

Viewpoints, Exhibition, First Half 2026
at Museum Rietberg, Zürich

GBF for Cooperative Research
on South Asian Art and Artists
Foundation

Viewpoints

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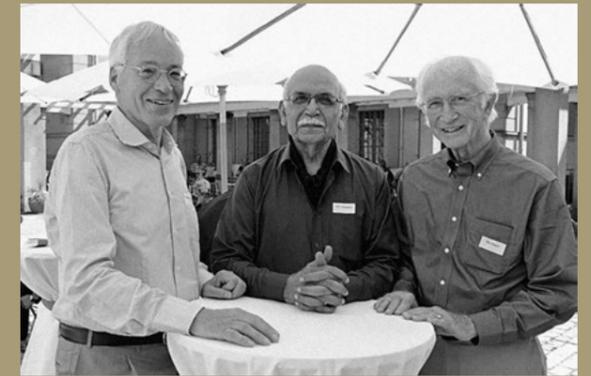


Not yet identified Kota Master
Bangala Ragaputra, Son of Raga Hindola
Folio from 'Kota Narayana Ragamala Series'
Kota, around 1770
Pigment painting on paper
Private collection, Zurich

Methodologies and Perspectives

Indian paintings provide rich, layered experiences that leave lasting impressions on viewers from all backgrounds. For over a century, scholars have explored them through different art-historical perspectives, producing invaluable research for collectors, students, and keen observers. Yet, beyond symbolism, subject matter, provenance, and style, many questions about technique and materials remain unanswered. One approach is scientific assessment of these paintings. Studying the strokes and underlying patterns below the surface offers rare insights into the intention of painters and their workshops and can deepen our understanding of both inherent meanings and materiality.

In pursuit of this knowledge, the GBF Foundation for Cooperative Research on South Asian Art and Artists at Museum Rietberg has collaborated with the Swiss Institute for Art Research (SIK-ISEA), Zurich, to initiate scientific analyses of selected works. As its initial project, the Foundation has launched research on fifteen paintings from an eighteenth-century Kota Narayana Ragamala series. This ongoing study, with its non-invasive and non-contact nature using spectroscopic methods, has yielded fresh insights while simultaneously opening new lines of enquiry. One such finding is the presence of the pigment atacamite in several of these works, originating from either the Atacama Desert in Chile or China, which prompts us to retrace historic trade networks and demonstrates the surprising availability of such materials to painters in north-western India.



The GBF Foundation, in partnership with Museum Rietberg, supports and promotes scholarly programmes on South Asian art, especially painting. Its mission is to strengthen the museum's role as a global centre for this field and to highlight its renowned collections. Named after the scholars Dr. B. N. Goswamy, Dr. Milo Cleveland Beach, and Dr. Eberhard Fischer, the Foundation honours their pioneering contributions that continue to inspire future research.

Study of a Ragamala Folio: *Bangala Ragaputra*

Bangala Ragaputra is a folio from the *Kota Narayana Ragamala* series. Scientific examination of this folio focuses on materials, pigments, and techniques. It also reveals intricate details under microscopic imaging, including particle size and pigment layering. Information on materiality and the meticulous painting process provides a fresh perspective on the tradition and greater respect for the not yet unidentified painter.

Analysis of the painting reveals that the painted picture is significantly smaller, with side borders and a thicker backing added later. For this folio, the painter began with various underdrawings, applied a base layer of calcium white, and filled in pigments in layers or combinations. Some pigments were applied discreetly; for instance, the

