The History of the Colour Reproduction of Artwork

Daniele Torcellini

CREATE
Colour Heritage & Conservation
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From black and white to colour
The academic opinion regarding the colour reproduction
The differences between the concepts of “reproduction” and “translation”
The development of colour photography
The technology of colour photography, selection negatives
The technology of colour printing, three colour printing process
The first application of colour photography to artwork reproduction
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Is the reproduction of artwork an art expression itself?

We can easily recognise the artistic quality of the engraving, the etching or the black and white photography even when these techniques are applied to the artwork reproduction.

What happens when we move to the field of the colour photography?
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- engraving
- black and white photography
- colour photography
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In 1946 M. J. Friedlander wrote in his book *Von Kunst und Kunnershaft* that black and white photos should be preferred because they cannot be mistaken for the original paintings. They should be used solely to realistically recall the originals and should not be used in critical research.

R. Longhi, in the middle of the century, was one of the few critics to consider the importance of creating accurate colour reproductions of artwork. In some papers, he wrote that the critic’s eye could be educated to use the new photographic techniques as it had already been educated to use black and white takes, predicting that, in the years to follow, important publications and university lessons would be illustrated in colour.

In 1963, E. Wind compared black and white reproduction to a reduced orchestra playing an orchestral score; he also compared colour photography to a reduced orchestra but with all the instruments out of tune.
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Photography is a code in which the object of art is transcribed, so it might be better to speak about “translation” rather than “copy”. Undoubtedly, images produced by photography are not the real object, but they can supply some information of the real objects, though altering some characters of it.

The code of the original object is defined by the brushstrokes on a canvas and the pigments in an oily binder, the code of the final object will be defined by the colour separation negatives, the printing using the three colour process, the chemical inks, the gloss paper and so on.
The translation will never achieve the same appearance as that of the original object. The translation will never match the original object. But the translation can be used to recall the work of art.

The comparison of the pictures is one of the first tools used by art historians in formulating their critical and historical thesis on a specific painter or a specific age. To compare paintings when they are not in the same location, when they are not side by side, is only possible through the use of reproductions / translations. The more informative the translation is the more successful the comparison will be.
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Since the development of the first photographic processes in 1839, the daguerreotype, the reproduction of colour has been considered an important goal to achieve. The first attempts made in this direction had the aim of reproducing all of the colour nuances by means of a single direct exposure. This was not the right way. The right way for reproducing colour was to use separation negatives.

The trichromatic theory of colour states that only three colours are necessary to produce all shades. These colours can be mixed in an additive or subtractive method. Simplifying, the additive method is the mixture of the lights, the subtractive one is the mixture of the pigments.

In the printing processes this theory was applied, not very successfully, by Jacob Christoph Le Blond in the middle of the eighteenth century. Le Blond’s colour prints were made by superimposing three monochromatic plates: the red one, the blue one, and the yellow one.
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The additive colour mixture

The subtractive colour mixture
Jacob Christophe le Blond
XVIII c.

Three-colour mezzotint
printing technique

The right amount of red, blue and yellow of each colour of the original composition was determined by Le Blond only by means of his eyes and his experience.
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In 1861, James Clerk Maxwell took the first colour photograph using three different selection negatives in black and white, taken through three coloured filters (red, green and blue) and projecting the film-slides through the same coloured lights, superposing one on top of the other.
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original

filters

camera

separation

negatives
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Additive colour mixture
Stages involved

- separation positives
- projection through coloured filters
- superimposition
- coloured image

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Scientists like Louis Ducos Du Hauron and Charles Cros applied the trichromatic procedure to the photomechanical printing processes, making it possible to print full colour photographic images on paper.

One of the first colour photography printed by Louis Ducos du Hauron 1877

coloured edges
Subtractive colour mixture
Stages involved

separation positives
inking matrices
printing the matrices one on top of the other
coloured image
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Art magazines

Around the end of the nineteenth century and in the first years of the twentieth century these technologies encountered the development and the increasing diffusion of art magazine publishing. Art magazines, such as the The Studio (in England), the Emporium (in Italy) and others, began publishing colour reproductions of artwork in the last years of the nineteenth century.
Art magazines

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In 1898 the Istituto d’Arti Grafiche in Bergamo began publishing art-books. The colour images were bought from the publishers Seemann (from Leipzig) and Römmler & Jonas (from Dresden).


In 1904, the Lumières presented the autochrome process at the Academy of Science.

