Technical analysis of the materials and techniques of Pablo Picasso : from the blue period to the blue seas of the Mediterranean

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Using as starting point *The old guitarist, 1903/04* (AIC 1926.253) - a quintessential blue period painting- and *The red armchair* (1931) - an archetypal "Ripolin" painting- this talk will explore how the combination of non-invasive and micro-invasive means of analysis can shed light on the materials and methods of one of the most important artists of the 20^{th} century. While *The old guitarist, 1903/04* represents a classic case of the artist building a new composition over previous ones, whose color scheme and compositional details we can now appreciate thanks to the scientific analysis, *The red armchair* represents an instance of the artist's innovative use of un-conventional painting materials.

A dynamic force in the art world, Pablo Picasso (1881-1973) made use of an innovative painting medium - house paint - to fuel his creativity and build a new vocabulary for a modern way of painting starting as early as 1912. He did so well before the introduction of synthetic media such as cellulose nitrate, alkyds and acrylics, later popularized by artists like David Alfaro Siqueiros, Jackson Pollock and Morris Louis. Gertrude Stein, a friend and collector, notes that Picasso referred to Ripolin as "la santé des couleurs", that is they are the basis of good health for paint. The artist's choice of such non- traditional materials appears to be related to their surface qualities and availability of a wide range of colors, as well as a radical, avant-garde interest in introducing this common household product into his artworks.

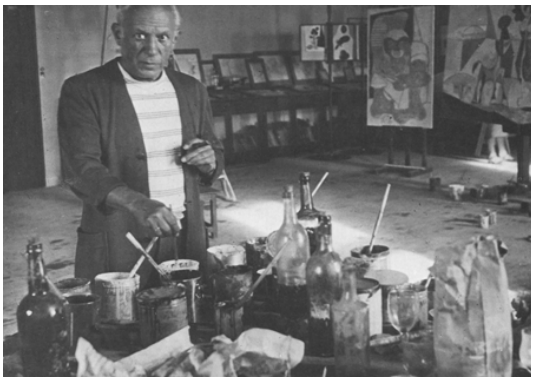

FIGURE 1 – Pablo Picasso portrayed in his studio in Antibes in 1946 : numerous cans of (house and boat) paint can be noted in the foreground.

House paints manufactured by the French company Ripolin gained such popularity in Europe that the term "ripolin" became synonymous with enamel paints in general. Similarly, paintings by Picasso, Picabia and their contemporaries thought to contain these materials came to be known as the "ripolin paintings". Traditionally, the presence of such paints has been inferred from their bright colors and tendency to form flat, glossy surfaces that do not retain brushmarks.

However, common artists' practices such as the addition of extra medium, driers, and varnishes to tube paints can mislead visual assessment by achieving similar surface qualities.

Since 2006 the Art Institute of Chicago has conducted an international program of interdisciplinary research applied to the characterization of early (1910-1950) oleoresinous Ripolin paint reference samples and their identification in Pablo Picasso's so-called "Ripolin" works, combined with a comprehensive survey amongst conservators of the specific characteristics of Ripolin paintings. In the course of this project, a multi-step analytical protocol has been developed, using X-ray Fluorescence spectrometry and Micro-Fourier-Transform Infrared (FTIR) spectroscopy as preliminary survey tools. Additionally, to fully reverse engineer the paints Pyrolisis Gas-Chromatography- Mass spectrometry (Py-GC/MS) and thermo- gravimetric analysis are used to trace changes in formulation, to identify the type of natural resin present, as well as to detect the possible presence of other organic materials or additives specific to these paints. The in-depth analytical approach also involves Raman and Fourier-Transform (FT)- Raman microspectroscopies, Inductively Coupled Plasma / Mass Spectrometry (ICP/MS), Scanning Electron Microscopy (SEM) and Scanning Transmission Electron Microscopy (STEM) to fully explore the molecular and chemical composition of house-paints as well as characterize in detail the particle size distribution and morphology of the paint components.

Results of a major applied research project started at the Musée Picasso in Antibes in 2009 will also be summarized and described. The Antibes Museum houses a unique collection of works that Picasso painted in situ in the Summer and Fall of 1946, turning the lack of availability of traditional oils and canvases in the south of France at this period into an opportunity to freely unfold his creativity using non-traditional materials. Thus, the collection represents an exemplary group of works of high relevance for the study of the Picasso's use of non- artists' paints and is the primary site where the research groups are applying their analytical protocol.

This research fills a significant gap in our knowledge of materials used by artists in the first half of the 20^{th} century. Once completed, the project will expand our knowledge of the formulations of artists' and non-artists' paints and the relationship between their composition and their working and visual properties while also bringing an increased understanding of the connection between material choices and meaning in the oeuvre of Picasso.