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Polish Archaeology in the Mediterranean 20, 245-249

2011

THE 12 *NUMMIA* COIN FROM OLD DONGOLA

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Abstract: *Dodecanummia* was the most popular denomination in Egypt in early Byzantine times. The cast found in Dongola must have reached the town by accident, but it remains an open question whether from Egypt or rather from the Near East. Copper and lead content determined for the cast approximated that for some other examined late Roman casts from Egypt.

Keywords: cast, chemical analyses, *dodecanummia*, lead copper alloy, Dongola, Egypt, Sudan

Excavations inside Building VI on the citadel in Old Dongola brought to light a copper coin (Ad.08.265):[1]
Dim.: 12.2 x 12.6 mm, weight 0.76 g, die axis 6 [***Fig. 1***].

Obv.: Bust of emperor to right
Rev.: Cross between I and B; in ex.: ΑΛϵƵ
AD 518–608 or later.

Small fragment missing.
The coin is difficult to read because of the corrosion. The legend on the obverse is not legible and the bust is not distinct. It can be said in general that it represents one of the emperors issuing *dodecanummia* coins with the emperor's bust in right profile: Justin I, Justinian I, Justin II, Tiberius II, Maurice Tiberius or Phocas. The image on the reverse is also not sharp, but the composition is typical of this denomination: a cross between I and B, and a mint mark in exergue, which appears clear enough.

The object appears to have been cast; the thickness is 1.1–1.2 mm and there is a casting sprue extending beyond the edge approx. 2 mm. The sprue was grooved into a mold with impression of the reverse of a prototype coin, as well as also partly on the surface of this impression. Hence the convexity observed also beneath the exergual line, between the letters ϵ and Ƶ. Irregularly formed metal appears beside it, in the plane of the obverse. The cavity with the impression of the obverse of a prototype coin must have been shallow in all probability. The molds had not adhered closely to one another at the time of casting and some metal spilled out. This accidental lump was not removed and neither was the metal filling the casting sprue.

The object must have been produced in terracotta molds. The remnants of a single sprue may suggest that only one prototype coin was impressed in the surfaces of the

[1] I thank Prof. W. Godlewski, director of the PCMA excavations in Dongola, for kindly showing me this find.

molds or that the impressions in the molds were combined with one channel for pouring the metal. The second option seems more economic, because more pieces could be produced in one go. The technology must have been similar for casting coins in molds with either a "branching tree" or a radiate arrangement of impressions, known from late Roman Egypt. Casts produced in molds with a radial arrangement should have evidence of at least two casting sprues, because the impressions of prototype coins were interconnected (Dattari 1913; Krzyżanowska 1985: 45–51; Lichocka 1996; Noeske 1998; Noeske 2000a: 812–813; Noeske 2000b: 117–120). It cannot be excluded that the Dongola cast had the remains of another casting sprue at the point where it was damaged.

Chemical analyses of the coin from Old Dongola demonstrated copper and lead content approximating that for examined late Roman casts from Kom el-Dikka in Alexandria, Egypt (Lichocka 2005: 766–767). These two metals were the two main constituents of the alloy. Apart from a large number of late Roman imitations made by casting in molds with several impressions identified from this site (Lichocka 1990: 244–247; Lichocka 2005a: 304, 311; Lichocka 2005b: 764–766), only one specimen (perhaps two, but the condition is too poor for identification), shows a cross between I and B on the reverse, which is typical of *dodecanummia*.

Dodecanummia was the most popular denomination in Egypt in the early Byzantine period, similarly as other Alexandrian denominations intended for internal circulation. Only singular examples have been discovered outside Egypt, hence the tiny *dodecanummia* casts registered in Palestine[2] may have been produced in Egypt, just as late Roman casts which circulated in Syro-Palestine (Moorhead 1983: 153, No. 619; Noeske 2000b: 119, 271; Bijovsky 2000–2002: 197–209; Bucher 2003: 101). Curiously, *dodecanummia* casts produced most probably in multiple-impression molds seem to be better attested in Palestine than in Egypt.

No molds with impressions of *dodecanummia* are known (see Noeske 2006: 357–358).

