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MATERIALS AND TECHNIQUES IN VICEREGAL PAINTINGS AND SCULPTURE IN LIMA - 16TH AND 17TH CENTURIES

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ABSTRACT

This article presents a synthesis of a research project carried out by an interdisciplinary group from Spain and Peru, undertaken in 2004–2006. Its main focus was to identify technical features of painting and sculpture produced in Lima, Peru, from the 16th to 17th centuries. The starting point was to identify the materials and techniques originating in Europe as distinct from those of the pre-Hispanic world, and to detect local innovations in artistic practice. While historical sources reveal the availability of some pigments, gums and resins used in pre-Hispanic times, no information has been found on mineral extraction or mining and internal commerce during the viceregal period (late 16th to early 19th centuries). Three routes of investigation were explored: direct examination of the works of art, physical-chemical analysis of the material components and study of relevant documentary sources.

RÉSUMÉ

Cet article présente la synthèse d'un projet de recherche exécuté par un groupe interdisciplinaire d'Espagne et du Pérou de 2004 à 2006. Il avait pour principal objectif d'identifier les caractéristiques techniques de la peinture et de la sculpture produites à Lima, au Pérou, au cours des XVI^e et XVII^e siècles. La première étape a consisté à établir une distinction entre les matériaux et les techniques issus d'Europe et ceux du monde préhispanique, puis de repérer des innovations locales dans la pratique artistique. Si des sources historiques révèlent la disponibilité de certains pigments, gommes et résines employés à l'époque préhispanique, aucune information n'a pu être trouvée concernant l'extraction de minéraux, l'exploitation minière et le commerce inté-

INTRODUCTION

This article presents the synthesis of a project dedicated to investigating materials and technical procedures used by painters and sculptors in Lima (Peru) in the second half of the 16th century and the first half of the 17th century.¹ The main objective was to assess the degree to which European artistic practices were employed in Peruvian art of the early colonial period and to what extent did local tradition prevail: the materials used by the artists and the survival of traditional technology of the pre-Hispanic world were of special interest. The secondary objective was to identify documents that provide information on pictorial and sculptural techniques and to analyze the origin of materials from both commercially or locally purchased materials.

In terms of technique, the early period of Peruvian viceregal art has received little scholarly attention. Most prior research has focused on the 18th century. Knowledge of techniques is needed not only to analyze and determine the type of conservation necessary for the treatment of objects and paintings, but also to understand their intrinsic cultural value. Increasing recognition of painting and sculptural techniques as a factor of historical-artistic interpretation has become an important part of interdisciplinary study. In addition, in an effort to contribute to the scholarship of the technical characteristics of Peruvian Viceregal paintings and sculptures of Peru, this project has developed a methodology that will serve as a model for future investigations.

METHODOLOGY

Three types of sources were used:

- research of documentary and literary sources
- visual examination of technical characteristics among a significant selection of paintings and sculptures of the 16th and 17th centuries
- studies of material components through chemical analysis.

Research in documentary and literary sources

A systematic investigation of documentary sources of Peruvian Viceregal art of the 16th and 17th centuries was conducted. Unpublished documentation

rieur au cours de la période de la vice-royauté (de la fin du ^{xvi}e siècle au début du ^{xix}e siècle). Trois pistes d'investigation ont été explorées : l'examen direct des œuvres d'art, l'analyse physico-chimique des composants matériels et l'étude des sources documentaires pertinentes.

RESUMEN

Este artículo presenta la síntesis de un proyecto de investigación realizado por un grupo interdisciplinario de España y Perú, realizado entre 2004 y 2006. Su enfoque principal consistía en identificar las características técnicas de la pintura y la escultura de Lima, Perú, entre los siglos XVI y XVII. El punto de partida consistía en diferenciar los materiales y técnicas originadas en Europa de aquellas del mundo prehispánico, y detectar las innovaciones locales de la práctica artística. Si bien las fuentes históricas revelaron la disponibilidad de algunos pigmentos, gomas y resinas utilizadas en épocas prehispánicas, no se ha encontrado información sobre la extracción u obtención de minerales, ni sobre un posible comercio interno durante el período virreinal (desde finales del siglo XVI hasta principios del siglo XIX). Se exploraron tres vías de investigación: el examen directo de las obras de arte, el análisis físico-químico de los componentes materiales y el estudio de fuentes documentales relevantes.

