

Identification of Historic Pigments by Direct Microscopical Visual Analysis

ABSTRACT

Although it is believed that the eye can discriminate millions of colors, the perception of them is produced in the brain. Fortunately, for the scientific analysis of artists' materials, paint is a physical substance produced on Earth. Here, there are far fewer choices—namely a hundred common pigments or so—that can be grouped loosely by colors commonly found in nature and pleasing to the eye: blue, green, yellow, orange, and red, together with neutral colors like brown, black and white. Within each color group, there are usually only about a dozen or so common possibilities.

Each pigment has its own shape, size, color, refractive index, birefringence, etc., and, therefore, it is distinguishable from all others microscopically by direct viewing with the polarized light microscope (PLM). There is no video or digital imaging, chart recording, or computer printout that needs to be interpreted. Because the microscope enlarges each pigment up to the size we see everyday objects, it frequently leads to the identity and the exclusion of all others. Particles with the same or differing color and quality, or mixtures of pigments, are easily recognized. Results from the PLM produce a narrow range of likely choices requiring far less time and expense by comparison to other indirect, non-visual methods. The microscopist only needs to prepare the dispersion, properly learn the pigments, and look through the PLM first. A flowchart and key based on the one originally developed by Dr. Walter C. McCrone, and used to teach classes frequently offered by the McCrone Research Institute for the identification of pigments, will be presented together with descriptions for successful positive identifications using the Polarized Light Microscope.

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