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New Pen & Old Ink: XRF Analysis of a Unique Archive from 1st c. BCE Tebtunis

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The Project and Question

This study examines the ink used in an archive of >50 bilingual papyri (in Greek and Demotic) written by a single scribe that were found in two crocodile mummies excavated from Tebtunis by B.P. Grenfell and A.S. Hunt in 1900. The papyri consist of accounts and contracts produced for a writing office in the 70-60s BCE. This group of papyri is the first example of Demotic written with the kalamos reed pen, making it unique among Egyptian records in the 1st c. BCE. **If this scribe employed an "atypical" writing instrument to inscribe these papyri, was the ink used likewise atypical?**

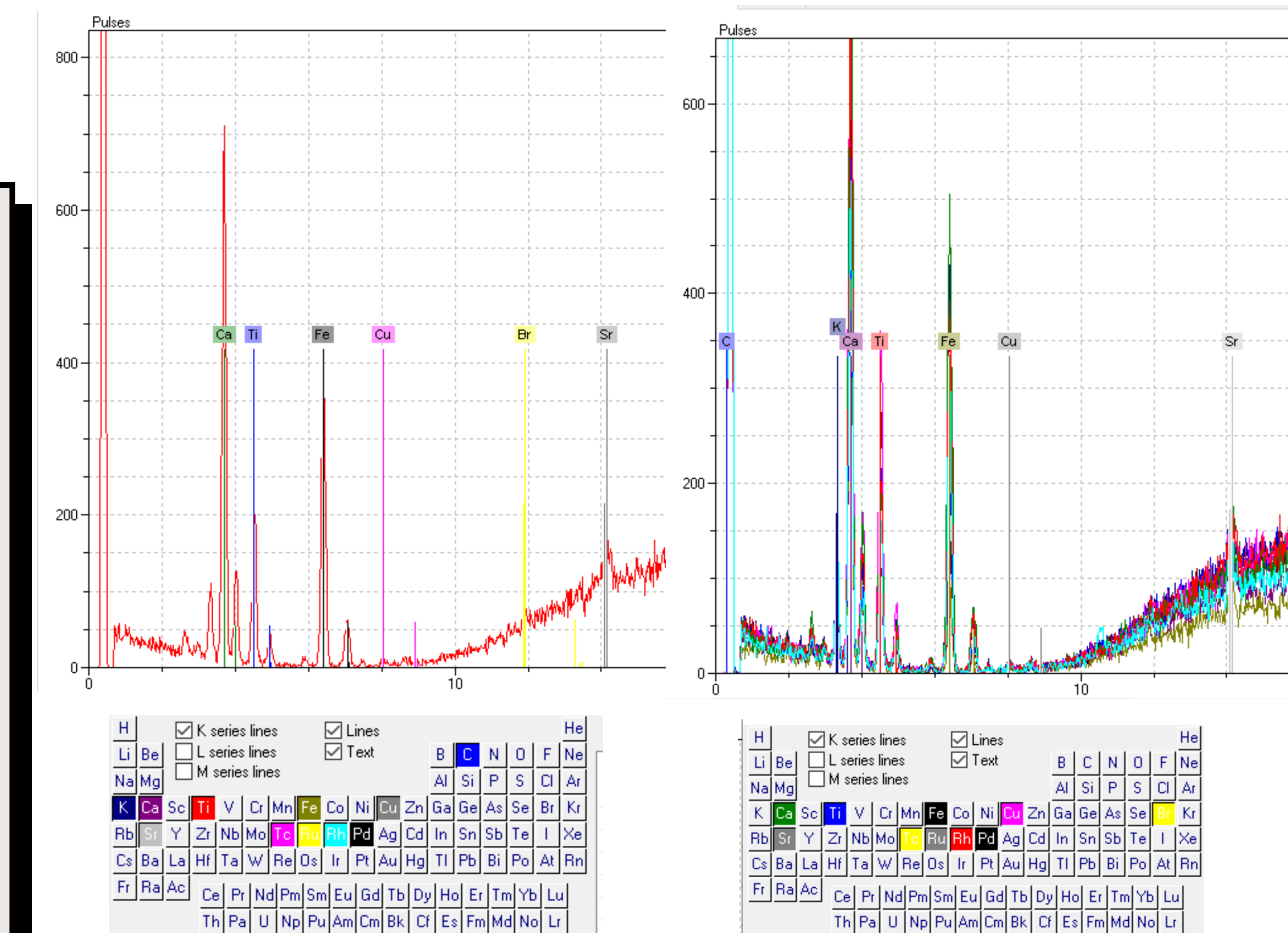


Conclusion

Past XRF analyses of papyri have revealed the addition of copper sulfate and other metallic elements in inks of this period, but **this study was able to exemplify how enduring Egyptian ink recipes survived even in the midst of later innovations, and that there is not necessarily a correlation between ancient writing instruments and ink recipes.** While this paper is archaeometric in nature, it holds potential ramifications for our interpretation of ink recipes found in textual sources and in the material record.

