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Roger Fenton, *Portrait of Prince Alfred,* 1854. Salt print on paper. Accessions Committee fund: gift of Barbara and Gerson Bakar, Emily L. Carroll, Leanne B. Roberts, Helen and Charles Schwab, and Judy C. Webb, 95.129

Anna Atkins, *Ceylon,* ca. 1850. Cyanotype. Accessions Committee Fund, 2002.50

Unknown, *Untitled,* ca. 1850. Hand-colored daguerreotype. Gift of Robert Harshorn Shimshak and Marion Brenner, 2005.356

Eugène Durieu, *Draped Nude,* ca. 1855. Albumen print. Accessions Committee Fund, 97.449

Unknown, *Untitled,* ca. 1860. Hand-colored ambrotype. Gift of Robert Harshorn Shimshak and Marion Brenner, 2005.361

Unknown, *Untitled,* n.d. Tintype. Gift of Gordon L. Bennett, 2004.404

SALT PRINT

William Henry Fox Talbot first introduced salt prints in 1839. They are made by immersing ordinary writing paper in salt water and then coating one side with a solution of silver nitrate, thereby embedding light-sensitive silver chloride in the paper's fibers. A negative is placed on top of the sensitized paper and exposed to sunlight until an image appears. The print is then made permanent with sodium thiosulfate (hypo) and can be toned for greater permanence and richer hues. Occasionally the paper is pretreated with a thin coating of albumen, which makes the surface slightly glossy. Because multiple salt prints can be made from a single negative, this process made it feasible to publish them in photographic albums and books.

CYANOTYPE

Cyanotypes were first introduced in 1842 by Sir John Herschel. They are made by brushing ordinary paper with an iron-salt solution that produces bright blue pigments when exposed to light. Once dry, the sensitized paper is placed in sunlight in contact with a glass plate negative or other image source, such as a plant specimen, until the image appears on the paper. The paper is then washed in water to stop development. The materials used to make cyanotypes are essentially the same as those used today to reproduce architectural blueprints.

DAGUERREOTYPE

In 1839 Louis-Jacques-Mandé Daguerre publicly announced a method for automatically reproducing an image of the world. The daguerreotype, as Daguerre named his invention, consists of a highly polished, silver-coated copper plate that is made light sensitive with iodine vapors. When exposed to light in a camera and developed with mercury vapors, a frostlike image appears that can be permanently fixed in a chemical bath. The delicate plate is usually displayed behind glass in a booklike miniature case to protect it from abrasion or tarnish. Because the process does not involve creating a positive image from an original negative, daguerreotypes are always one of a kind.

ALBUMEN PRINT

Widely used until the 1890s, albumen prints are characterized by their glossy surfaces and sharp image definition. They are made by floating thin paper in an egg-white (or albumen) mixture containing salt. This mixture coats the paper, giving it a smooth, glossy surface when dry. The paper is then made light sensitive with silver nitrate and exposed to sunlight in contact with a negative, which is typically made of glass or waxed paper. The resulting image is permanently fixed by bathing the paper in a solution of hyposulfite and water. Toning during processing, often with gold chloride, yields variations in color and makes the image more permanent.

AMBROTYPE

Ambrotypes are named for James Ambrose Cutting, who popularized the process during the 1860s in the United States. A glass plate is coated with collodion (gun cotton dissolved in ether) and dipped in a silver nitrate bath, making it sensitive to light. While it is still wet, the plate is exposed in a camera and developed to produce a negative with whitish tones in the light areas and clear glass in the dark areas. Backed with an opaque coating or viewed against a dark background, the areas of light and dark read as positive. Ambrotypes do not originate from negatives and are thus unique objects. They require protection in miniature cases because the glass plates and collodion emulsion are extremely fragile.

TINTYPE

Tintypes were very popular in America in the 1860s. They are produced on thin sheets of iron coated with an opaque black or brown lacquer. The lacquered metal is made sensitive to light with collodion containing silver salts and then immediately exposed in a camera and developed. The process is essentially the same for producing a collodion negative, and, in fact, tintypes are negative images; it is the dark, lacquered background that produces the effect of a positive image. Tintypes were often placed in decorative frames or miniature cases like those used to protect daguerreotypes and ambrotypes. Hand painting was frequently employed to compensate for their lackluster tonal range.

William James Stillman, *North Porch, Erechtheion, Acropolis, Athens,* ca. 1868. Carbon print. Gift of Gordon L. Bennett, 2004.698

CARBON PRINT

Alphonse-Louis Poitevin patented the carbon print process in 1855. These prints are made by coating a tissue with a gelatin solution containing light-sensitive potassium bichromate and pigment, usually carbon black. The sensitized tissue is placed in contact with a negative in direct sunlight, and the gelatin hardens in the exposed areas. The tissue is then pressed against a second sheet of paper that has been coated with insoluble gelatin; both sheets are soaked in warm water, and the original tissue and any areas of unhardened gelatin float free. The image is left on the second sheet, which is immersed in water containing alum to further harden the remaining gelatin. The transfer from the tissue to the second sheet reverses the image, an effect that can be counteracted by inverting the negative at the time of exposure or by making a second transfer at the end of the process.