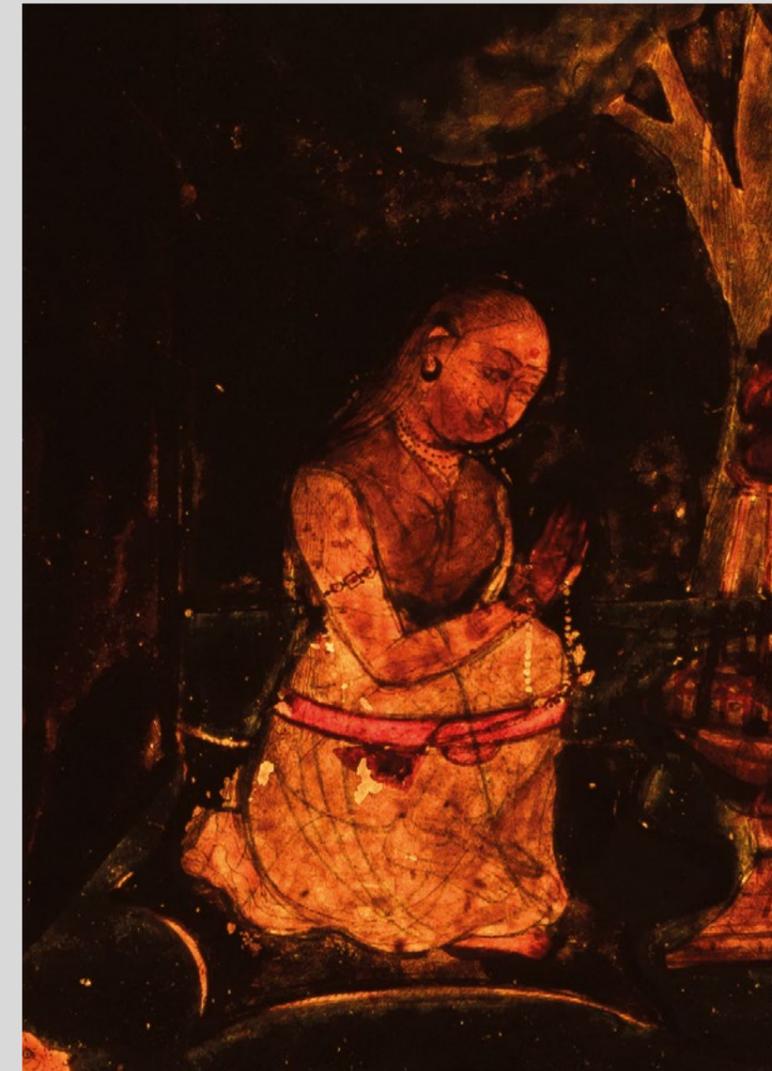
basic elements for the brown building are lead and mercury (cinnabar), and it features almost invisible Indian yellow along the brick lines. Highlights such as white pearls were applied at the end, along with the final outlines. The painter also seems to have made some adjustments in the end, such as adding a subtle hint of a moustache to an otherwise feminine face.

This room provides further information on the scientific processes carried out to study this folio, along with some fascinating findings.

The Ragamala Tradition and *Bangala Ragaputra*

The Ragamala tradition translates the moods of raga music into poetic and visual forms. It was prominent in South Asian courtly culture from the sixteenth century onward. In this tradition, different musical modes are classified within a family system, where ragas are represented as male, raginis as female, and *ragaputras* as the sons of the ragas. The folio *Bangala Ragaputra* is identified as the son of *Raga Hindola*

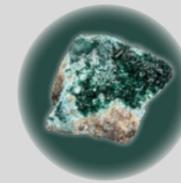
and was painted between 1750 and 1775 CE. Although the verse for this composition is missing, related texts describe Bangala as a courtly woman renouncing worldly life for spiritual practice. Her austere lifestyle transforms her feminine attributes, giving her an androgynous form that reflects devotion and transcendence.



Androgynous Figure of Bangala

Technical photography, particularly infrared and visible light transmission imaging, reveals that the artist refined the drawing over three separate occasions. In an earlier version, the figure's breasts were still visible, but in the final composition they were concealed. Ultimately, the artist introduced an unexpected detail: a fine moustache. This

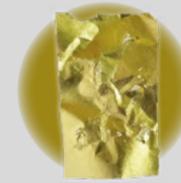
subtle addition creates a striking contrast with the figure's otherwise feminine features: the long, flowing hair, the red bindi (a religious mark on the forehead, usually worn by women), and the overall delicacy of the form.



