CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY

Name(s)
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Project Number
J2128

Project Title
The Effects of Different Exposures on Paints

Abstract

Objectives/Goals
Objective:
The purpose of my science fair project was to investigate which age of paint, casein paint, tempera paint, Renaissance paint, or modern oil paint, would sustain its color and luster (shine) through a series of exposures to extreme conditions such as sunlight, heat, freezing, and soaking in water and acidic water.

Methods/Materials
Procedures
A.Color Banks 1.Prepare all four ages of paint (casein, tempera, renaissance and modern) in all six color types (refer to Note Book Procedures).
2.Cut out 144, 6cm by 6 cm, non treated canvas cloth squares.
3.Prepare 6 banks of canvas squares (sun, heat, baseline samples, heat/freeze, soak water, and soak acid) of 24 samples, (6 of each color x the 4 ages of paint (casein, tempera, renaissance, modern)4.Keep 24 samples as a baseline reference (e.g. red casein, red tempera, red renaissance, red modern; yellow casein).

Results
A.Sun Exposure. In general, the exposure of all of the paint bases and colors to sunlight produces very little change both visibly and spectrally. B.Heat Exposure. Heating, causes the greatest affects on all of the colors and paint bases observed. In general all colors/ bases display visible darkening. C.Freeze/Heating Exposure.Results from freeze/heating of the color/bases produced practically identical results to heating alone. This indicates that freezing did little to decompose the colors/ base paints.D.Water Exposure.In general the greatest effects of water exposure on the color/bases paints was fading. Casein and tempera based paints were the most severely affected, while renaissance and modern oil paints were the least affected.E.Acid Solution Exposure.Results from acid solution exposure of the color/bases produced practically identical results to water alone.

Conclusions/Discussion
Conclusion:My original hypotheses that protein based paints (casein and tempera) would deteriorate the fastest under conditions such as the sun, heat, freezing, and soaking in both water and acidic water, because of their natural organic binders was acceptable under some conditions, but not all. Under some circumstances, Casein based paints remained very stable (heating, sunlight), where as oil based paints decomposed rapidly when heated. On the water exposure however, the oil based paints were consistently more durable than the natural based paints where significant fading was observed. Sunlight appeared to affect the paints the least.

Summary Statement
My project is about exposing paints from different eras to different conditions (Sun, freezing, heating acid and water) to determine difference in stability as observed visibly and by spectrophotometry.

Help Received
Santa barbara paint depot helped run the samples on the spectrophotometer