Amelia Bergner, *Photogram of Leaves,* ca. 1877. Chromate-based printing-out print. Accessions Committee Fund, 2006.12

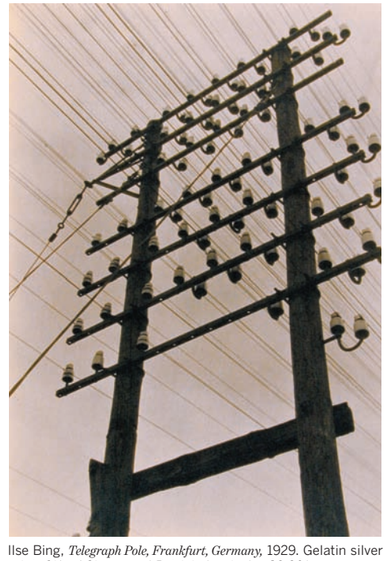
CHROMATE-BASED PRINTING-OUT PRINT

In 1839 the Scottish photographer Mungo Ponton discovered an inexpensive new photographic process that relied on the light sensitivity of potassium bichromates (then known as chromates) rather than silver. His discovery spurred the invention of many other related processes such as the carbon print. The approach involves coating a sheet of paper with a gelatin solution containing light-sensitive chromates. The sensitized paper is placed in contact with a negative or other image source in direct sunlight, and the gelatin hardens in the exposed areas. When rinsed in water, the unhardened gelatin dissolves, leaving behind an image created by the areas of hardened gelatin. The unusual pale, bluish green color of the prints may be caused by pigments or by a chemical reaction between the chromates and the paper.

Alfred Stieglitz, *Marie Rapp,* 1916. Platinum print. Purchase, Alfred Stieglitz Collection, 52.1801

PLATINUM/PALLADIUM PRINT

Platinum prints are made using paper that has been treated with a solution of potassium chloroplatinate and iron salts. The paper is placed in contact with a negative and exposed to light until a faint image appears. The print is then developed in a solution of potassium oxalate that dissolves the iron salts and reduces the chloroplatinate to platinum in the exposed areas. Platinum prints were popular from the 1870s until the 1920s, when the price of platinum rose sharply. Palladium prints, which are essentially the same but use the metal palladium instead of platinum, or in combination with platinum, presented a cheaper alternative. Both types of prints are valued for their permanence and subtle tonal range.



Ilse Bing, *Telegraph Pole, Frankfurt, Germany,* 1929. Gelatin silver print. Gift of Simon and Patricia Lowinsky, 82.301

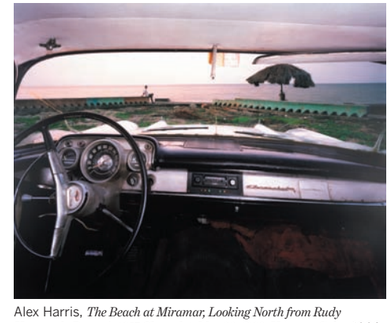
GELATIN SILVER PRINT

First introduced in the 1870s, gelatin silver prints are still widely used today. Manufacturers offer a range of different black-and-white gelatin silver papers, all of which are coated with an emulsion of gelatin and light-sensitive silver salts. After the paper is briefly exposed to light through a negative, normally in a darkroom using an enlarger, a chemical developer renders the latent image as reduced silver, which is then fixed and washed. Twentieth-century photographers have made creative use of the silver print's exquisite tonal range, ability to reproduce fine detail, and malleability in the darkroom.

Shizuka Yokomizo, *Stranger No. 1,* 1998. Chromogenic print. Purchase through a gift of Mary and Thomas C. Field, 2005.283

CHROMOGENIC PRINT

A chromogenic print is a color photograph comprised of at least three emulsion layers containing silver salts. Each emulsion layer is sensitive to a different primary color. After the paper is exposed—usually to a negative—and developed, a colorless silver image forms in each layer. The addition of dye couplers, which chemically bind with the products used to develop the silver images, forms dyes of the corresponding colors in each emulsion layer. When the print is permanently fixed, the remaining silver is bleached and dissolved out of the print. Viewed together, the three layers appear as a full-color image.



Alex Harris, *The Beach at Miramar, Looking North from Rudy Hermando Ramos's 1957 Chevrolet, May 20, 1998, Havana, Cuba,* 1998. Ink-jet print. Members of Foto Forum and Accessions Committee Fund, 2006.17

INK-JET PRINT

Ink-jet prints are generated by computer printers. A series of nozzles spray tiny droplets of ink onto paper in a precise pattern that corresponds to a digital image file. Various methods for forming the ink droplets have been developed over the past thirty years. Two different technologies are commonly used by printer manufacturers today: the thermal bubble (or bubble jet) and the piezoelectric method. In thermal ink-jet printers, heat causes the ink to form bubbles, which push their way out of the spray nozzles and onto the paper. In piezoelectric ink-jet printers, an electrical current charges a piezo crystal, creating vibrations that force ink out of the nozzles. These technologies, as well as the introduction of specially designed papers, have greatly improved image sharpness and resolution.