NATIONAL PARK SERVICE
DEPARTMENT OF THE INTERIOR

Conserve O Gram

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Caring For Blueprints And Cyanotypes

The bright blue *blueprint* or *cyanotype* process was developed in 1842. It was first used to record herbarium specimens without benefit of a camera. The specimens were placed directly against sheets of paper impregnated with chemicals and exposed to light. These cameraless images were most common between 1842 and 1860, although some later artists and scientists also produced them.

Between 1880 and the 1920s the process became popular for producing prints from photographic negatives called cyanotypes (cyan means blue). The most common use of the process occurred between 1890 and the present, when it was used for producing copies of architectural and engineering drawings, called blueprints. Many architects of the last hundred years used blueprints to reproduce their working drawings, and many amateur and professional photographers used cyanotypes to produce draft copies of photographic prints.

Appearance and Deterioration

Both blueprints and cyanotypes have bright blue image detail with white highlights on smooth matte-surfaced uncoated paper. However, if the images were photographically reversed, they may have white image detail with blue highlights. These reversed images are sometimes labeled with their alternative names *ferroprussiate prints* or *pellet process prints* or the technical process name *photogram*.

Blueprints most often reproduce architectural or engineering drawings, diagrams, and plans. They are often discovered in construction files, oversized map cases, and maintenance records. Cyanotypes are photographs usually housed unframed with other photographic prints. When blueprints or cyanotypes are made without cameras they may also be labeled as photograms. These cameraless images are most commonly a ghostly white reproduction of plant specimens or objects on a brilliant blue background—a reverse image of most cyanotypes— housed with photographs or scientific illustrations.

Both blueprints and cyanotypes are produced using light-sensitive iron salts that lodge deep in the uncoated paper. The paper fibers of blueprints and cyanotypes are visible under 30-power magnification. Due to their acidic nature, cyanotypes and blueprints are frequently brittle and may have some brown staining, or foxing, that results from mold growth around minute metal particles in the paper. Despite these problems, blueprint and cyanotype images are usually stable and can maintain a surprisingly bright image.

Blueprint and cyanotype images commonly fade when:

- placed in an alkaline (buffered) environment. An alkaline or buffered environment causes blueprints and cyanotypes to lose image detail and density. The images first turn yellowish-brown before eventually fading to white.

- exposed to light. Original blueprints and cyanotypes should not be used in exhibitions.

NOTE: Surprisingly, images that have faded or lost image detail due to light exposure can recover image density over time if they are stored in the dark in a neutral, non-buffered environment.

Housing Blueprints and Cyanotypes

Since blueprints and cyanotypes can be damaged by both light and an alkaline environment, blueprints and oversize cyanotypes should be housed flat in unbuffered, neutral-pH folders, within metal map cases or within shallow solander-type unbuffered boxes. Cyanotypes that are 8" x 10" or less may be housed upright on their edge within an unbuffered, neutral-pH four-flap sleeve, then in an unbuffered folder, and finally in boxes like other photographs. Use unbuffered folder stock that is high alpha cellulose and low-lignin.

Because of their brittleness, blueprints and cyanotypes tear easily. Each blueprint or cyanotype should be housed in its own individual folder that is unbuffered, high alpha cellulose, and low-lignin. If, for reasons of economy, this is not possible, use unbuffered neutral-pH tissue paper to separate individual images from each other and from their folder. ***Never use buffered, glassine, or ground wood housing materials.*** Avoid placing more than three oversize items in a folder because of their fragility. Rolling blueprints or cyanotypes on tubes is discouraged because of their brittleness and lack of durability. If rolled they tend to crack and tear.

If blueprints to be rehoused are already rolled or folded you must flatten and unfold them ***only*** if they are strong and durable. Brittle or fragile items should be flattened or unfolded by a conservator. (See *Conserve O Gram* 13/2, How to Flatten Folded or Rolled Paper Documents.)

Plastic Sleeves and Encapsulation

Placing the highly acidic blueprints and cyanotype images in a microenvironment that traps the acid next to the paper enhances the paper's brittleness. However, polyester sleeves do have the advantage of limiting contact with an alkaline environment, thus discouraging image fading. Generally avoid encapsulating brittle blueprints or cyanotypes or housing them in any plastic sleeves or folders, including polyester. Polyester sleeves or folders are recommended only if the cyanotype or blueprint is ***not*** brittle but is experiencing fading due to contact with buffered or alkaline materials from which it cannot otherwise readily be separated.

Handling

All folders within a drawer or box should be the same size, regardless of the size of the blueprint or cyanotype in them. This procedure will keep smaller folders from shifting to the back of the map case or box and getting lost or crammed together. Each folder should be carefully labelled near its fold in pencil with the collection name, box or drawer number, accession/catalog number, other identifying number, photographer or artist, subject, date, and any restrictions—particularly those related to fragility.

Since blueprints and cyanotypes lack mechanical strength, they must not be bent, folded, rolled, or moved without a rigid support. Therefore, researchers and staff must remove a folder completely from a map case drawer or box before opening the folder to view an item. When removing a single folder from a drawer or box, support the folder with a piece of acid-free unbuffered board.

Riffling through folders in a map case or box by bending the folders back upon each other can also damage the images. Consider storing folders in a map case with their labeled spines (i.e., the fold portion of the folder) facing the drawer front to discourage browsing. All staff should be warned not to fold or bend these images towards the back of the drawer to speed browsing. Instead, remove the images from the drawer in their folders.

Researchers and staff who work with oversize blueprints and cyanotypes require a large clear work space. The table must be big enough to allow three stacks of folders as well as a writing surface: one stack contains the folders already viewed; a second stack contains the folders to

be viewed; and the third stack is the folders being viewed.

Blueprints or cyanotypes that have original notations or changes by the image creator or the image creator's staff are commonly treated as original records. Such original notations on blueprints are relatively common with working drawings. Many blueprints or cyanotypes have outlasted the original negative or drawing upon which they are based, making them the last record of an image. Last surviving copies should be treated as originals.

Sources

Unbuffered, pH-neutral folders and folder stock; storage boxes and solander-type boxes; and unbuffered, pH-neutral tissue paper are available from archival-quality materials suppliers, such as the following:

Conservation Resources International, 8000-H Forbes Place, Springfield, VA 22151; (800) 634-6932 or (703) 321-7730; Fax (703) 321-0629.

Light Impressions Corporation, 439 Monroe Avenue, P.O. Box 940, Rochester, NY 14603-0940; (800) 828-6216 or (716) 271-8960; Fax (716) 442-7318.

University Products, 517 Main Street, P.O. Box 101, Holyoke, MA 01041-0101; (800) 628-1912 or (413) 532-9431; Fax (800) 532-9281.

References

Coe, Brian and Mark Haworth-Booth. *A Guide to Early Photographic Processes*. London: Victoria and Albert Museum, 1983.

Reilly, James M. *Care and Identification of 19th Century Photographic Prints*. Rochester, NY: Eastman Kodak Publication No. G-2s, 1986.

Ritzenthaler, Mary Lynn, Gerald J. Munoff, Margery S. Long. *Archives and Manuscripts: Administration of Photographic Collections*. SAA Basic Manual Series. Chicago: Society of American Archivists, 1984.

Wilhelm, Henry. *The Permanence and Care of Color Photographs: Traditional and Digital Color Prints, Color Negatives, Slides, and Motion Pictures*. Grinnell, Iowa: Preservation Publishing Company, 1993.

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