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Resurrecting “Poor Man’s Purple”: A Transdisciplinary Study of Color-Shifted Pigments Used in an Encaustic Fayum Mummy Portrait of Ancient Egypt

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Resurrecting THE POOR MAN'S PURPLE

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The Purple Clavus

THIS POSTER PRESENTS research conducted by the VIP: Science of Art students through the College of Innovation and Design. The research team consists of both undergraduate and graduate students from diverse backgrounds including the Arts, Sciences, and Social Sciences.

HISTORY

During the Roman period in Fayum Egypt, encaustic mummy portraits, consisting of pigments mixed into molten wax applied to a hardwood panel, were attached to the mummy wrappings of the deceased [1][2]. One such portrait, The Bearded Man (32.6), features a purple clavi, and purple – often derived from the murex mollusk – was generally reserved for the elite [3]. Nanoscale analysis suggests a red organic material was color shifted to produce a “poor man’s purple”, likely using the Kermes insect or the Madder plant root [4] [5].

ABSTRACT

It is the goal of this project to reverse engineer the purple pigment from The Bearded Man portrait by [1] using organic materials to create red pigments and [2] color shifting the pigments to a purple hue through the addition of metals salts, changing the pH, and color mixing. Additionally, we aim to recreate a similar portrait helping us to understand the process by which the pigments were used.

METHODOLOGY



Figure 1: Raw (a) madder root and (b) Kermes\Cocheinal. Raw materials were (c) ground into a powder via mortar and pestle then allowed to steep in a water bath for 24-72 hours to release the pigments into solution. (d) The larger pieces of material were filtered from the solution using a cheesecloth, removed, and discarded. To the pigment solution, mordants, metal salts, and/or alkali salts were added to induce color change. The solvent was then evaporated off and (e) the resulting product was crushed into a fine powder and (f) subsequently set into a wax binder and placed into a metal tin.



Figure 2: Image illustrating the effect of mixing metal salts (100 μL of 2.4 M chrome (Cr), 300 μL of 145 μM lead (Pb), and 100 μL of 0.6 M iron (Fe)) with a cocheinal and alum solution.

