

The Excavation of the Prehistoric Burial Tumulus at Lofkënd, Albania



Volume 1: Text

John K. Papadopoulos, Sarah P. Morris,
Lorenc Bejko, and Lynne A. Schepartz

For Review Only

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ANALYTICAL STUDIES OF THE METAL OBJECTS FROM LOFKËND

Vanessa Muros and David A. Scott

INTRODUCTION

The study of the metallic finds excavated from the tumulus at Lofkënd provides a unique opportunity to examine a number of objects from the same context and time period, adding to the body of data published for metal artifacts from Albania as well as southeastern Europe. This study, which utilizes optical microscopy, portable X-ray fluorescence spectroscopy (pXRF), X-ray diffraction (XRD) analysis, and metallographic examination, provides only preliminary results from the work undertaken thus far on the Lofkënd metals. Additional studies are ongoing, but these initial results help to provide a better understanding of the metallurgical techniques used in this area during the late Bronze Age to Early Iron Age.

METHODOLOGY

A total of 162 metal artifacts were excavated at Lofkënd. These range from copper alloys, silver-copper alloys, gold, and iron to composite objects made from a copper alloy and iron. This particular study focused on analysis of the copper alloy objects (including the composite objects of bronze and iron), the silver-copper alloys, and the gold/electrum objects.

Optical microscopy

Prior to undertaking any sampling or analysis, all metallic artifacts in this study were examined using a binocular microscope (7–40x magnification). This

helped to identify areas for analysis, as well as inform on condition, technology and manufacture, and potential sample sites.

Portable X-ray fluorescence spectroscopy (pXRF)

Portable X-ray fluorescence spectroscopy (pXRF) was used to provide a general understanding of the alloy composition of 70 copper alloy and gold artifacts excavated at Lofkënd and to guide sampling and further analysis. Results of the analysis were used to provide qualitative data to allow for comparison of the objects with each other and to look for any overall differences in composition that could be detected by pXRF. Because the analysis was not done on a polished metal surface but rather on a corroded surface, quantitative analysis could not be undertaken. Instead, when looking at the data acquired for each object and comparing them across types, relative peak height was used to provide a method to determine possible differences in composition. Because the condition of each object varied according to the amount of corrosion present and degree of mineralization, which in turn would affect the elements present in those surface layers and in what quantity, the relative peak height was used to provide very cursory information on possible differences that could guide future research and sampling, as well as analysis using other instrumentation.

Objects were analyzed using a Bruker AXS TRACeR III-V portable X-ray fluorescence analyzer (rhodium X-ray tube and Si-PIN diode detector). Readings were taken from the surfaces of the artifacts, on an area about 4–5 mm in diameter, which