The cast under study must have reached Dongola accidentally, either from Egypt or the Near East. It could have been brought by a merchant, a pilgrim or an ordinary traveler. It cannot be excluded that it was used in payment, but it does not attest to the circulation of these coins in this period in Dongola (for some earlier coin finds documented in Sudan, Gradel 2007). It is more likely modest evidence of contacts between this region of Nubia and the Byzantine Empire.

CHEMICAL COMPOSITION[3]

The metal alloy was examined with X-ray fluorescence spectroscopy using

[2] I wish to express my gratitude to G. Bijovsky of the Israel Antiquities Authority, Jerusalem, for pertinent information and for showing me some examples of *dodecanummia* casts discovered in Israel. I am also very grateful to R. Abdy and T. Moorhead from the Department of Coins and Medals of the British Museum, London, for their assistance in my research on molds and casts during my visits to London, and to W. Weker from the State Archaeological Museum in Warsaw for his suggestions concerning metal alloy analyses.

[3] Analysis by E. Pawlicka of the Central Archaeometric Laboratory of the Institute of Archaeology and Ethnology of the Polish Academy of Sciences in Warsaw.

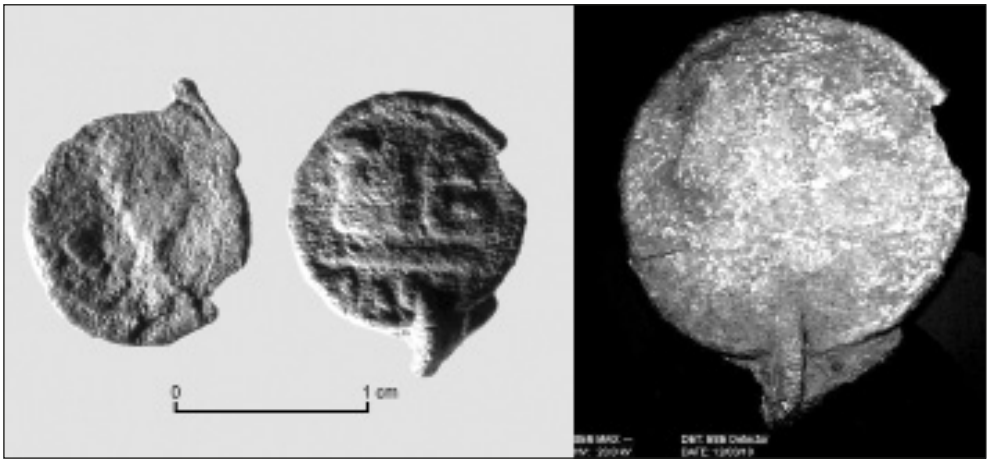

Fig. 1. Dodecanummium from Old Dongola, obverse and reverse (left); SEM image of the reverse (Photos W. Jerke [left] and E. Pawlicka)

Table 1. Chemical composition of dodecanummium Ad.08.265 from Dongola

Examined points	Elements Wt %					
	Cu	Fe	Ni	Zn	Sn	Pb
Obverse						
1	34.04	2.36	0.13	0.00	0.07	54.39
2	25.94	1.63	0.06	0.00	10.39	61.97
3	6.72	0.37	0.22	0.00	0.95	91.74
Reverse						
1	33.68	0.99	0.09	0.00	5.34	59.90
2	30.34	1.02	0.14	0.03	5.53	62.94
3	2.95	0.27	0.04	0.00	0.00	96.74
Broken edge						
1	73.50	0.15	0.23	0.52	1.74	23.86
2	11.40	0.30	0.06	0.00	0.05	88.18
3	56.66	0.32	0.23	0.47	1.67	40.76

a scanning electron microscope (SEM). Nine measurements were made in points where there was no corrosion or where the corrosion had been mechanically removed. Three points were on the obverse, three on the reverse and three on the broken edge. The points in the damaged area permitted the alloy in the core to be checked, not only on the surface. Tests measured the content of six elements [*Table 1*]: copper, iron, nickel, zinc, tin and lead. Measurements on the obverse and reverse demonstrated a predominance of lead, from 54.39% to 96.74%, and copper content from 2.95% to 34.04%. Measurements in the broken edge revealed a predominance of either copper, from 11.40% to 73.50%, or lead, from 23.89% to 88.19%. Since lead does not dissolve in copper, a lead-copper alloy must contain precipitated lead, the presence of which was indicated distinctly in the measurements.

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