Rodolfo Namias, an Italian scientist and photographer, in the 1911 edition of his handbook of colour photography, *I processi odierni per la fotografia dei colori*, explains the autochrome process in detail and mentions Gaston Braun.

The art photographer adopted the new plates in the reproduction of the masterpieces of Rembrandt, Greuze, Corot and others, reaching magnificent and “perfect” results.

The autochrome could be projected or printed on paper through the Utocolor process. Anyway, in the field of art reproduction, the three separation negatives process continued to be the dominant method for shooting photographs for a long time.
Autochrome (1905 - 1920) after John Singer Sargent (1904 - 1905) watercolour

Arnolde (1869-1942) Genthe
Autochrome after Bernardo Cavallino (1616-1666) painting
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In the first decades of the twentieth century some publishers around the European territory began to publish series of monographic issues dedicated to the most important artists and artistic movements illustrated in colour.

These monographic issues are radically different from the art magazines. Their main features are: large format, a small number of pages (eight to ten), short texts, an artist’s biography or a historical and critical text to introduce the artist, six to eight full-colour plates on the right hand pages, with the titles and a short critical description of the artworks on the left hand pages. The images were printed in a three or four colour process on separate sheets of paper and then glued to the pages of the magazine.
One-hundred Modern Masters
series of issues circa 1904
Istituto Italiano d’Arte Grafiche
Bergamo
The History of the Colour Reproduction of Artwork

Kunstlermappen
series of issues circa 1910
E. A. Seemanns
Leipzig
The History of the Colour Reproduction of Artwork

Die Galerien Europas
series of issues circa 1920
E. A. Seemanns
Leipzig
The History of the Colour Reproduction of Artwork

The Great Masters of Colour
series of issues, circa 1930
Istituto Italiano d’Arti Grafiche
Bergamo

GIOVANNI BELLINI

I GRANDI MAESTRI DEL COLORE

ISTITUTO ITALIANO D’ARTI GRAFICHE - EDITORE - BERGAMO
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La pala è situata in alto di una parte di circa cm. 55, proveniente dalla chiesa di S. Giobbe, dove era collocata già nel 1485, da circa duecento anni fu quindi dipinta intorno al 1480. Raro un cartellone con la firma Giambellino Bellini. Secondo alcuni scrittori, quest'opera dipinta dal Bellini ad alio (1). Ample la letteratura; si parlano Sanudo nella Cronaca, Sabellico, Venier, Sansovino, Ridolfi, Barchini, Zanetti, Croce e Cavalcaselle. Gomma, L. e A. Viantiri, Divisor etc. Si accenna ad una copia di Coton.

La Madonna siade, modesta e mantonata in tessuto raggiungendo un gioiello il foglietto austro, o lati, e i due gruppi, i suoi Francesc, Giambattista, Giobbe, Domenico, Sebastiano, Ludovico. L'azione è suspesa, i gesti minuscoli come conviene a chi si trova in un momento di contemplazione o di preghe, a chi senza la presenza in unità i segni del martirio e della sofferenza, pagan, o strumenti di tortura, a chi a solito con rotazione rapida la regina del tempo, a pregare in un ferro d'oro.

L'ordine, le spiegazioni, l'ambientazione, la figura, le cose di questa scena rappresentano l'appartenere, sono impropri dei nuovi pennini e sentimenti dell'umanesimo. L'ambiente è sostanzioso, regale a vero e l'architettura fatta nel quadro vuole essere presenza e vera come quella della cappella in cui la tavola si alleggerà, sicché il capitello creata, puramente ripiombi il motivo dei diaboli che era nell'alto di S. Giobbe; i suoi segni cromaticamente astrano l'eco dell'alba che accoglie il tramonto, le figure, appena in un proprio attimo con gentil attributi hanno un proprio stato di anima si esprime in un proprio Squisitamente passato dell'unità del quadro, così dalla composizione. l'umanesimo e Rinnovamento sono già in pieno attivo in ogni loro profondi e conseguenze, la luce classica del Mantegna è i suoi libri latini. Anche per coloro che hanno subito le sorti dell'ultima modernità, qui appena chiaramente quanto, nel senso dell'unità del quadro, il Bellini abbia fatto tesoro dell'esempio del grande scultore. Specialmente ora, che fortunati studi e ricerche hanno condotto alla parziale ricostruzione della pala di San Zeno e nel museo di storia dell'arte di Vienna (Inventario, Ottobre 1981, pagina 200), confermante quasi riscoperti frescamente con questa pala monumentale, è essi interpretato.
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In 1935 Kodak launch Mannes and Godowsky’s Kodachrome process. It was a multi-layer process based on the colour development. Blue, red and green sensitive layers.