Atacamite



Lead White



Gold



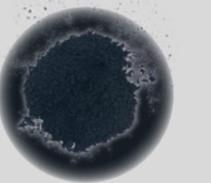
Indigo



Indian Yellow



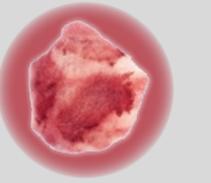
Kaolin



Charcoal Black



Red



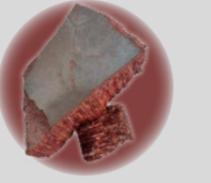
Red Lacquer



Silver



Tin



Vermilion

Farbdiagramm

1
Vermilion, Charcoal black,
Lead White, Indian Yellow

2
Tin, Lead White

3
Atacamite, Lead White,
Indigo, Indian Yellow

4
Red, Red Vermilion

5
Atacamite, Indigo, Lead White

6
Indian Yellow, Lead White,
Charcoal Black

7
Lead White, Kaolin

8
Indian Yellow, Lead White,
Vermilion, Red Lacquer, Red,
Charcoal Black, Kaolin

9
Vermilion

10
Gold, Silver

Simple Explanation of Technical Terms

The painting was studied without being touched or samples having been taken. Instead, specialists used high-resolution photography and scientific methods that show how light interacts with different materials (spectroscopy). Below is a summary of the analysis and imaging methods applied:

X-ray fluorescence spectroscopy (XRF)

XRF detects the elements present in inorganic materials, while the resulting images show how these elements are distributed across the painting. Because pigments can share common elements or be made of multiple elements, this method is especially useful for identifying and distinguishing different materials.

Fourier transform infrared microscopy in external reflection mode (micro-ER-FTIR)

FTIR micro spectroscopy can identify both organic and inorganic compounds on a very small scale by studying their molecular structures. Using a microscope in reflection mode, this method allows a careful examination of the surface as well as deeper layers of the artwork.

Reflection Spectroscopy (RS)

RS gently identifies different materials by examining their electronic structure and

molecular composition. It is especially useful for detecting red pigments, which can be difficult to analyse in paintings and historical artworks.

Ultraviolet (UV)

UV imaging uses light with shorter wavelengths than the visible spectrum to reveal surface details that cannot be seen under normal lighting. Certain substances in the painting, like the pigment Indian yellow (goguli), glow under UV light, making them easier to identify.

Infrared Reflectography (IRR)

IRR reveals what lies beneath the surface layers of paint. This method captures the infrared light reflected by the artwork, making hidden details visible.

Infrared Transmission Imaging (IRT)

IRT works similarly to infrared reflectography, but here the infrared light is placed behind the painting. The camera records the light passing through the artwork, revealing hidden details beneath the surface.

