

Cyanotype history

Today's photographers manipulate and print images with ease. Given the range of digital processes available, it is easy to forget that only 180 years ago photography as we know it was not even invented.


At that time, the competition to capture the perfect image was intense. Many processes were experimented with and discarded. Some techniques were too slow, others too expensive, and some involved hazardous chemicals. But one technique was so quick, inexpensive and safe that it was nearly disregarded because of its simplicity, the cyanotype.

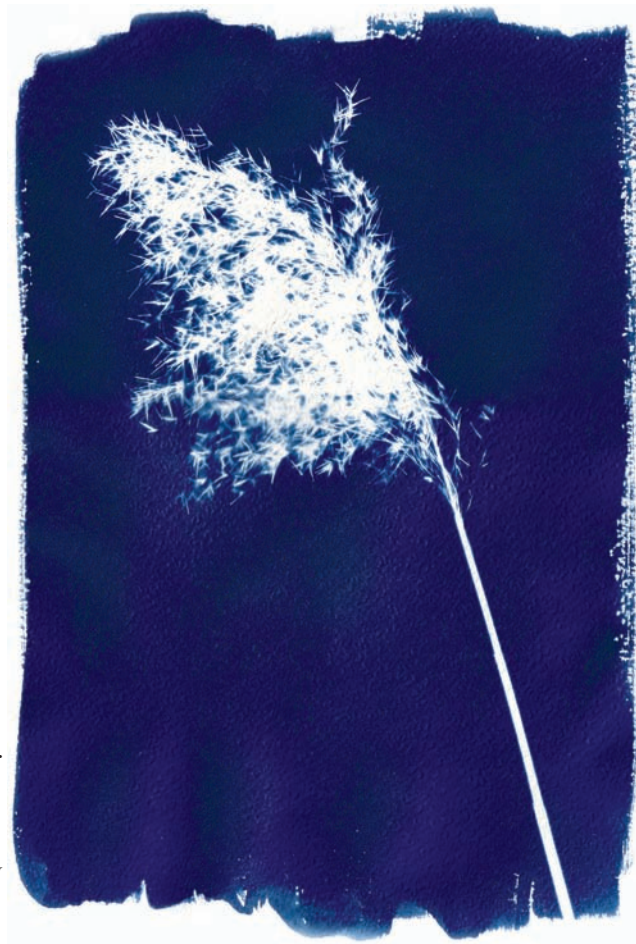
The process was invented in 1842 by Sir John Herschel. He discovered that ferric salts could be combined to create a light sensitive coating. That coating could be applied to paper and used to transfer images. He was able to print the first successful non-silver based photo. But there was one problem. The images were blue. The idea of printing all images in shades of blue was not popular with most photographic pioneers, who were still struggling to perfect black and white.

One botanist, Anna Atkins^[1] produced and illustrated a book of British algae using the cyanotype process in 1843. She felt that this photographic method of illustration was a more accurate method to capture the minute details of the algae than sketching. This was the first book ever made using photographic illustrations. Each book was

handmade. She then went to publish further studies of plants. Eventually, pictorialists latched onto the idea of cyanotypes and a special paper was marketed for them.

Although silver based developing methods became the standard, the ease of use and the affordability of the process set the conditions for cyanotypes to take on other forms and survive. For example, cyanotypes were used as a proofing method for photographers, and also by architects for copying architectural plans. These images had one distinct characteristic, they were blue – the blueprint.

The photography world is changing rapidly and it's uncertain if we'll even have ordinary film cameras in the future. Artists have found a perfect compliment to today's advances in digital technology. The cyanotype process puts the development in their hands. 



Anna Atkins placed plants on cyanotype paper to make prints of them. The image above "Reed in the Wind" is made in a similar fashion.

[1] Anna Atkins (1985) Sun Gardens - Victorian Photograms, Phaidon Press Ltd. A reprint was made in 1985 by Phaidon press, it is unfortunately out of print, but can be found in rare bookshops. I was lucky to find a copy on www.powells.com



"Elderberry" by David W. Riccio © 2004

To make this photogram, David coated half sheets of 140 lb. watercolor paper (a semi-rough surface) in the dark with freshly mixed traditional cyanotype chemistry. The paper was placed flat on a glass plate and coated by pulling a glass rod across the paper in a single pass. The paper dried overnight in the dark. The sheets were then trimmed, stacked and put into a light-sealed bag and pressed under a stack of books to flatten them.

Fresh plant material was collected from an elderberry bush out in back of David's studio. The elderberry was trimmed and arranged on the inside glass surface of a large vintage 1900 contact frame. The contact frame was taken out into the sunlight and placed perpendicular to the sun. Noon sun on a clear mid-May day at about 55 degrees north, and exposed for 30 minutes.

The cyanotype was washed in cold water for about 15 minutes. While still wet the cyanotype was placed face up on a sheet of glass. The glass and cyanotype was placed at a slight incline to the vertical in a sink. The print was then washed in a single steady flow with about a cup of Hydrogen Peroxide (3% strength). This is to deepen the blue and complete the reaction of any remaining chemistry on the paper. The cyanotype was washed again with a gentle stream of cold water for 5-10 minutes and allowed to dry on the glass plate. The print was stacked between new cotton blotters and allowed to dry completely under pressure - using an old plant press.

