Scientific Investigation of Martín de Murúa's Illustrated Manuscripts

Project Overview

Martín de Murúa was a Spanish Mercedarian friar who lived in Peru at the end of the sixteenth and beginning of the seventeenth centuries. Murúa wrote two illustrated chronicles of the history of Peru: *Historia del origen y genealogía real de los reyes Incas del Piru* (1590, private collection of Seán Galvin) and *Historia general del Piru* (1616, J. Paul Getty Museum). The investigation of the making and makeup of these two manuscripts constitutes an extensive and multifaceted project conducted by staff from the Getty Conservation Institute (GCI), the J. Paul Getty Museum, and the Getty Research Institute (GRI), along with colleagues from the Metropolitan Museum of Art, Harvard University, and the Universidad Pontificia Católica del Perú.

The Murúa Manuscripts. Left: *Historia del origen y genealogía real de los reyes Incas del Piru,* 1590 (private collection of Seán Galvin); right: *Historia general del Piru,* 1616, Ms. Ludwig XIII 16 (83.MP.159) J. Paul Getty Museum.

Both manuscripts contain numerous watercolor illustrations depicting Inca royalty, history, and traditions. One part of the project was to study the materials and techniques by which the illustrations of the two Murúa manuscripts were produced. It was hoped that the results of a technical study would provide a basis to determine correlations between materials and artistic hands, as well as relationships between the illustrations in the two manuscripts.

The two Murúa manuscripts were the centerpiece of the exhibition The Marvel and Measure of Peru: Three Centuries of Visual Histories, 1550-1880 at the Getty Research Institute from July 8, 2008 to October 19, 2008. An essay describing the results of the technical study of the Getty's Murúa is included in the volume of essays published along with a facsimile of the Getty's Murúa,

Capaq Yupanqui, the fifth *inca*, from Martin de Murua *Historia general del Piru,* 1616, Ms. Ludwig XIII 16 (83.MP.159), fol 30V; J. Paul Getty Museum.

produced in conjunction with the exhibition. Seán Galvin graciously made his 1590 Murúa manuscript available for study and testing for several months prior to the opening of the exhibition; the technical investigation into the illustrations in the Galvin Murúa revealed important insights into how the manuscript was constructed and its relationship to the later Getty Murúa. The results from the study of both Murúa manuscripts were presented at a symposium held at the close of the exhibition.

Analytical Methodologies Employed

Due to the importance and delicate nature of the illustrations, no samples were removed from the painted surfaces; only non-invasive techniques were used in the study. Initial examination of all colored folios was carried out using X-ray fluorescence (XRF) spectroscopy. XRF is a non-invasive technique that can detect the majority of elements commonly found in mineral-based pigments. XRF analysis on the manuscripts was carried out using a Keymaster (now Bruker) Tracer III-V Handheld XRF spectrometer (Re tube, 40kV, 1-2μA, Ti/Al filter, held in non-contact configuration). From the elements detected, the pigments present may be inferred—e.g., the detection of mercury suggests the presence of the red pigment vermilion, derived from the mineral mercuric sulfide, HgS, also known as cinnabar. However, many pigments contain the same elements and therefore elemental analysis alone may be insufficient to make a conclusive identification of the pigment present: e.g., the presence of lead may indicate the white pigment lead white, the red pigment red lead, or the yellow pigment lead-tin yellow.

Galvin Murúa being examined using the GCI's Bruker portable XRF spectrometer.

Definitive identification of pigments present can be made using a molecularly specific technique such as Raman spectroscopy. Raman spectroscopy is a non-invasive technique that employs a beam of laser light that interacts with the material under investigation to produce a spectrum that is characteristic of the individual molecular compound. The GCI's Renishaw InVia Raman spectrometer has multiple excitation wavelengths (1064, 785, 633, 514, and 488 nm), and is coupled to a microscope, enabling the examination of small particles, even down to individual pigment grains. All analyses were

Getty Murúa being examined using the GCI's Renishaw Raman spectrometer.