from a number of different archives in Peru and Spain was also sought; mercantile documentation (registries of boats, commercial transactions and inventories of merchants' inventories) was especially extensive, yielding information on artists' materials imported from Spain and those obtained locally. The registries of the *Tierra Firme Fleet* (Hiring Section, General Archives of Indies, Seville) that contain lists of merchandise loaded onto boats in Seville and sent to Peru² were also consulted, as well as the sources of *Real Tribunal del Consulado de Lima* in the National Archives of Lima (AGN), where lists of merchandise were kept of the boats of the South Sea Fleet arriving at the port of Callao. The lists originating from the payment of taxes levied on merchandise are preserved at the collection *Real Caja de Lima* (AGN).

Other diverse sources in the AGN provided additional information regarding commercial transactions and merchants' inventories: protocols (mercantile transactions), letters written by merchants in the *Real Tribunal del Consulado de Lima* (containing abundant news on demand and exchange of products), judicial files of civil lawsuits in the *Real Audiencia* (inventories of merchants stores) and various sources in the Court of the Inquisition (files relative to the illicit capture of goods from criminals by the *Santo Oficio*, with inventories of stores, auctions, lists of creditors, account books, registries of ships, sale of goods, etc.). The extensive information found in this last source reflects the Jewish or foreign origin of many merchants, who were thus suspected of practicing Judaism or of heresy and subject to investigation.

The arrival of the Spanish to the New World and the contact with the indigenous cultures aroused great interest and knowledge exchange was constant. As a result, an important technical literature was generated, focusing on topics such as health, nutrition, dyeing techniques and technology. Bibliographies are extensive; therefore only those books containing information on artistic materials will be mentioned: official chronicles (León Pinelo 1659), *Relaciones geográficas* for the Council of the Indies (Jiménez de la Espada 1881–1884), literature on natural history (Acosta 1590), on metallurgy (Barba 1640), and general or local chronicles of religious orders (Cobo 1639, 1653). Finally, another source for the project was the vocabulary and dictionaries in Spanish and native languages (Santo Tomás 1560, González Holguín 1608), which included terminology of pigments, resins and dyes.

Among documents of a mercantile character, the chronicle of the early 17th century, *Descripción del Virreinato del Peru* stands out. It was written by a Portuguese Jew and dedicated to the Dutch governors. It describes the commercial mechanisms that ruled Peru and the stores of merchants of the *Plaza Mayor* (main square) of Lima and the surrounding streets. It also includes an appendix on the types of goods that were sold in the Viceroyalty.

Examination of selected works

The examination of paintings was centered on the work of an Italian painter, Angelino Medoro, who was the predominant painter working in Lima



Figure 1
Nuestra Señora de la Ángeles. Angelino Medoro. Oil painting/canvas. 17th century. Los Descalzos Monastery, Lima, Peru

Figure 2
Imposición de la casulla a San Ildefonso. Leonardo Jaramillo. 17th century. Oil painting/canvas. Los Descalzos Monastery Lima, Peru

during the first decades of the 17th century. He had a prolific workshop, numerous commissions and a permanent relationship with a group of sculptors, whose work was also included in this research.³ Medoro is, together with Mateo Pérez de Alesio and Bernardo Bitti, most renowned for introducing Mannerist models to Peru, and he was also one of the great painters who exerted influence on his contemporaries. Nevertheless, until the present project, Medoro has not been studied from a technical point of view. Individual works of other painters active in the first half of the 17th century in Lima were also included in the study: Antonio Mermejo, Leonardo Jaramillo, Bernardo Bitti or Pérez de Alesio and anonymous painters (Figures 1, 2, 3).

In sculpture, works of Alonso Gomez, Martin Alonso de Mesa, Martin de Oviedo, Luis Ortiz de Vargas, Luis de Espindola and Bernardo Perez de Robles were selected for investigation. All of these artists were born in Spain or were of Spanish ancestry. Sculptors working in Lima such as Roque Balduque, Juan Baptist Vázquez, Martinez Montañés and Juan de Mesa, were all from Seville (Figures 4, 5).