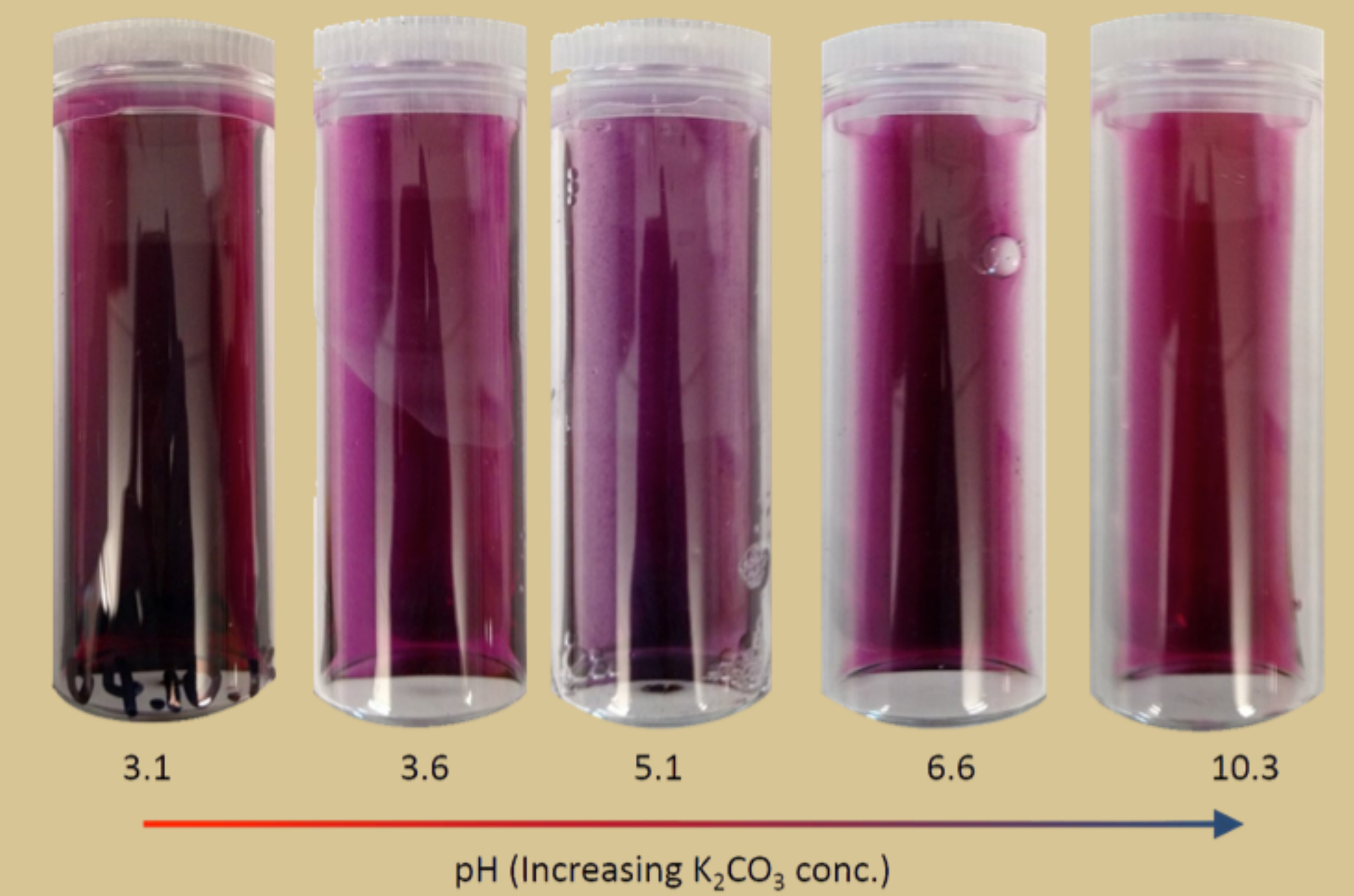
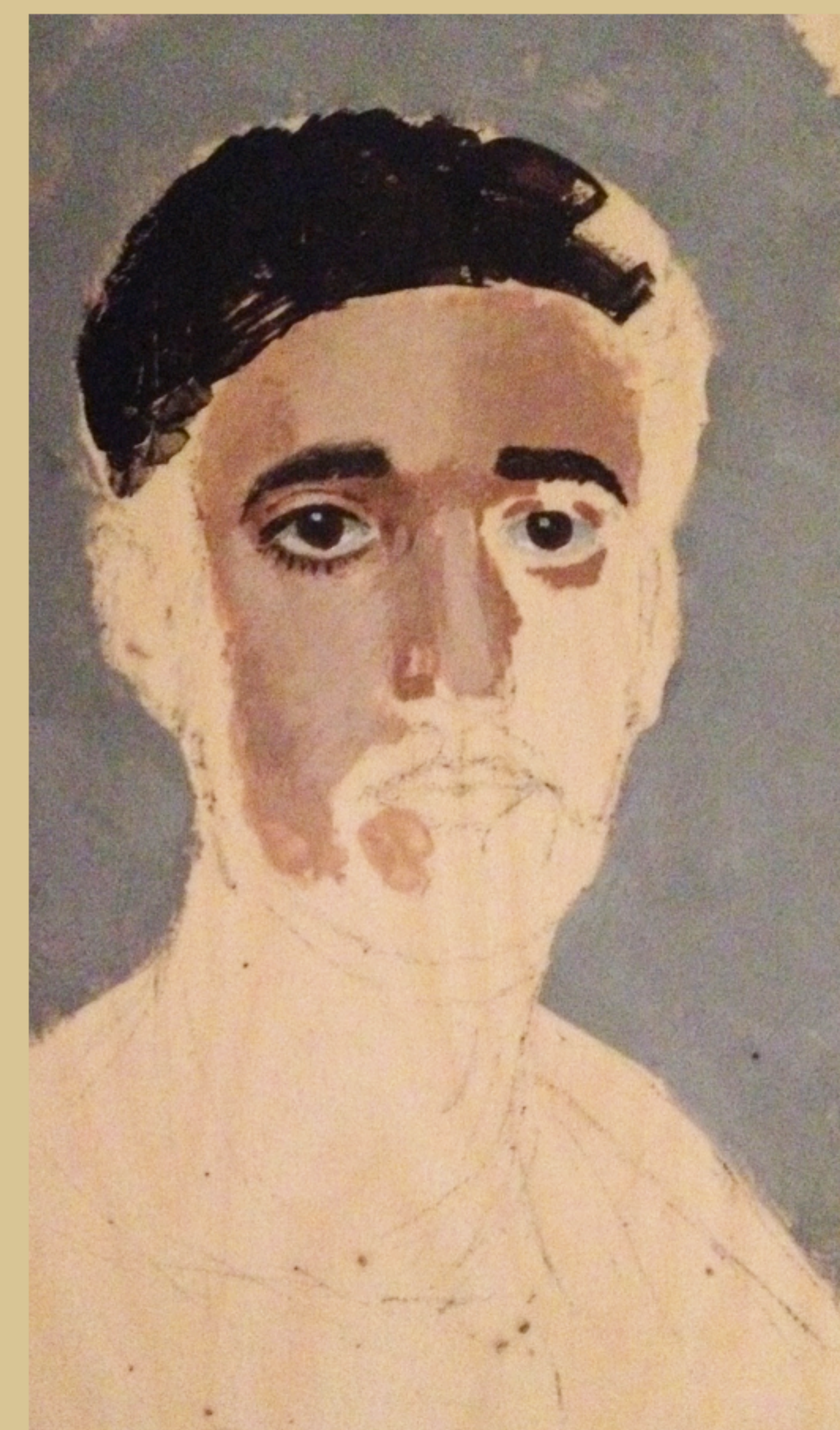


Figure 3: Cocheinal and alum solutions with various pH levels due to titrating with 0.14 M K₂CO₃ (i.e., potassium carbonate) solution of which demonstrate slight color shifts.

FUTURE WORK

Future research will be focused on both the production of encaustic paints from these pigments and analytical comparisons of the pigments. A sample of each pigment will be examined for the following: (a) absorbance/transmittance, (b) fluorescence, and (c) lightfastness and the effects of photodegradation. This record of analytical data allows future research to be conducted, while the encaustic paint most closely resembling that in The Bearded Man will be used in a reproduction of the mummy portrait.



Mummy Portrait of a Bearded Man, Egyptian ca. 170-180 CE, encaustic on wood, The Walters Museum (32.6) (cc).

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