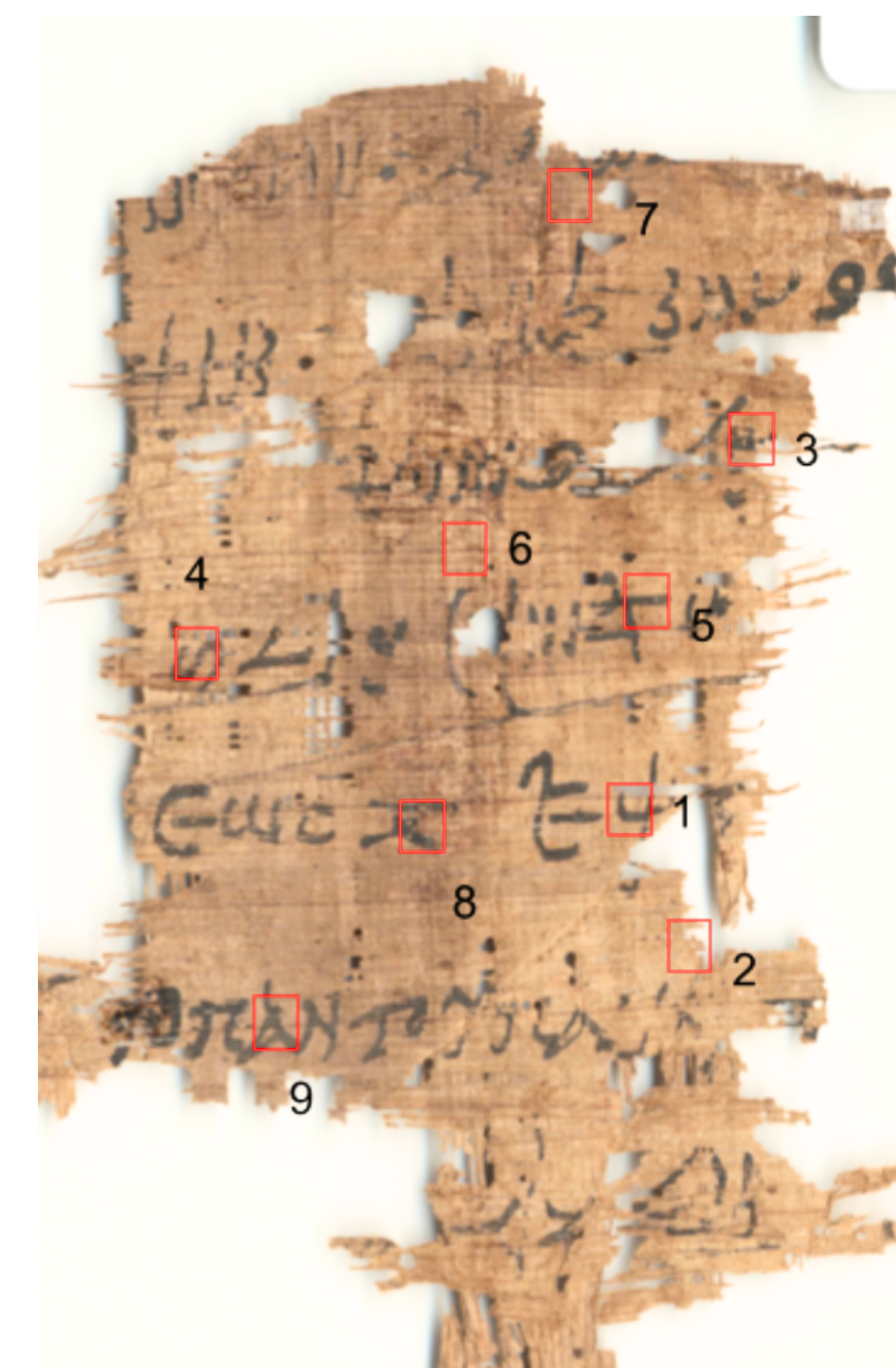
Previous Studies

Previous studies have found metallic elements in liquid black inks from the 4th c. BCE to late antiquity. The prevailing hypothesis has been that liquid ink (dipped with a kalamos) contained metals, while the ink cakes in Egyptian scribal palettes (used with a moist rush) did not. Delange's 1990 study has been subsequently cited as the source for this deduction. **This led to a tentative conclusion that there was a correlation between writing instrument, language, and ink composition.** Liquid inks of the simple carbon recipe have not been found from before the 1st c. CE (until now). **Can this correlative hypothesis be supported or complicated by an ink analysis on an archive in which a kalamos is used for Demotic (a script that had been written using a rush)?**



Methods & Results

The pXRF testing parameters on the Bruker Tracer 5i were **set at 50 kV at 60 s. intervals** with a Ti/Al filter, Rhodium anode, at 19.9 eV/ch, and **9 loci (3 blank, 3 Gr., 3 Dem.)** were scanned on P.Tebt.UC 2490, and a number of other testing locations were chosen for further papyri. The ink was absent of heavy metals in the areas tested, and we can conclude that the traditional Egyptian ink recipe (consisting of gum arabic, soot, and water) was used.



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