

Abstract Submitted  
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**Analysis of Historical Coins by X-ray Fluorescence** MARK RADD-  
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Dame Department of Physics, LOUIS JORDAN, University of Notre Dame Rare  
Books and Special Collections Department — Using different setups of the EDAX  
Orbis Micro X-ray Fluorescence (XRF) Analyzer, we have learned more about the  
limitations and optimizations of the XRF method and collected data about early  
British and Spanish colonial silver coins. XRF spectrometry was used to study Mex-  
ican, Bolivian, and Massachusetts silver coins from the University of Notre Dame's  
Rare Books and Special Collections Department. Runs were performed in both air  
and vacuum conditions, and the x-ray beam diameter was compared between 1 and  
0.03 mm. Using these methods we were able to contribute to the understanding  
of the historical coinage as well as learn about the best ways to use the method.  
During analysis we found significant differences in the spectra for silver L shell ex-  
citation and silver K shell excitation when switching from 0.03 to 1mm x-ray beam  
widths. Our data trends also fit with the historical theory that the coinage from  
the Massachusetts' mint were created by melting down Spanish silver coins (like the  
ones made from Mexico and Bolivia) and adding a small percent more of copper.  
We have the intent to build on what we have learned by also studying some Roman  
Denarii in the future, and by trying to create a custom designed version of the XRF  
which can be moved more easily and provide quick scans for a larger number of  
artifacts.

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