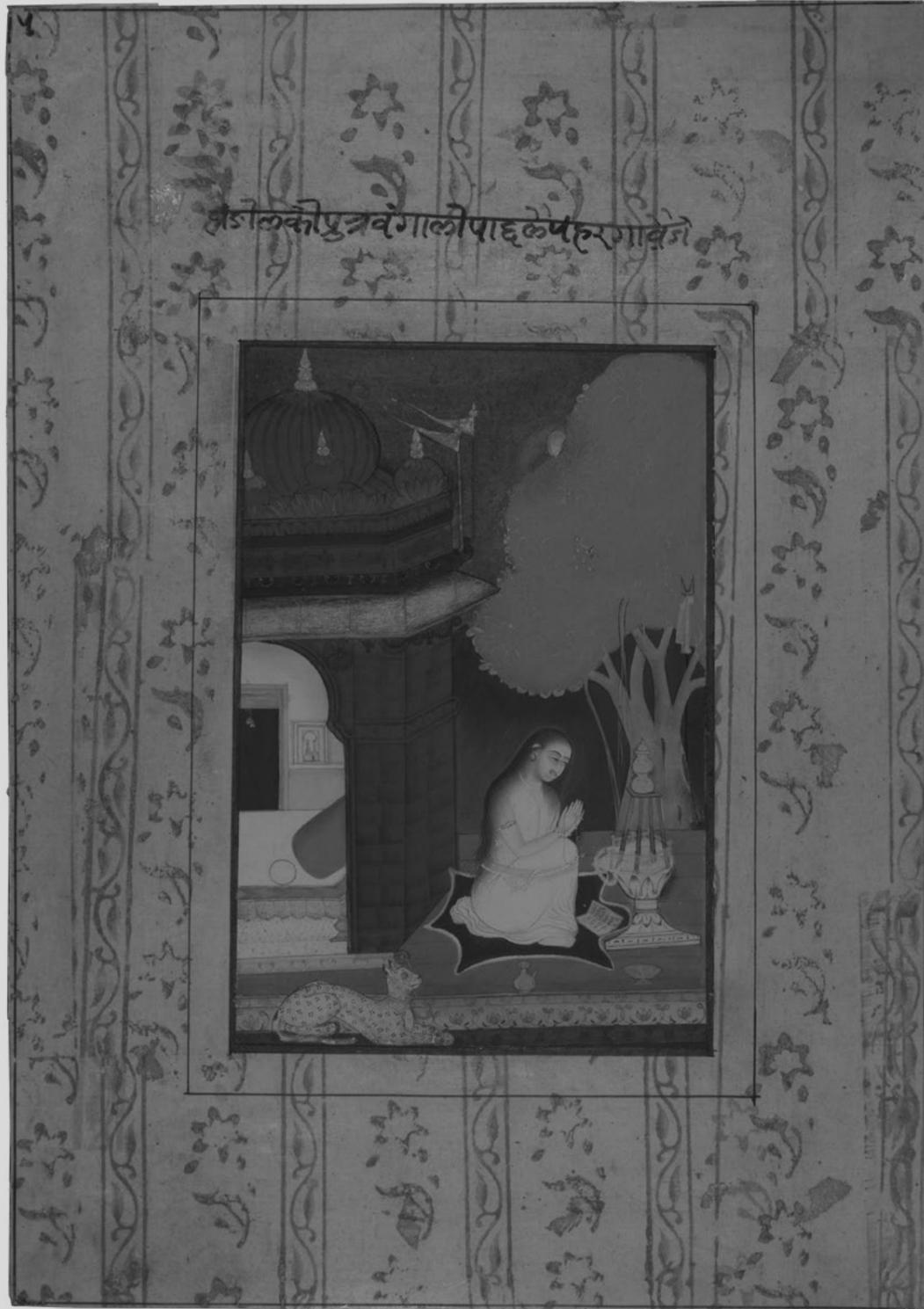
Visible Light (Vis)

Vis uses the same principle as infrared transmission, but with a normal visible light source and a standard camera (without an infrared filter) to capture details.



Ultraviolet Image (UV)

The pigment *Goguli* (or Indian yellow) fluoresces under UV light. It often appears mixed with other pigments, such as blue to make green, and is applied in thin layers, for example on the bricks of building.