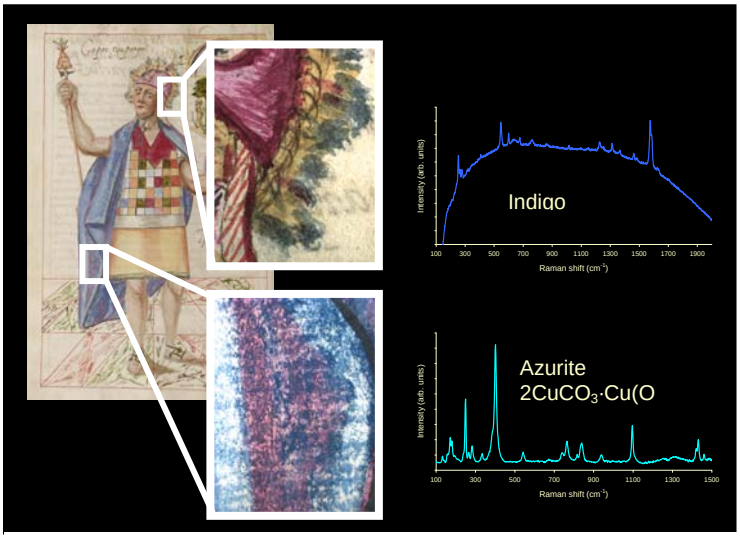
performed using a long focal length 50X objective (f.l. 7 mm, N.A. 0.50) to prevent accidental contact with the manuscript pages.

Phase I Results: The Illustrations in the Getty Murúa

The Getty Murúa contains three hundred and ninety-nine folios, thirty-eight of which are illustrated. The majority of the illustrations show Inca royalty dressed in traditional garments. Initial analyses of the illustrations focused on the colors and colorants used to depict the garments. Although the rendering of the garments and their coloration is a remarkably accurate reflection of Inca textiles, no direct material correlation was observed between the colorants used in the illustrations in the Getty Murúa and those which would have been used in the production of textiles. The colorants identified in the manuscript include mineral pigments and organic colorants that were widely available to manuscript artists in the late sixteenth century.

A number of pigments—including vermilion, indigo, and orpiment—were found throughout the manuscript. However, unique marker pigments and/or pigment combinations were also identified from which four distinct palettes and up to five different execution campaigns or working sessions could be distinguished. Whether these palettes, or color groups, represent different artists or the same artist working with a different palette cannot be determined based on analysis of the colorants alone.

The first palette consists of the basic pigments that were found throughout the manuscript, and includes orpiment, vermilion, red lead, azurite, indigo, a copper-based green, and an organic red colorant. Although not characterized by the presence of a marker pigment, the absence of unusual pigments was sufficient to group the folios on which these pigments were found as sharing a common palette.



Raman spectra of blue pigments - indigo and azurite – identified throughout the Galvin Murúa.

The second palette also contained the pigments found in the first palette, but was distinguished by the addition of the pigment yellow ochre. This palette was found on illustrations appearing in the later part of the manuscript. Significantly, the change from the first palette to the second corresponds to a stylistic change in the illustrations. The first palette corresponds to portraits of individual Inca rulers; the appearance of the palette characterized by yellow ochre corresponds to illustrations that include multiple figures and either background vignettes or other landscape depictions, such as buildings or rockery.

Detail from Investiture of Sinchi Rocha, from Martin de Murua *Historia general del Piru,* 1616, Ms. Ludwig XIII 16 (83.MP.159), fol. 21R; J. Paul Getty Museum.

A third palette, characterized by the pigment lead-tin yellow, is only found on one folio—a tipped-in folio near the beginning of the manuscript. This folio is also unique in that it is the only folio with illustrations on both the recto and verso. These factors suggest the recto and verso illustrations were done at different times, and possibly by different artists. Furthermore, the appearance of lead-tin yellow—a European manufactured pigment—might also suggest the folio was executed, or at least modified, after the manuscript had traveled to Spain.

A fourth palette was characterized by the use of the arsenic sulfide pigments pararealgar and realgar and was found to be associated only with the four tipped-in folios thought to have been transferred from the Galvin Murúa to the Getty Murúa. The palette associated with these folios was further characterized by the use of indigo as the sole blue colorant; the majority of the other folios in the manuscript were found to contain both azurite and indigo. These four folios represent only a small fraction of illustrations from the Galvin Murúa, and therefore the determination as to whether or not multiple hands were involved in their creation was the focus of the second phase of the project—the analysis of the illustrations in the Galvin Murúa.

Finally, silver paint was identified in illustrations in the first part of the manuscript. The silver paint was used to decorate elements such as spearheads and cloak pins, which would have been metallic in real life. It was also used to decorate the sandals of many of the figures. Other embellishments were also observed, including the shading of the marble floors and the insertion of coats of arms on the folios containing depictions of the Inca kings. Significantly, although these embellishments are found on all the folios from the beginning of the manuscript, they stop abruptly approximately one-third of the way through. It appears that the original intention may have been to embellish all the folios, as there are instances where, for example, a spearhead is outlined but not filled in. We do not know why the embellishment campaign suddenly stopped. Regardless, the use of the silver paint is not classified as a separate palette but rather as part of a subsequent embellishment campaign.

