

Regraxar or glazing: aspects of this technique in a group of Portuguese paintings attributed to Francisco João (active 1563–95)

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The glazing technique of 20 panel paintings attributed to Francisco João, the most productive painter working in the region of Évora, southern Portugal, between 1563 and 1595, was compared with references to this practice found in 16th- and 17th-century Iberian painting treatises (see Table 1). These paintings are distributed among several churches in southern Portugal and are currently the subject of a scientific programme that aims to identify and characterise the materials and techniques used in the workshop of this master.

The following five treatises were considered:

- *Reglas para pintar* (end of the 16th century), Anonymous, Santiago de Compostela, Spain (Bruquetas Galán 1988)
- *Arte da pintura, simetria e perspectiva* (1615), Filipe Nunes, Lisbon, Portugal (Véliz 1986)
- *Arte de la pintura* (1649), Francisco Pacheco, Seville, Spain (Véliz 1986)

- *Breve tratado de iluminação* (before 1640–50), Monk of the Order of Christ, Portugal (Monteiro and Cruz 2010)
- *Tractado del arte de la pintura* (c.1656), Anonymous, Andalusia, Spain (Véliz 1986)

Although most of these documents date from the first half of the 17th century, they were selected on the basis of their Iberian origin along with the fact that they relate, in part, to practices from the previous century. Glazing was referred to as *bañar* or *trasflorar* in Spanish historical documents and as *regraxar* in the Portuguese texts. The comparison between the original paintings and these historical documents was made in terms of the materials present, the build-up of the paint layers and the methods of spreading the glazes. In the paintings under study, glazing was only detected in red and green draperies, although Iberian treatises describe this technique for the colours purple and blue as well (Table 1).



Figure 1 Imprint of the weave of a cloth on the glazed surface of the tunic of St John from the *Assumption of the Virgin* of Beringel, Portugal. (Photo: Helena Melo.) (See Plate 85 in the colour plate section.)

Table 1 References to the paint build-up and pigment mixtures used for glazing according to Iberian painting treatises.

PAINTING TREATISES				
Visible colour	Undermodelling		Glaze	Source
	1	2		
Red / Pink	vermilion	carmine + white	red lake	Pacheco
		minium + white (lights) carmine + verdigris (shadows)		<i>Reglas...</i>
	vermilion + carmine	vermilion + carmine + white (lights) pure carmine or black (shadows)		Pacheco <i>Tractado...</i>
	red ochre or hematite + white black + white	carmine + black (shadows)		Pacheco <i>Tractado...</i> Nunes
Purple	blue (preferably smalt) + carmine + white		red lake	Pacheco
	blue + white			Pacheco <i>Tractado...</i>
	carmine			ultramarine <i>Tractado...</i>
Green	verdigris or green + white			Pacheco <i>Tractado...</i>
	verdigris + white + lead tin yellow			Pacheco
	blue + lead-tin yellow	indigo + lead-tin yellow (shadows)	verdigris	Portuguese monk
	malachite + white or black			Pacheco
	ochre			<i>Tractado...</i>
	yellow	green (2nd); ochre (3rd); green + umber (4th)		<i>Reglas...</i>
	black + white			Nunes Pacheco <i>Tractado...</i>
Blue	blue + white	smalt (shadows)	ultramarine	Pacheco
	indigo or woad + white	pure indigo (2nd); indigo + umber (3rd); indigo + black (4th)	smalt	<i>Reglas...</i>
Other	red		asphalt	Nunes
	painting surface			<i>Reglas...</i>
	orpiment	burned orpiment (shadows) massicot (lights)	red ochre	<i>Tractado...</i>
	Figures in the landscape, angels inside a halo		white + 1 colour	Portuguese monk

Glaze samples were made into cross-sections and examined with optical microscopy (OM). The materials were identified using micro Fourier transform infrared (μ FTIR) spectroscopy (Hyperion 3000) and low-pressure scanning electron microscopy with energy-dispersive X-ray analysis (SEM–EDX).

Green glazes were applied in a single layer made of verdigris to which a little lead-tin yellow or lead white was sometimes added. The undermodelling was achieved with lead-tin yellow for the lights and with ochre or a greenish-black paint for the shadows. Carbon black, lead-tin yellow, lead white, ochre and verdigris were used. The mixture of a yellow and black pigment found in the undermodelling was not mentioned in the historical sources considered.

Red glazes were applied in one or two superimposed layers. Two red lakes – one with a substrate rich in sulphur and the other rich in aluminium – were identified. Particles rich in silica and oxygen with small amounts of aluminium, calcium and sometimes sodium or manganese, were analysed by SEM–EDX in some of the red glazes. They appear to correspond to an extender made from mineral, or to ground glass, a material mentioned as a drier in all the abovementioned historical documents. The imprint of a woven fabric was observed in some of the red glazes, following the advice given by Filipe

Nunes (1615) to use a linen cloth to spread glaze layers (Fig. 1). Underlayers were built with an opaque vermilion-based paint modelled in one or two layers of similar tonal range, or with a pink, ochre or pink-greyish paint applied in a single layer. Pigments such as vermilion, red ochre, ochre, red lake, carbon black and lead white were used.

The glazing technique found in a group of paintings produced in southern Portugal during the second half of the 16th century showed the permanence of conventional techniques that, with small variations, were related closely to the references found in the Iberian painting treatises investigated. Although glazing was limited to red and green colours, evidence was found of an extensive knowledge of materials, notably in the selection of the particular technique of blotting the red glaze with a cloth and in the addition of an extender or drier that appears to be ground glass, to red glazes.

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Plate 85 Imprint of the weave of a cloth on the glazed surface of the tunic of St John from the *Assumption of the Virgin* of Beringel, Portugal. (Photo: Helena Melo.) (See Fig. 1, p. 195.)