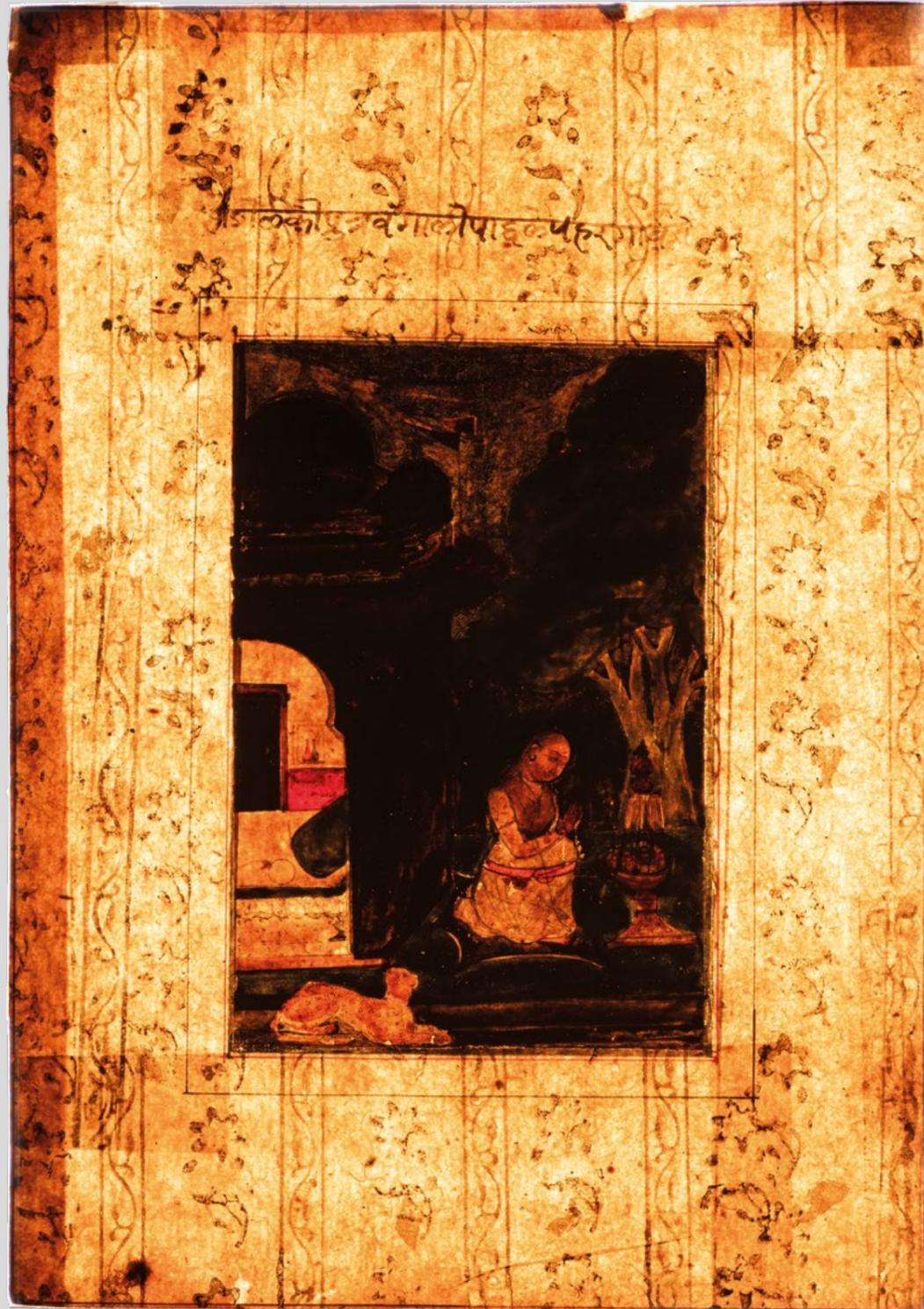
Infrared Reflectography Image (IRR)

This image helps in understanding the final lines, forms, and highlights better. It also helps in identifying the strokes and brushwork of the painter.



