

THE COMPOSITIONAL ANALYSIS OF COPPER AND BRONZE GREEK COINS FOUND AT HISTRIA (ACROPOLIS CENTRE-SOUTH SECTOR) USING A PORTABLE X-RAY FLUORESCENCE SPECTROMETER

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Abstract: A number of 42 Greek coins (most of them issued and/or circulated at Histria during the autonomous period of the city and several issued by Histria during Roman times) were found during the 2013-2016 archaeological campaigns conducted in the Acropolis Centre-South Sector. The coins, made of copper and copper-based alloys, were subject to a non-invasive compositional analysis using a portable X-Ray Fluorescence (XRF) spectrometer, in order to determine trends and technological choices in the coinage production. The composition of these items was compared to that characterising a batch of coins found at Histria during older excavations.

Cuvinte-cheie: Histria, Sector Acropolă Centru-Sud, monede grecești, analiză XRF

Rezumat: Un număr de 42 de monede grecești (cele mai multe emise și/sau în circulație la Histria de-a lungul perioadei autonome, precum și câteva emise de Histria de-a lungul perioadei romane) au fost descoperite în cursul campaniilor arheologice 2013-2016 din Sectorul Acropolă Centru-Sud de la Histria. Monedele, realizate din cupru și aliaje ale cuprului, au constituit subiectul unei analize compoziționale non-destructive utilizând un spectrometru cu fluorescență de raze X (XRF) portabil, cu scopul de a determina tenduri și alegeri tehnologice în producerea monedelor. Compoziția acestor piese a fost comparată cu cea a unui lot de monede provenind din săpături mai vechi efectuate la Histria.

The excavations on the *Acropolis Centre-South* (ACS) Sector at Histria/Istros (Istria commune, Constanța County) began in 2013, based on a four-year archaeological research program financed by the University of Bucharest. The sector covers a surface of approximately 50 × 40 m (2000 m²) just south of the centre of the acropolis of Histria and of *street c*. The research brought to light the last Late Roman dwelling level (6th c. AD), covered by massive layers of debris. There were identified a large structure, with two phases, conventionally named Roman building no.1 (CR01), as well as other walls belonging to previous and contemporary structures. The building CR01 was flanked east and west by two streets, which formed crossroads with *street c*¹.

The research occasioned the recovery of a rich and varied archaeological material, of which coinage represents an important and interesting category. During the first two archaeological campaigns 22 coins were found (seven in 2013 and 15 in 2014, including a *passim* coin from outside the sector), and already published². The following two archaeological campaigns (2015–2016)

brought to light a larger number of representatives of this category. During the 2015 campaign 73 coins and coin-shaped items were recovered, their preliminary identification resulting in a final number of 68 coins (including one *passim* from outside the sector) and five coin-shaped items (possibly but not certainly coins). During the 2016 campaign 54 coins and coin-shaped items were also recovered and went through preliminary identification.

In an attempt to learn more about the Greek and Roman coinage made of copper and copper-based alloys, the team decided to conduct a compositional non-destructive analysis on the coins found during the 2013–2016 campaigns, using a portable X-Ray fluorescence spectrometer Innov-X Systems Alpha Series, with W anticathode tube, SiPIN diode, Peltier cooling effect, and work parameters 40 kV tension, 35 μA intensity, acquisition time 2 min. The analysis was conducted on this batch both before and after their patina was removed³. The results from the second set of analyses (on cleaned coins) were taken into consideration for publication.

¹ For more details see Bottez *et alii* 2015.

² Vilcu, Țârlea 2016.

³ The coins were cleaned and restored by Mrs. Georgiana Mureșan (Institute of Archaeology "Vasile Pârvan" Bucharest), to whom we express our thanks for her contribution to this research.