COPPER BASED PIGMENT ALTERATION FROM DIAGUITA CULTURE

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STUDY
Pottery vessels from the Chilean Diaguita Culture show alteration of the black paint that was used for its decoration. Loss of cohesion, change in color from an intense black, to a reddish brown/greenish brown layer, and modification in composition account for this alteration.

WHERE

Argentina

Diaguita CULTURE

SOUTH AMERICA

CHILE

Argentina

Diaguita culture occupied N-central Chile and NW Argentina (800-1536AD) in Chile they inhabited 5 valleys: Copiapó, Huasco, Chañar, And Limarí.

WHAT WE WORKED WITH

• Raw pigment from archaeological sites of El Olivar (white and red) and Ovalle (green)
• Pottery with iconography that present the black and altered black paint

THE BLACK ISSUE

Cu is the major component of the black paint mainly as tenorite (CuO) and with lesser Fe, as hematite (Fe2O3). Tenorite may be the primary source of black for the Diaguita iconography. BUT tenorite has not yet been found as pigment in archaeological sites. In Andean prehistoric cultures C, Mn and Fe minerals are the primary sources of black, NOT tenorite. 2 origins are proposed for its presence: NATURAL or MANUFACTURED

THE GREEN ISSUE

Physical and chemical mechanisms are responsible for the alteration of the black paint. "Transformation" from black to brown corresponds to an impoverishment in Cu compared to Fe. Hematite (Fe2O3), quartz (SiO2) and cuprite (Cu2O) are present. Cross sections from sherds from Limarí Museum show multiple scenarios of alteration.

MANUFACTURED

Most Cu minerals can transform to tenorite when heated in air, like malachite, azurite, (4) atacamite, antlerite, cuprite, chalcocite. Temperature varies. These minerals occur within the study area.

CONSIDERATIONS

• Tenorite pigment could be prepared first, then used as a black paint OR transformed during heating
• Atacamite could provide material for the formation of the black tenorite via firing process. What would be the necessary quantity of pigment for coloring?
• Firing process is important. Some Andean cultures did not heat the black and red paint on their potteries. Numerous Diaguita potteries show an incomplete oxidation process during firing

SOME THINGS TO THINK ABOUT

• The use of tenorite as black pigment could differentiate Diaguita from their neighbors.
• Could the Diaguita have ingeniously heated atacamite or cuprite, and end up with black tenorite?
• Study of paste and coloring layers in microscope (SEM) will give more information on firing and alteration processes

THE ALTERED BLACK ISSUE

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CONSIDERATIONS

Key parameters for understanding the alteration processes are:
• Manufacture
• Firing processes and techniques
• Soil dynamics and composition
• Alteration during burial and/or post excavation

BIBLIOGRAPHY