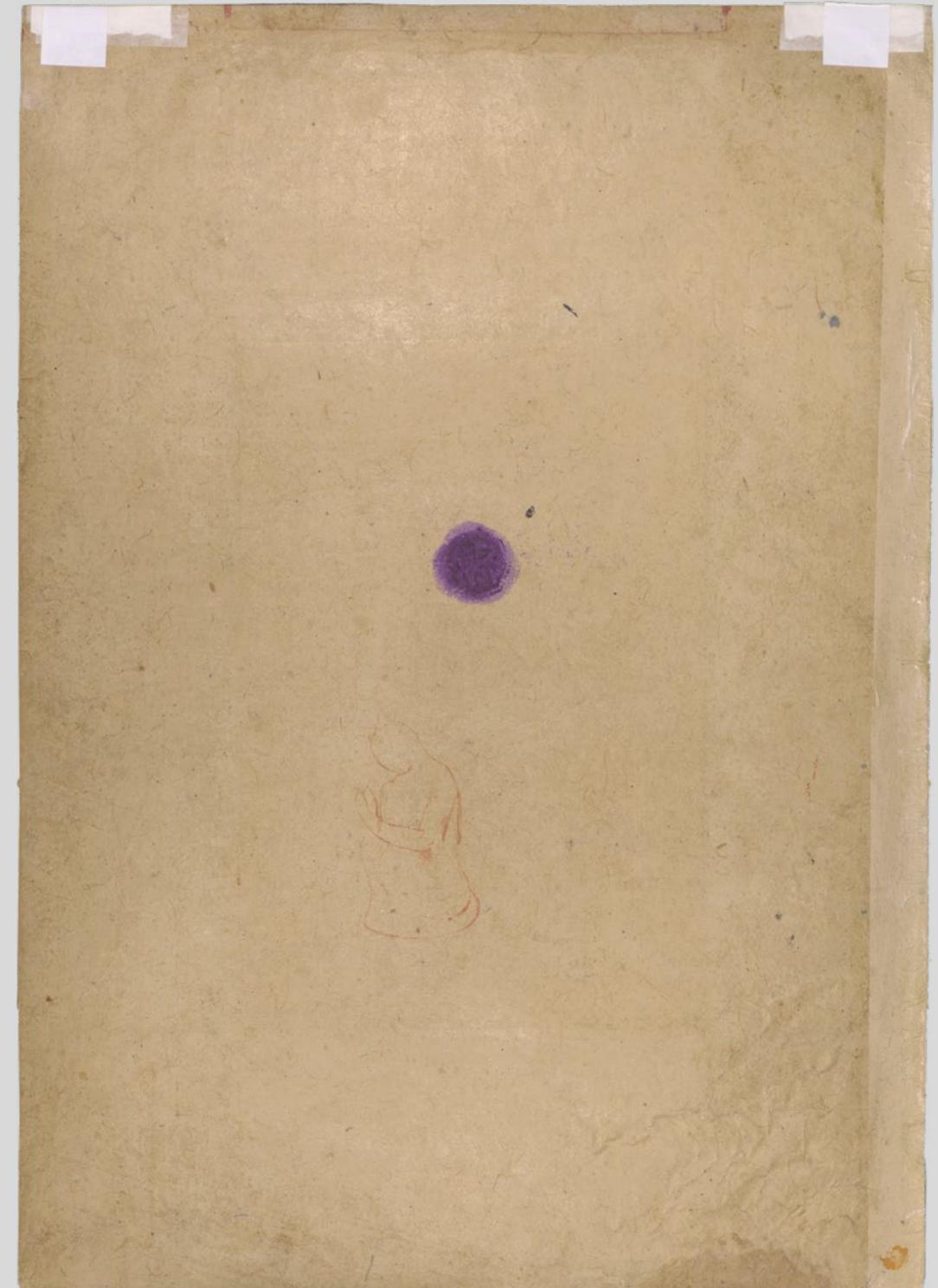
Infrared Transmission Image (IRT)

This image reveals the underlying drawings as well as the overall structure of the painting. It also makes visible the edges added at a later stage, which is a distinctive feature of this series.



Visible Light Transmission Image (Vis T)

The underdrawings are clearly visible in this image, showing at least three preliminary attempts before the final composition. The brush movements for colour filling are also evident.



Visible Light Back Image (Vis RS)

The back of the paintings in the series have the smudged seal of a previous owner, along with coloured dots along the edges and faint mirror-image drawings of the figures on the front.



Raking Light Image (Vis SL)

Raking light highlights the undulations where different papers are joined and reveals the layering and texture of applied pigments; it informs about the structure of painting.



Micro Image 1: Detail of the religious mark on the forehead

Thick layers of opaque pigments are evident. The tiny dark spots on the orange areas are a result of light burnishing with a polished agate stone.



Micro Image 2: Details of *Pardaz*, or stippling, and other lines
Different kinds of brushwork are visible: smudged lines (brown lines at the jawline), stippling (tiny brush strokes for shading), thick lines (of the hair), and embossed dot highlights (for the white pearls).



Micro Image 3: Crown of a sleeping peacock
As the peacock sleeps, its neck disappears beneath its wings, while the crown is still visible like a white blossom.