Data about the constructive aspects of the works, pictorial techniques and polychromy were collected and evaluated by direct examination and material characterization (fibers, wood, binding media, pigments and metal layers) through scientific analysis.⁴

Registry of the information

As a complement to the project, a computerized management technique of the research was developed. A database of documentary sources and works of art was created. It will allow investigators to explore data from different aspects: artists, dates, places, techniques, materials, etc., and to cross-reference information as well as expand this investigation to other artists and time periods.

Training and diffusion

In order to take advantage of the project, training opportunities were proposed within the academic frame of the National University of San Marcos in Lima, including a guiding methodology of scientific research in the fields of art history and conservation, collaboration with students, organization of seminars and didactic audio-visual materials.

RESULTS

The transfer of European techniques to Lima can be attributed to the numerous Italian and Spanish artists attracted by the promise of wealth offered by the Viceroyalty. Given their abundant production and renowned workshops, the first generation of Limeñan artists of the late 16th century propagated these techniques throughout the Americas. The need to construct altarpieces – seen as essential for worship – demanded painters, gilders, assemblers and sculptors. From the beginning of the 16th century, specific



Figure 3
Trinidad en la tierra. Anonymous. 17th century. Oil painting/canvas. Los Descalzos Monastery, Lima, Peru



Figure 4
San Francisco resucitando a un muerto. Angelino Medoro. 17th century. Oil painting/canvas. Los Descalzos Monastery, Lima, Peru

techniques associated with these altarpieces were developed: oil media for paintings and the painted faces of the sculptures; tempera media for the polychromy on gold, and burnished gilded surfaces laid on poliments containing bole over gesso grounds.

The investigations sought to address the issue of transfer of materials and methods: were materials used in Europe available in Lima, or did artists adapt their working practices to local materials, therefore modifying their technical methods? Here, two aspects for illustrating this question are considered: the use and supplies of wood and of pigments used in paintings and sculptures.

Wood

The first generations of sculptors and assemblers established in Lima had to apply the use of diverse woods in contrast to those they originally worked with. From the very beginning, the contracts of altarpieces specified the use of oak for architecture and cedar for moldings, columns and sculptures. Tropical cedar *Odorata Cedrela L.* is an abundant species in Central and South American tropical regions and, as documentary sources state, it was normally brought from Nicaragua, as it was cheaper to cut down and transport. It is a tree with a large trunk, with soft, porous, light-weight wood that is resistant to xilophagus attacks. For these reasons, it was used for the carving of images, reliefs and columns. Soon it was also exported to Spain for diverse purposes where Andalusian sculptors made extensive use of it. Oak is a tree of the genus *Tabebuia*, originally of the humid forests of the intertropical regions. This wood was appreciated for its hardness and resistance to the attack of insects, but its hardness rendered it less suitable for sculptures. Artists in Lima used oak from Guayaquil (Ecuador), and cedar from Nicaragua and Panama. These woods were brought to Lima by ship in the mid-16th century, primarily for use in boat building and urban construction.

The sculptures selected for the current project allowed us to verify different systems of construction from those used by artists in Spain, due to the particular features of cedar. Details of technical differences and similarities were studied. A good example is the *embonado* technique, the union of pieces of wood to obtain a block large enough to carve the sculpture. In Spain, pine or walnut timber was usually employed to make the block, called *embón*. This construction takes advantage of the trunk of the tree at its maximum circumference and it is only necessary to add other pieces for the most prominent details as hands, for example. On the contrary, Limeñan sculptors used longitudinal sections of cedar boards up to one meter in thickness, but not more than 15 centimeters in width (they could go from shoulder to shoulder of the sculpture). This shape required that several boards were glued together in order to obtain the necessary volume. The difference between the two systems of work was due to the manner in which the wood was cut and the way in which it was transported. In Spain, due to the smaller sizes of the trees like walnut and pine, transportation