Examples of embellished (top, details from fol. 30V) and unembellished (bottom, details from fol. 34V) details from *Historia general del Piru,* 1616, Ms. Ludwig XIII 16 (83.MP.159); J. Paul Getty Museum.

Phase II Results: The Illustrations in the Galvin Murúa

The Galvin Murúa contains one hundred and forty-seven folios, one hundred and twelve of which are illustrated. The majority of the illustrations can be attributed to Guaman Poma de Ayala, a native Peruvian best known for his illustrated manuscript *El Primer nuevo corónica y buen gobierno* (1615, Royal Library, Copenhagen). The Galvin Murúa shows evidence of extensive editing, including the insertion of illustrations from other manuscripts. The first fifteen illustrations are pasted-in (that is, taken from another source and pasted on top of an existing page), as are a few other illustrations toward the end of the manuscript. Some of the pasted-in images are identifiable as having been drawn by Poma, while others are not.

Drawing attributed to Guaman Poma containing pink pigment. From *Historia del origen y genealogía real de los reyes Incas del Piru,* 1590, Galvin MS, fol. 126R, private collection.

Because of the large number of illustrations in the Galvin Murúa, selected folios representing observable different artistic hands, editorial and insertion campaigns, or unusual imagery were subjected to in-depth analysis. Based on pigment analysis, two main palettes were identified—one containing vermilion and realgar, corresponding to the illustrations attributable to Guaman Poma, and one in which vermilion and realgar were not present, corresponding to the remainder of the illustrations. Each of these two main palettes could be broken down further, based on the presence or absence of other pigments. For example, a few of the illustrations attributable to Guaman Poma contained large passages painted with a bright pink organic pigment. The position of the folios containing this pink pigment within the manuscript suggests that these folios, while undoubtedly executed by Poma, were likely done at a different time, when he had added this new pigment to his palette.

The non-Poma images are found primarily at the beginning of the manuscript, and contain portraits of the Inca kings and queens. Although the images show certain stylistic differences, they share a remarkably similar palette. Only subtle differences between the pigments used in the depiction of groups of illustrations could be detected, insufficient to indicate whether or not the illustrations were executed by different artists. In order to further explore the hands involved in the execution of these images, the pigment analysis must be used in conjunction with an analysis of the drawing style, media, tools, and imagery.

One particularly interesting feature of the Galvin Murúa is that the portraits of the Inca queens (coya) are embellished with a coat of arms, in contrast to the Getty Murúa, in which the coats of arms are found above the portraits of the Inca kings. Furthermore, in the Galvin Murúa small images within the coats of arms are stylistically attributable

The coya Ipahuaco with coat of arms of the seventh *inca*, Yahuar Huacac, drawn by Guaman Poma. From *Historia del origen y genealogía real de los reyes Incas del Piru,* 1590, Galvin MS, fol. 28V, private collection.

to Guaman Poma, a conclusion supported by the detection of vermilion and realgar—pigments characteristic of Poma's palette—in these images. The positioning of the coats of arms and other features attributable to Poma's hand within the illustrations suggest that they were applied after the main figure was completed.

Understanding the making of the Galvin Murúa is complicated due to the fact that a number of folios have been removed and new folios added. Nevertheless, from these studies it appears that the illustrations were created in at least two stages: the first stage being the execution of the series of Inca portraits, and the second stage being the completion of the illustrations by Guaman Poma, who created images depicting aspects of Inca society, but also embellished the previously executed portraits.

Project Participants

Barbara Anderson, Head of Exhibitions, Getty Research Institute, and Consulting Curator for Spanish and Latin American Materials (currently Director, State of New Mexico, Department of Cultural Affairs, Museum Resources Division): project organizer, co-editor, essay author, and curator of the exhibition.

Nancy Turner, J. Paul Getty Museum, Manuscripts Conservator: analysis of illustration techniques and materials, collation of manuscripts, essay author.

Karen Trentelman, Senior Scientist, Getty Conservation Institute: scientific analysis of pigments and colorants, essay author.

Elena Phipps, Senior Textile Conservator, Metropolitan Museum of Art: analysis of representation of colonial Peruvian textiles in the manuscripts, essay author.

Tom Cummins, Professor of Art History, Harvard University: art historical study of the images, editor and essay author.

Juan Ossio, Professor of Anthropology, Universidad Pontifícia Católica del Perú: comparison of Murúa's two manuscripts, essay author.

Members of the investigation team discussing the Murúa manuscripts. Photo: Courtesy of Getty Research Institute.

Rolena Adorno, Professor of Spanish Languages and Literature, Yale University: essay author.

Ivan Boserup, Curator of Manuscripts, Royal Library, Copenhagen: essay author.

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