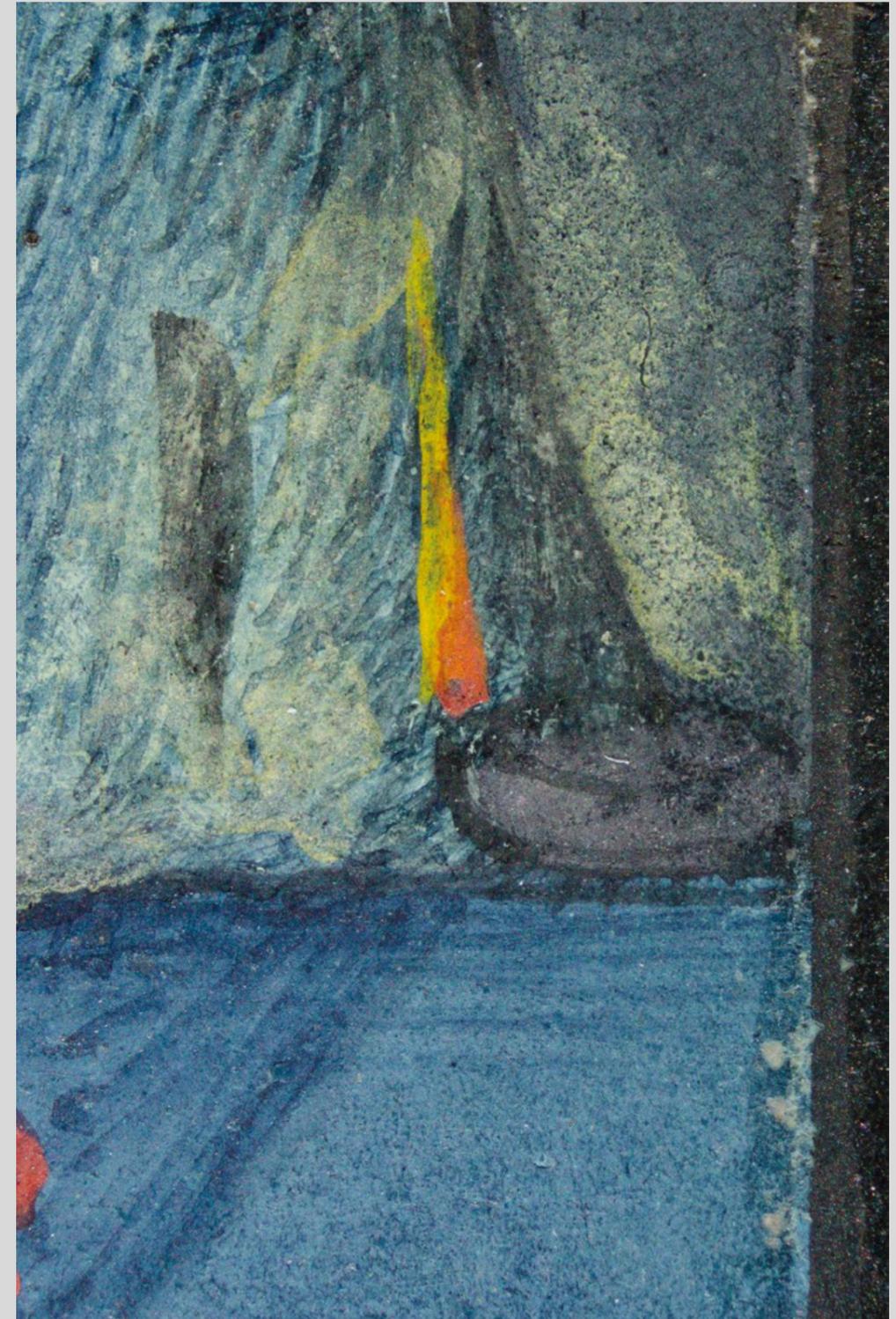
Micro Image 4: Detail of the leopard's face
Within the small face of the leopard, different brushstrokes and layers of colour are visible. The eye is delicately accentuated with touches of gold.