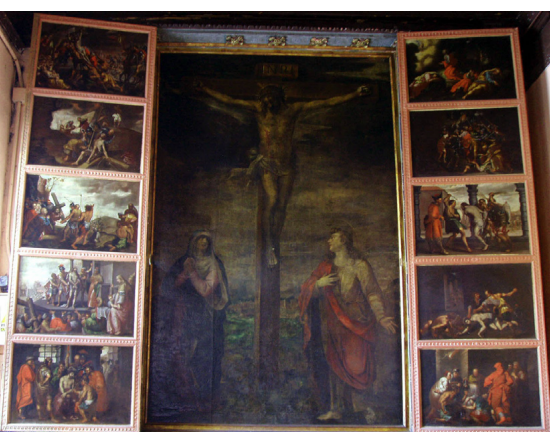


Figure 5

Calvario. Angelino Medoro. 17th century.
Oil painting/canvas. San Francisco
Monastery, Lima, Peru

Figure 6

San Buenaventura. Anonymous. 17th
century. Polychrome wood sculpture.
Instituto Nacional de Cultura, Lima, Peru

was done along the rivers. The cedar, whose trunks are much larger, arrived in Lima by ship, already cut in planks. The difference in finishing of wood carving in Lima is also related to the type of wood used. Wood sculptures in Spain were generally made in hard woods and they were carved using a chisel, a technique that allows precise details to be carved. In Lima, cedar was shaped with a carpenter's rasp instead of a chisel, as the wood was softer, but the details were less precise. Moreover, cedar's homogeneity makes it easier to work and requires less plaster layers than Spanish sculptures. Finally, due to the porosity of the wood, boards of cedar may be easily glued together to form larger shapes, thus eliminating the need to use dowels or pegs to secure joins (Figures 6, 7).

Pigments

Pre-Hispanic artists independently used many natural pigments also found in Europe: vermillion, azurite, malachite, black charcoal products, earth pigments, orpiment, realgar and also a variety of lakes made from dyestuffs derived from vegetable or animal sources. Chroniclers (*cronistas*) and other authors of the 16th and 17th centuries (Betanzos 1987, 201; Capocle 1959, 129; Vivar 1966, 14, 20; León Pinelo 1943, 266) emphasize the wealth of blue and green copper pigments. Other 'minerals of great estimation for the painters' were obtained in the Eastern mining areas of Bolivia (Lipes) and north of Chile (Atacama). Vermilion from the deposits of cinnabar was mined in Huancavelica (Peru); red, yellow and other colors of earths were also found throughout the Andean region.

In spite of the written references concerning local deposits of natural pigments, their good quality and their use by native people, data on their internal commerce and use by artists of the Viceroyal period was not found. Pinelo (1659) observes, for example, that the production of blue pigments, one of the most celebrated by the chroniclers, was practically abandoned during colonial times. The interest of the Spaniards to focus colonial production on precious metal extraction and to leave the provision of other necessities in the hands of merchants within the metropolis also affected the supply of artists' materials. Moreover, Spain never had an outstanding industry of art materials, and foreign trade was the main source of supply.

It seems that the materials used by the first generations of European artists in Lima were not from native products. The primary components of the palette of pigments used for painting in oils was made up of synthetic materials (lead white, lead-tin yellow, verdigris and other blues and greens based on copper, smalt, vermillion, red lakes). All were fundamental in order to obtain the brightness, transparency and chromatic intensity characteristic of contemporary European oil painting.

Analysis made on paintings by Angelino Medoro and other painters reveals the use of a similar range of pigments as those used in contemporary European paintings (Bruquetas 2009). However, an exception has been noted: a mineral blue pigment, vivianite (ferrous phosphate), possibly of



Figure 7
San Buenaventura. Anonymous. 17th century. Polychrome wood sculpture, back (*embonado*). Instituto Nacional de Cultura, Lima, Peru

Figure 8
La Visitación. Martín Alonso de Mesa. 17th century. Polychrome wood relief. Lima Cathedral, Peru

local origin, has been detected in a painting by Angelino Medoro. It appears to have been mixed with lead white to provide a light blue ground layer and with a deep blue layer also containing azurite and white.

