BUDDHA'S WORD

The Life of Books in Tibet and Beyond

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Colours

Paola Ricciardi and Anuradha Pallipurath

Tibetan colour theory, as reported to us by fifteenth-century scholar Bodong Panchen Chogle Namgyal (Bo dong Paṇ chen Phyogs las rnam rgyal), considers the existence of five colours: white, red, blue, yellow and black. All other colours are thought to derive from these five. Historic and contemporary sources, however, also discuss the use of a number of green pigments.

Information on pigments and painting techniques used by artists working in Tibet and in the neighbouring regions is relatively scarce, and the vast majority of it relates to painted scrolls (*thangka, thang ka*) (see Laurenzi Tabasso, Polichetti & Seccaroni 2011). A few scientific studies of pigments on *thangkas* have also been published, in most of which the technical analysis had been carried out on small samples removed from the paintings. These seem to confirm the identity of the pigments used by Tibetan artists as reported by historic and contemporary sources.

Many of these pigments could be sourced from specific regions in Tibet – this was the case for blue azurite and green malachite, red cinnabar and yellow and orange arsenic-based compounds (i.e. orpiment and realgar). The most common pigments, such as red and yellow earths and ochres, yellow dyes and carbon-based blacks, could be sourced from a number of sites in the region. Other pigments were imported into Tibet from neighbouring countries such as Nepal and China, or from India. These include red vermilion, i.e. the synthetic analogue of cinnabar, as well as orange minium, red lac dye and blue indigo (Jackson & Jackson 2006).

A large number of analytical methods are currently used for the technical investigation of cultural heritage objects, including works of art on paper, such as manuscripts and prints. The most sophisticated of these, which are also the most accurate, require taking small samples from the objects. Because of the damage, however small, that this causes to the art object, these methods are more and more often being substituted by so-called non-invasive analytical methods, which do not require sampling and can be used in situ, often without the need even to touch the object. Such is the case of reflectance spectroscopy (Aceto et al. 2014), which was used to analyse the pigments and mixtures used on four pages from a sixteenth-century print of the *Maṇi bka' bum* (Cambridge University Library Tibetan 149).

The beautifully coloured illustrations in this book were hand-painted after the xylographic print had been completed, by two different artists, Khepa (mKhas pa) Dorgon (rDor mgon) and Khepa Drime (mKhas pa Dri med), as mentioned in the colophon. The presence of more than one painter at work is reflected in the analytical results: the four pages subjected to analysis can be separated into two pairs (fols. 319r and 320r vs fols. 370v – 371r) on the basis of the pigments identified.

Both artists used cinnabar (or vermilion), possibly mixed with a small amount of a red earth, to paint red areas. Green areas were painted with mixtures of indigo with yellow pigments, probably different on the two sets of pages, which the spectroscopic analysis was unable to identify. 'True' blue areas only exist on fols. 370v and 371r, where they were obtained with azurite; the greenish-blue hues on fols. 319r and 320r were instead obtained by either mixing or, more likely, layering azurite and indigo. The identification of yellow pigments was possible by combining the spectral results with images obtained under ultraviolet illumination: the yellow areas on fols. 370v-371r show a strong luminescence emission, suggesting the presence of an organic dye. The lack of emission on the other folios, in addition to the spectral features of the yellow areas, suggests instead the use of orpiment.

These very preliminary results highlight the

Anuradha Pallipurath
carrying out spectroscopy on Tibetan 149
Cambridge, 2012.
Photograph by Hildegard Diemberger

potential of non-invasive scientific analysis as a tool to further our knowledge of the materials and painting techniques of Tibetan artists. Further analysis of a greater number of pages from Tibetan 149 may well allow authorship of the decoration on each of them to be assigned to one or the other artist.

A Tibetan manuscript, preserved at the Cambridge University Library (Add. 1666), was also analysed with reflectance spectroscopy and the results of the technical investigation will be published soon (Ricciardi & Pallipurath forthcoming). Additionally, if a substantial corpus of Tibetan manuscripts and prints were to be analysed in the future, we may well be able to start generalising the results obtained so far and exploring the relationship between artists working in Tibet and in neighbouring countries, based on their use of certain painting materials and artistic techniques.

Results of pigment analysis on four pages from Tibetan 149.
From top to bottom: fols. 319r, 320r, 370v and 371r.
A=azurite, C=cinnabar/vermilion, D=organic dye, I=indigo, O=orpiment, Y=unidentified yellow pigment(s)

Soot from burnt Pine wood (*merang or thangshing*)
Southern Solu, Nepal
Collected and donated by Kulung Karma, December 2013
Private Collection
Photograph by Hildegard Diemberger, December 2013