 1923; II, *Vespasian to Domitian*, 1930; III, *Nerva to Hadrian*, 1936; IV, *Antoninus Pius to Commodus*, 1968; V, *Pertinax to Elagabalus*, 1950 (H. Mattingly); VI, *Severus Alexander to Balbinus and Pupienus*, 1962 (R.A.G. Carson)
BSNR	Buletinul Societăţii Numismatice Române, Bucureşti
BIAB	Bulletin de l'Institut Archéologique Bulgare, Sofia
CAB	Cercetări Arheologice în Bucureşti, Bucureşti
CCA	Cronica cercetărilor arheologice din România, Bucureşti
CICSA	Centrul de Istorie Comparată a Societăților Antice, București
CIL III	Th. Mommsen (ed.), *Corpus Inscriptionum Latinarum. Vol. 3, Parts 1-2. Inscriptiones Asiae, provinciarum Europae Graecarum, Illyrici Latinae*, Berlin, 1873.
CN	Cercetări Numismatice, Bucureşti
CNA	Cronica Numismatică şi Arheologică, Bucureşti
CNH	L. Réthy, Corpus nummorum Hungariae, I-II, Budapesta, 1899-1907
CNRS	Centre National de la Recherche Scientifique, Paris
Crawford, RRC	M.H. Crawford, *Roman Republican Coinage*, Cambridge, 1974
Crawford, RRCH	M.H. Crawford, *Roman Republican Coin Hoards*, Londra, 1969
CreştCol	Creşterea Colecţiilor, Biblioteca Academiei Române, Bucureşti
Dacia	Dacia. Recherches et découvertes archéologiques en Roumanie, Bucureşti, I-XII (1924-1947)
Dacia, N.S.	Dacia, Revue d'Archéologie et d'Histoire Ancienne, Nouvelle Série, Bucureşti (1957-)
DIR	*Documente privind istoria României*
D.J.A.N. Argeş	Direcția Județeană a Arhivelor Naționale Argeş
DOW-LRC	Ph. Grierson, Melinda Mays, *Catalogue of Late Roman coins in the Dumbarton Oaks Collection and in the Whittemore Collection. From Arcadius and Honorius to the Accession of Anastasius*, Washington, 1992
DRH	*Documenta Romaniae Historica*, Bucureşti
Herinek	L. Herinek, *Österreichische Münzprägungen von 1740-1969*, Viena, 1970
Huszár	Lajos Huszár, *Münzkatalog Ungarn von 1000 bis heute*, Budapesta, 1979
IAB	Institutul de Arheologie „Vasile Pârvan", Bucureşti
IGBulg II	G. Mihailov (ed.), *Inscriptiones Graecae in Bulgaria repertae*. *Vol. II. Inscriptiones inter Danubium et Haenum repertae*, Sofia, 1958.

SCN, s.n., XV-XVII (XXVII-XXIX), Bucureşti, 2026, p. 227-229.

