PHOTOGRAPHS

5.2.2 Types of Photographs, part 2: Color

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COLOR PHOTOGRAPHY

The desire to depict photographic images in color has existed since the invention of the medium. Many different techniques were developed, each with its own unique aesthetic and varying complexities. It wasn't until the introduction of chromogenic color in the 1930s that accurate color photography was made widely available. There were many intriguing and lovely color processes invented along the way. The list below discusses some of the most common of these. Please note, while some major manufacturers and tradenames are listed below, the list is by no means exhaustive.

DEFINITIONS

Additive color: Color that is based on combinations of red, green, and blue (RGB), which when combined together result in white. Additive color requires light to pass through the object being viewed. Additive color photographs are usually on transparent supports and require a transmitted light source for viewing. Familiar technologies that use additive color are phone screens and computer/television monitors. Under magnification, one can see red, green, and blue dots or lines.

Subtractive color: Color that is based on combinations of cyan (C), magenta (M), and yellow (Y), which when combined together result in black. Subtractive color requires light to reflect off of the object and can be used with opaque or transparent supports. Subtractive color theory was dominate in 20th century color technology and is still used today in digital output media (e.g. color inkjet printing).

Image material: Although most color processes are based on silver halide chemistry, the final image material is primarily made up of either pigments or dyes. Pigments tend to be large, stable, and opaque particles, while dyes tend to be small, fugitive, and transparent particles.

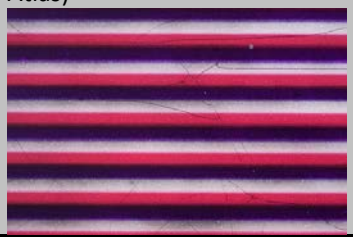
Misregistration: Some photographic processes, such as dye imbibition prints and pigment processes, have the layers of color applied separately to the final support, and they may not be perfectly aligned. As a result, a single color may be visible at the edges of an area made up of multiple colors.

IDENTIFICATION

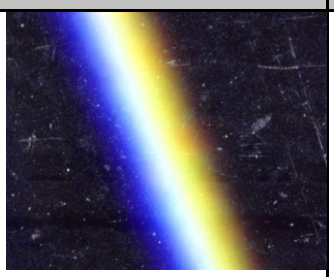
The following are the most important features used to identify a type of color photograph:

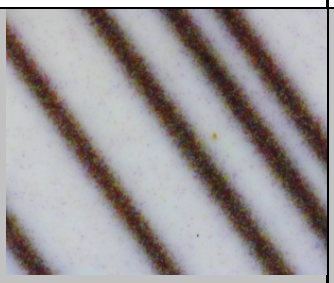
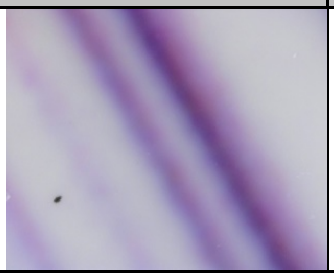
1. Positive or negative
2. Nature of support material
3. Format
4. Texture and surface quality
5. Color and tone
6. Characteristics of deterioration
7. Manufacturers' back printing

ADDITIVE PROCESSES (DYE BASED)

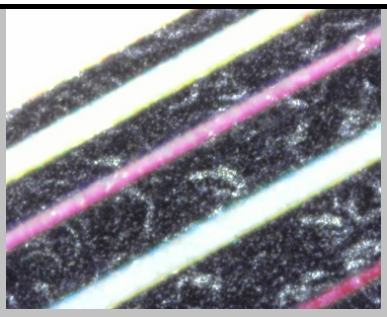
Technique	Commercial Names	Support	Dates	Image at 235x magnification	Identifying Features
Additive color screen processes	Autochrome, Agfacolor, Dufaycolor, Finlay Color, Joly, Paget Color	Glass or plastic	1890s – 1940s	Autochrome Plate  Joly Plate (photo from Graphics Atlas) 	• Silver gelatin image viewed through a screen • Repeating geometric or random pattern of RGB dyes, visible under magnification • May be varnished • Are bound with black paper tapes at the edges with cover glass

SUBTRACTIVE PROCESSES (DYE BASED)

Technique	Trade Names	Support	Dates	Image at 235x magnification	Identifying Features
Chromogenic	Transparencies: Kodachrome, Ektachrome, Agfacolor Neue Prints: Minicolor, Kodachrome, Kodacolor, Gevacolor, Fuji Crystal Archive, Kodak Endura	Cellulose nitrate, pigmented (white) cellulose acetate, fiber based paper, and resin coated (RC) paper	Transparent support: 1935 – present Prints: 1942 – present (many brands are no longer manufactured)	Chromogenic print on RC paper  Chromogenic 35mm slide 	• Action of light on silver halides to create layers of gelatin colored with dyes to CMY (silver removed during processing) • Light and dark fading possible; loss of C&Y during dark fading; loss of M&C during light fading • Yellowing from dye coupler staining in the highlights (especially prints pre-1954) • Prints made after 1990 tend to be much more stable • Most common 20th century color process
Dye Imbibition prints	Dye Transfer (Kodak), Flexichrome, Eastman Wash-off Relief	Baryta paper	1946 – 1993		• Silver gelatin image used to make separate matrices to apply dye color layers (usually CMY) imbibed into a gelatin coating and transferred onto a paper • Bright whites • Registration marks may be visible in the border, may see slight misregistration of color layers • Pre-1989 magenta dye fluoresces in UV • Excellent dark stability

					• Most common as fine art and advertising
Silver Dye Bleach	Film: Gasparcolor Print: Utocolor, Cibachrome, and Illfochrome	Polyester or resin-coated (RC) paper	1906 – present		• Action of light on silver halides to bleach layers of gelatin colored with dyes to CMY (silver removed during processing) • Usually very high gloss • Boarders will usually be black if they are visible • Printed from a positive transparency • Base is white plastic • Sharp stable images; high color saturation
Dye Diffusion	Polaroid, Peel-Apart, Polarcolor, Polarcolor II and Integral (SX-70), Fuji Instapix	Various plastic and/or paper	1963 – present		• Soft diffuse lines under magnification • Integral has plastic border around image • Peel-apart may have adhesive residues at border, slight relief, and clear coating on top

SUBTRACTIVE PROCESSES (PIGMENT BASED)

Technique	Commercial Names	Support	Dates	Image at 235x magnification	Identifying Features
Pigment Process	Fresson, UltraStable, carbon, carbro, gum dichromate	Paper or plastic	1890s – present		• Little fading, excellent dark stability • Slight relief (whites are support base) • Pigments held in gelatin (most common) or gum arabic; • May have misregistration of color layers • May have delamination of color layers

REFERENCES/RESOURCES

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