In 1938 the process was simplified and Kodak introduced Kodachrome in cut-sheet size.

In 1941 Kodak introduced the first colour printing service using a multi-layer print material. Minicolor prints from kodachrome transparencies.

In 1942 Kodacolor negative-film and printing service was introduced in US.

In 1946 Ektachrome (ASA 8) was released in US. It was the first coupler-containing reversal film developed by Kodak.

In 1961 Kodachrome II (ASA 25) film was introduced.

In 1963 a new generation of ASA64 Ektachrome was introduced.

In 1976 Ektachrome Professional Film was introduced.
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The Kodak materials were soon to be introduced in the field of art reproduction, in 1939 by the Color Slide Cooperative. This Cooperative, based in Princeton, was a non-profit organisation with the aim of reproducing artwork for teaching purposes. The first set of slides realized by the Cooperative was made up of 50 slides taken of paintings in the Frick Collection of New York.
Art Education—Equipment

THE PURPOSE AND PROGRAM OF “COLOR SLIDES COOPERATIVE”

BY DONALD N. WILBER, THE IRANIAN INSTITUTE

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In 1953 the Scala Istituto Fotografico Editoriale S.A.S. was founded in Florence by John Clark and Mario Ronchetti and was promoted by the Italian art historian Roberto Longhi.
By using an optical bench in order to realize large format photos, and Ansco film (20 x 25 cm), the Scala company began working with negative films printed on paper. In the following years, this process was substituted with negative/positive films and later Kodak film took the place of Ansco. The company also created film-slides dedicated to the tourist market and universities, using Ferrania negative/positive materials and then, from 1961 on, Kodak film.
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In recent years, several expositions have been organised in which nothing more than reproductions of paintings are exhibited. The first one, in Italy, was Il miracolo di San Samuele (Venice 1979), the painting reproductions were printed in cibachrome, indeed, the purpose of the event was to publicize the equipment designed by Ilford, which prints slides directly on paper.

Il miracolo di San Samuele
(Venice 1979)
Exhibition of photographic reproductions of Italian paintings cibachrome
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Factum Arte is an independent workshop based in Madrid working both with contemporary artists and on the production of facsimiles that can be used for conservation purposes.
The painting has been scanned with a specially made, non contact scanning system (600 dpi with 16 bit depth of colour) and was photographed, using a Phase One H25 digital back fitted to a medium format Hasselblad body (22 megapixel, with a pixel size of 9x9 microns and 48 bit colour).

Particular attention has been paid to colour reproduction. During the recording extensive colour notes were made using a series of colour sticks made on site and matched to specific points on the surface of the painting.

The aim of the colour digital adjustments was to match the colours of an image printed onto gesso using Factum Arte's flatbed printer to the colour sticks recorded in the Musée du Louvre.

Finally the two files were printed in two layers, one on top of the other, beginning with the Phase One file. “The photo data is printed with a richness of colour and a brightness that looks very photographic. The overprinting with the scanner data adds complexity to the tone and produces an image that does not feel like a photograph. When this is mixed with the actual texture on the canvas the illusion, even from close up, is of a painted surface and not of a print”.

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P. Veronese (1528-1588)

*Le nozze di Cana*

Paris, Louvre
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In the table below a brief sampling of printed images in relation to their chromatic variations is shown.

(1) *Tiziano: I maestri del colore*, Istituto d’Arti Grafiche, 1934;
(2) *Enciclopedia Italiana di scienze, lettere ed arti*, Istituto della Enciclopedia Italiana, 1950;
(3) *Tiziano: I maestri del colore*, Istituto d’Arti Grafiche, 1965;
(4) *Tiziano: I classici dell’Arte*, Rizzoli, 1967;
(5) *Tiziano: Amor Sacro e Amor Profano*, Electa 1995, before restoration;
(6) *Tiziano: AmorSacro e Amor Profano*, Electa 1995, after restoration;
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1934  1950  1965  1967


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Tiziano, *Amor Sacro e Amor Profano*, different images before and after restoration.


Thomas Struth
(German, born 1954)
San Zaccaria, 1995
Chromogenic print
181.9 x 230.5 cm
The work of the German photographer Thomas Struth is an interesting intersections between art and art reproduction.

The photographic images are works of art in which the artist interprets other works of art reproducing them in their proper context.