European painters' supplies were readily available in Lima due to the active marine commerce between Lima and Seville. Pigments and other materials for the arts, such as resins and gums, were registered in documents of fleets that traveled between the ports of Seville and Callao. For example, an inventory of 1617 included '*azul para pintores finisimo, genuli, albayalde de tetilla, cardenillo*' (finest blue for painters, lead and tin yellow, lead white, verdigris) next to a series of paintings and sculptures (AGN, TC-JU2-2, fols. 183r-184v). Spanish painters sent both materials and works of art to the Americas; in 1660, for example, Zurbarán sent 26 pounds of colors and brushes to be sold in Peru (Caturla 1951, 27–30).

Lima was the main trade market of the southern Americas. Its commerce was concentrated in the main square and surrounding streets, where the market was located (in native language it was called *catu*) (Cobo 1964). Sales took place in fixed stores, in portable tents called *tendejones*, or simply by placing the merchandise on tables (Durán 1994, 184–189). Many inventories of merchants were located in the main square or in the streets where the merchants lived. Lists of materials include: sicatives (*almártaga*), resins (amber, sandarac, mastic, turpentine, *menjuí*), pigments (lead white, verdigris, lead-tin yellow, minium, smalt, carmine, 'blue dusts', vermilion, green earth, green mountain, *ancorça*, bright yellow-*jalde*), dyes (Dragon's blood, indigo from Guatemala, *cochinilla* from Mexico), Arabic gum, alum, Armenian bole, etc. The assorted products arrived over time in Lima with the fleets.

With no doubt, the city of Lima cannot be referenced for other cities of the Viceroyalty. It is understood that in remote areas, the trade and use of local native pigments occurred on a small scale, as in fact, it took place in the Cuzco School of painting. In a contract for an altarpiece for the Convent of La Merced in Cuzco (1581) the 'gilding master' (*maestro de dorar*) Juan Ponce de Leon required the use of 'fine colors of Castilla': 'blue, smalt, ashes, *genolis*, *encorça*, minium, vermilion, white of lead, kermes dye of Mexico...' (Cornejo 1960, 161–164). This list reveals that by the last third of the 16th century, pigments from Spain were shipped to places as far away as Cuzco. Certain local pigments were used in the Andean region, but for some special works of art, European pigments were preferred.

CONCLUSIONS

The sources studied for the project revealed that European artists' materials were readily available in Lima. There are no known documentary sources that reference the use of native pigment supplies by local artists. However, questions around the use of local materials remain unresolved. The presence of literary sources attests to their use in the pre-Hispanic era, but no documents were found relevant to the exploitation and internal commerce

of local materials in colonial times. On the other hand, chemical analysis has detected some unusual pigments such as mineral vivianite, which may originate from a local deposit. In contrast, the greater difficulty in transporting wood overseas compelled artists to employ local woods for sculptures and thus to develop different construction techniques than those used in Spain.

The project has established guidelines and directions of study for future research. The main contribution has been to introduce a methodology that enables this kind of complex investigation. For this reason, an interdisciplinary approach using a variety of documentary, literary, scientific and art historical sources is indispensable.

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NOTES

- ¹ The project was carried out between 2004 and 2006 thanks to the support of the Fundación Carolina of Spain and the Universidad Mayor de San Marcos de Lima.
- ² Due to the wide range of the documentation beyond the scope of this work, the references were taken from the years 1600 to 1605. See also Sánchez y Quiñones (2009).
- ³ A study about Angelino Medoro was published (Bruquetas 2009).
- ⁴ Chemical analysis took place at the private laboratory *ArteLab* of Madrid, under the supervision of chemist Marisa Gómez. The methods used were polarized light microscopy (PLM); scanning electron microscopy (SEM, HITACHI S 3000 N) – combined with energy-dispersive X-ray (EDS, OXFORD INSTRUMENTS S. INCA); infrared spectroscopy (FT-IR, PERKIN ELMER, Spectrum One); thin layer chromatography (TLC), gas chromatography-mass spectrometry (GC-MS, AGILENT TECHNOLOGIES GC 6890N MS 5973). Part of the results regarding Medoro paintings were published in Bruquetas (2009).

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