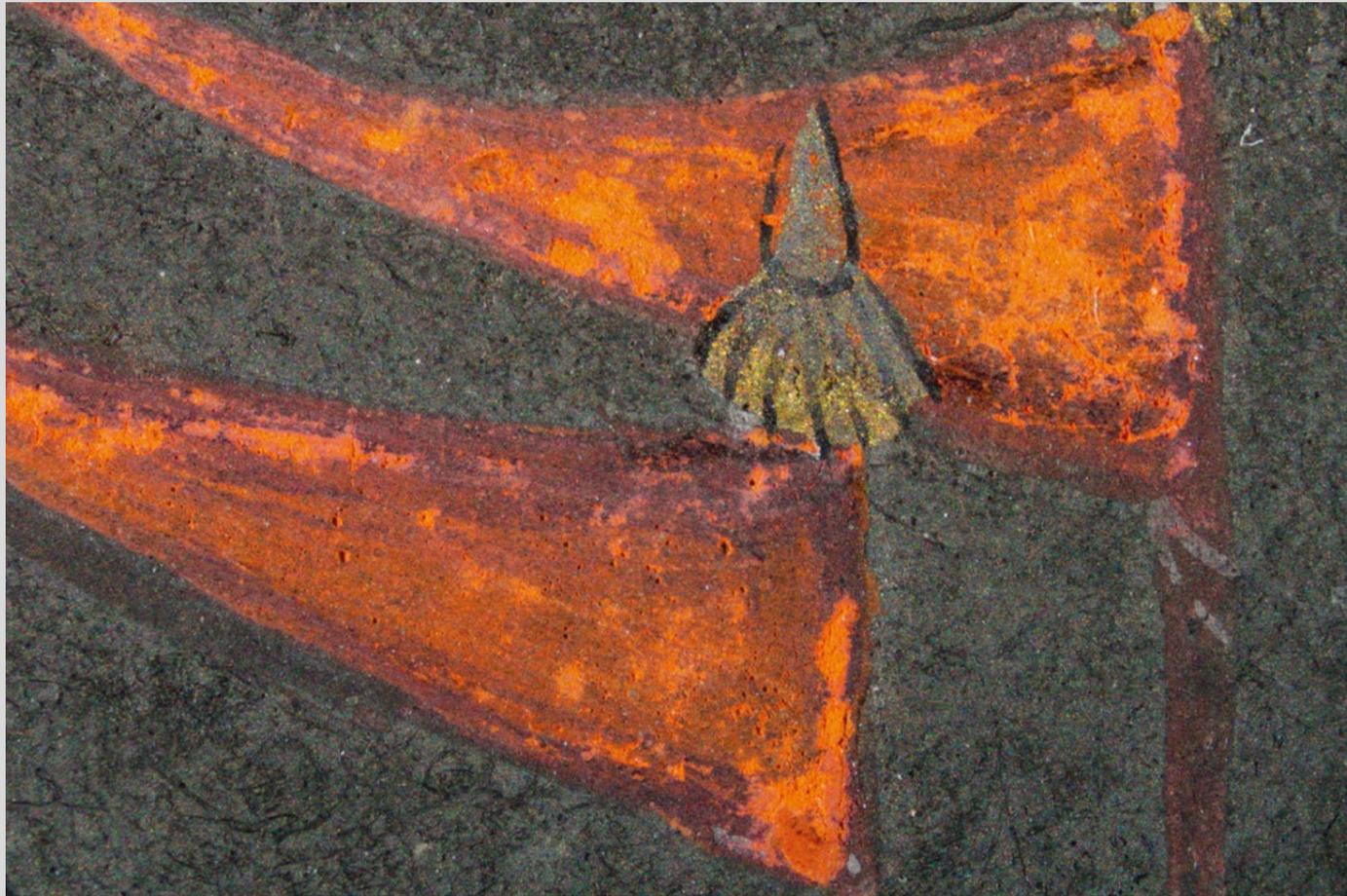
Micro Image 5: Detail of the illegible script,
which most resembles Arabic or Urdu
The open religious manuscript bears an illegible script that appears closer to Arabic than Devanagari.



Micro Image 6: Detail of the pattern on an architectural element
The patterns on the building use pigments in a watercolour-like manner, with details defined by pooling of colour rather than linework.



Micro Image 7: Detail of rays of light emitted by the lamp
The light from the earthen lamp radiates in thin, smudged, yellow strokes, rendered softly against the tree trunk.



Micro Image 8: Detail of damage on the religious flags

The vermilion on the flags, composed of lead-based pigment, has been applied in a thick layer that has oxidised over time. The presence of these flags indicates that the site is a place of religious significance.

Credits

Curators and Researchers: Sonika Soni and Alessandra Vichi (SIK-ISEA)

Head of Collaboration with SIK-ISEA: Caroline Widmer

Technical Images: Stéphanie Vuilleminot (SIK-ISEA)

Text: Sonika Soni, Alessandra Vichi

Design: Helene Leuzinger, Chiara Zarotti