SCIENTIFIC AND DIAGNOSTIC EXAMINATIONS

Vatican Museums Diagnostic Laboratory for Conservation and Restoration

SCIENTIFIC RESEARCH

The aim of this study is to "travel" between the layers which compose the work: in practice, to use pictures to show the use of the materials and how they are superimposed on each other. Naturally all this is possible thanks to technological advances, especially in analysis through the use of images and in high-resolution photography. In order to obtain the images, the Scientific Laboratory of the Vatican Museums has designed a robotic system which guarantees the highest resolution images across a wider range of the spectrum. For the *St Jerome* more than 2000 images were needed to document the entire surface and over 200 for the reflectography alone. Beginning with the external surface, studied in visible light, the work descended into the material with images in false-colour infrared to study the pigments. Reflectography at 1900 nm allows us to pass beyond the paints to arrive at the preparatory drawing.

IMAGES IN VISIBLE LIGHT

High resolution allow us to identify Leonardo's fingerprints, especially in the left-hand landscape. The artist has applied paint, and perhaps also the preparation of the panel, with his hands, leaving his prints in the fresh impasto. In the centre of the landscape we can also observe some lines which makes us think of vegetation that was never finished. The lion has been drawn using a blue, but the particles which compose it are not visible, even when greatly enlarged. This allows us to speculate that the artist used a colourant such as indigo. Indeed, indigo has a very fine granulometry in which the colouring principle is absorbed into very fine and impalpable inert material, such as sand or marble dust. Indigo is a material known throughout history and all over the world. It was the colourant used by the Maya to achieve their characteristic dark blue (called, indeed, Maya blue) long before the Europeans discovered the Americas. The same colourant was used in the Far East and in mediaeval European painting. In Italy it was known as Baghdad indigo because of its provenance. The same chemical molecule is still the base for creating denim today.

False colour infrared

The cuts suffered by the work are highly visible. Naturally, being "unfinished", very few pigments are present, either in quantity or variety. On St Jerome's face we can observe how the dark blue area which delineates many of the modelling lines consists of two different types of dark blue with a different infrared response: one appears red, the other dark blue. The first is probably indigo and the second copper-based (azurite). The foreshortening of the panorama on the left of the painting is very interesting. In this case there are also two types of dark blue present. The traces of a drawing of vegetation are more easily distinguished here, both in the upper and lower parts.

Infrared reflectography at 1800 nm

In the rocky panorama behind the Saint's head we observe some probable variations from the present configuration. The foreshortening of the panorama on the left seems to consist of relatively transparent material. In fact, the rocks on the extreme left are not visible in this image, but we get a clearer view of the morphological delineation of the pool and the flow of the water which curves just above the Saint's right hand. In the centre of this area there is a fairly well defined geometrical structure, which is nevertheless hard to interpret. We also observe variations from what is visible now on the rocks positioned by the right hand. The church on the right has completely disappeared. This means it was created without a preparatory drawing.

3D imaging

It is fundamentally important to study the spatial variations, even if microscopic, which the wooden support may undergo as a result of microclimatic fluctuations. Scanning the panel periodically and comparing the models with appropriate software, we can highlight possible deformations, however minimal, which may create situations of tension, possibly critical, within the complex system: painted layer – wooden support – mounting.