4-18-2016

Resurrecting a Graeco-Egyptian Purple: Reverse Engineering an Ancient Pigment of Scientific and Cultural Significance

Benjamin Herren
Brittany Archuleta
Jennie Coon
Cassie Green
Hanna Meinikheim

See next page for additional authors
Resurrecting a Graeco-Egyptian Purple
Reverse Engineering an Ancient Pigment of Scientific and Cultural Significance

Benjamin Herren, Garnet Kwader, Alaggio Laurino, Brittany Archuleta, Jennie Coon, Cassie Green, Cameron Quade, John-Paul Stroud, Robin McCown, Hanna Meinikheim, Brittany L. Cannon, Mari Carmen Casas, Janice Neri, Glenn Gates, and Darryl P. Butt

Mystery of The Bearded Man
We explored the processing of several dye precursors accessible to Graeco-Egyptians of antiquity (kermes, lichen, indigo, and the madder and alkanet roots - which can all be color-shifted to purple by a variety of metal and alkali salts) in order to characterize the production of the purple used in "The Bearded Man." Pigments produced experimentally were compared with a sample from "The Bearded Man" in order to better correlate the processing materials and methods available in ancient Graeco-Roman Egypt.

Organic Dye Origins and Methodology
Madder (Rubia tinctorum) is a perennial plant with roots that yield a warm-colored dye (anthraquinone) which can be shifted from yellow to deep red by an alkali substance. Using an iron mordant, it is possible to create a purple color; evidence also suggests that the addition of Egyptian Blue pigment (calcium copper silicate) creates a purple hue.

Lake Pigment Processing
Dyes are extracted by a simple boiling and steeping method. Colors are then shifted by the addition of metal salts and/or alkali solutions.

Results
Base Dye Materials

Kermes

Iron

Chromium

Lead

Discussion
The artifact pigment particle had contained certain elements and fluoresced under ultraviolet light. Though it is more laborious to collect than root dyes, kermes can be boiled in water to produce a red dye more vibrant than madder. Alkanet solutions can shift the dye from red to purple, but this range of color is not as wide for kermes as it is for cochineal.

Future Work
- Continue color-shifting the dye solutions using alkaline and metal salts
- Create lake pigments from the dye solutions using a mordant, such as Alum
- Obtain further spectral characterization (i.e. Raman and Fluorescence) of dye solutions and final pigments
- Add final pigments to a wax binder

References