ISM	*Inscriptiones Scythiae minoris*, I (1983), II (1987), III (1999), IV (2015), V (1980)
JIAI	Journal for Historical and Archaeological Research, Šumen
JNG	Jahrbuch für Numismatik und Geldgeschichte, München
LRBC	*Late Roman Bronze Coinage A.D. 324-498*, Londra, 1965: I – P.V. Hill, J.P.C. Kent, The Bronze Coinage of the House of Constantine A.D. 324-346; II – R.A.G. Carson, J.P.C. Kent, *Bronze Roman Imperial Coinage of the Later Empire A.D. 346-498*
Martin	F. Martin, *Kolonialprägungen aus Moesia Superior und Dacia*, Bonn, 1992
MBR	G. Buzdugan, O. Luchian, C.C. Oprescu, *Monede și bancnote românești*, Bucureşti, 1977
MCA	Materiale şi Cercetări Arheologice, Bucureşti
MemAntiq	Memoria Antiquitatis, Piatra-Neamţ
MINAC	Muzeul de Istorie Naţională şi Arheologie, Constanţa
MJIAP	Muzeul Județean de Istorie și Arheologie Prahova
MNA	Muzeul Naţional de Antichităţi
NC	Numismatic Chronicle, Londra
NK	Numizmatikai Közlöny, Budapesta
NZ	Numismatische Zeitschrift, Viena
Pere	Nuri Pere, *Osmanlılarda madenî paralar*, Istanbul, 1968
Pick	B. Pick, *Die antiken Münzen von Dacien und Moesien*, I, 1, Berlin, 1898
Pick-Regling	B. Pick, K. Regling, *Die antiken Münzen von Dacien und Moesien*, I, 2, Berlin, 1910
Pohl	Artúr Pohl, *Münzzeichen und Meisterzeichen auf ungarischen Münzen des Mittelalters, 1300-1540*, Graz-Budapesta, 1982
Preda	C. Preda, *Monedele geto-dacilor*, Bucureşti, 1973
RCAN	Revista de Cercetări Arheologice și Numismatice, Bucureşti
Recueil	W.H. Waddington, E.Babelon, Th. Reinach, *Recueil général des monnaies grecques d'Asie Minéure, I-IV,* Paris, 1904-1912
RÉSEE	Revue des Études Sud-Est Européennes, Bucureşti
RI	Studii, 1948–1952; din 1953, Studii. Revista de Istorie, Bucureşti.
RIC, I	H. Mattingly, E.A. Sydenham, *The Roman Imperial Coinage*, I, *Augustus to Vitellius*, Londra, 1923
RIC, I^2	C.H.V. Sutherland, *The Roman Imperial Coinage*, I, ediţie revăzută, Londra, 1984
RIC, II	H. Mattingly, E.A. Sydenham, *The Roman Imperial Coinage*, II, *Vespasian to Hadrian*, Londra, 1926
RIC, III	H. Mattingly, E.A. Sydenham, *The Roman Imperial Coinage*, III, *Antoninus Pius to Commodus*, Londra, 1930
RIC, IV, 1	H. Mattingly, E.A. Sydenham, *The Roman Imperial Coinage*, IV, 1, *Pertinax to Geta*, Londra, 1968
RIC, V, 2	P.H. Webb, *The Roman Imperial Coinage*, V, 2, Londra, 1933 (reimprimat 1968)
RIC, VI	C.H.V. Sutherland, *The Roman Imperial Coinage*, VI, *From Diocletian's reform (A.D. 294) to the death of Maximinus (A.D. 313)*, Londra, 1967
RIC, VII	P.M. Bruun, *The Roman Imperial Coinage*, VII, *Constantine and Licinius A.D. 313-337)*, Londra, 1966
RIC, VIII	J.P.C. Kent, *The Roman Imperial Coinage*, VIII, *The Family of Constantine I A.D. 337-364)*, Londra, 1981
RIC, IX	J.W.E. Pearce, *The Roman Imperial Coinage*, IX, *Valentinian I-Theodosius I*, Londra, 1933 (reimprimat 1968)
RIC, X	J.P.C. Kent, *The Roman Imperial Coinage*, X, *The Divided Empire and the Fall of the Western Parts A.D. 395-491)*, Londra, 1994
RPC	Roman Provincial Coinage

Ruzicka 1928	Leon Ruzicka, *Inedita aus Moesia Inferior*, Vjesnik Hrvatskoga Arheološkoga Društva, 15, 1928, p. 225-248.
SCBC	*Standard Catalogue of British Coins. Coins of England and the United Kingdom*, 41st Edition, London, 2006
SCIV(A)	Studii şi Cercetări de Istorie Veche (şi Arheologie), Bucureşti
SCN	Studii şi Cercetări de Numismatică, Bucureşti
SHA	*Scriptores Historiae Augustae*
Simpozion Chişinău 2000	*Simpozion de Numismatică dedicat împlinirii a patru secole de la prima Unire a românilor sub Mihai Voievod Viteazul, Chişinău, 28-30 mai 2000, Comunicări, studii şi note*, Bucureşti, 2001
Simpozion Chişinău 2001	*Simpozion de Numismatică organizat în memoria martirilor căzuţi la Valea Albă, la împlinirea a 525 de ani (1476-2001), Chişinău, 13-15 mai 2001, Comunicări, studii şi note*, Bucureşti, 2002
Simpozion Chişinău 2002	*Simpozion de Numismatică dedicat împlinirii a 125 de ani de la Proclamarea Independenţei României, Chişinău, 24-26 septembrie 2002, Comunicări, studii şi note*, Bucureşti, 2003
Simpozion Chişinău 2003	*Simpozion de Numismatică dedicat Centenarului Societăţii Numismatice Române (1902-2003), Chişinău, 26-28 noiembrie 2003, Comunicări, studii şi note*, Bucureşti, 2005
Simpozion Chişinău 2004	*Simpozion de Numismatică, organizat cu ocazia comemorării sfântului Ştefan cel Mare, domn al Moldovei (1504-2004), Chişinău, 29 septembrie-2 octombrie 2004, Comunicări, studii şi note*, Bucureşti, 2007
SMMIM	Studii şi Materiale de Muzeografie şi Istorie Militară, Bucureşti
SNG	*Sylloge Nummorum Graecorum*: Black Sea - *The British Museum*, IX, 1, *The Black Sea*, Londra, 1993; Rusia - M. G. Abramzon, N. A. Frolova, Ulrike Peter (eds.), *Sylloge Nummorum Graecorum Russland, Staatliches Historisches Museum Moskau: Münzen des Nördlichen Schwarzmeergebietes*, Berlin-Boston, 2019
Woytek	Bernhard Woytek, *Die Reichspragung des Kaisers Traianus (98-117)*, Viena, 2010.