David says: "I wanted to create images with the same processes Herschel and Atkins used."

*More of David's work can be seen on www.AlternativePhotography.com/artists/david_riccio.html
David's prints can be bought by emailing him on david@lemoncreekdigital.com
or through his website: lemoncreekdigital.com*

The cyanotype

The basic cyanotype recipe has not changed very much since Sir John Herschel introduced it in 1842.

However, some advances have been made by Mike Ware ^[2] in what is referred to as the Cyanotype II process, or the New cyanotype process. Ware's cyanotype formula has less bleed, shorter exposure times and a longer density range than Herschel's, but it is also slightly more complicated to mix and uses more toxic chemicals.

Cyanotypes are also called Blueprints, Sun prints, Ferroprussiate prints and Iron

prints. The natural blue color of the prints is referred to as Prussian blue. Cyanotypes use iron based salts (Potassium ferricyanide and Ferric ammonium citrate) to create blue images. Ferric simply means a compound containing iron and cyan means blue.

Prussian blue

Prussian blue is often called the first of modern pigments. It was made by the Berlin color master Diesbach in 1704 and is referred to as Berliner blue in Germany. It became available to artists in 1724 and has been very popular since its discovery.

The cyanotype process at a glance

The cyanotype process is simple. It can be done easily in a few steps:

Mixing chemicals

The cyanotype is made up of two simple solutions.

- Potassium ferricyanide and Ferric ammonium citrate (green) are mixed with water separately.
- The two solutions are then blended together in equal parts.

Preparing the canvas

- Paper, card, textiles or any other naturally absorbent material is coated with the solution and dried in the dark.

Printing the cyanotype

- Objects or negatives are placed on the material to make a print. The cyanotype is printed using UV light, such as the sun, a light box or a UV lamp.

Processing and drying

- After exposure the material is processed by simply rinsing it in water. A white print emerges on a blue background.
- The final print is dried and admired.

[2] For extensive technical information on cyanotypes, the different formulas and Mike Ware's research, see his book: "Cyanotype: the history, science and art of photographic printing in Prussian blue" by Mike Ware, published by the Science Museum and the National Museum of Photography Film and Television, 1999.



Mixing chemicals

Cyanotype is a very simple process. It involves treating a surface with iron salts that reacts to UV light.

Wear a face mask and rubber gloves when working with chemicals. In this case, Ammonium ferric citrate and Potassium ferricyanide. Two separate solutions are made and then equal quantities of each solution is mixed together in a third container.

Preparing the canvas

Paper, card, textiles or any natural material can be used to print on. Decide how big your print is going to be, and cut your material to size. Make sure your working area is dimly lit, or lit with a low-level tungsten bulb. Once the material is coated, leave it to dry in the dark.



Printing the cyanotype

Print a cyanotype by placing your negative or object in contact with your coated paper or fabric. Sandwich it with a piece of glass. Expose the sandwich to UV light. Natural sunlight is the traditional light source, but UV lamps can also be used. A photogram can also be made by placing items on the surface. Plants, decorative items or other objects can be used to create silhouettes or interesting shapes.



Processing and drying

When the print has been exposed, process it by rinsing it in cold water. The wash also removes any unexposed chemicals. Wash for at least 5 minutes, until all chemicals are removed and the water runs clear. Oxidation is also hastened this way – bringing out the blue color. The final print can now be hung to dry and be admired.



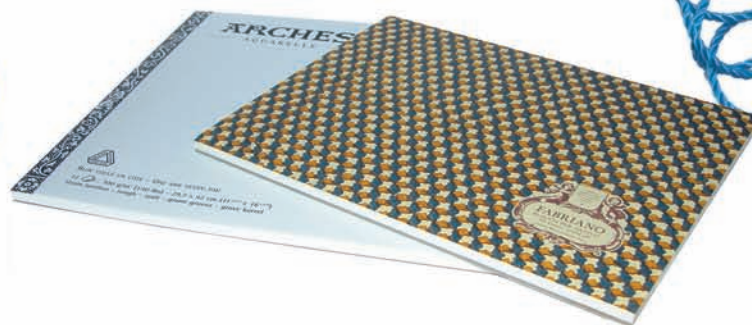
Making a print



What you need

Before you start, get all the items you need together.

- 25 grams of Ferric ammonium citrate (green)
- 10 grams of Potassium ferricyanide
- Water (distilled if possible)
- Scale or measuring spoons
- Measuring jug
- 3 glass containers for mixing ingredients
- Plastic spoons
- Face mask (DIY style)
- Goggles
- Rubber gloves
- Apron or old shirt
- Newspaper to cover work surface
- Cleaning cloth
- Brushes or coating rod
- Clothes pegs (plastic)
- Washing line or rope (plastic)
- Art paper or fabric for coating
- Glass or a contact print frame
- Sunshine or a UV light source



The formula

This recipe makes approximately 50 8x10 inch prints. The cyanotype is made up of two simple solutions:

Solution A: 25 grams Ferric ammonium citrate (green) and 100 ml. water.

Solution B: 10 grams Potassium ferricyanide and 100 ml. water.


If you're working with a different measurement system you'll find a conversion table in the reference section in the back of the book.

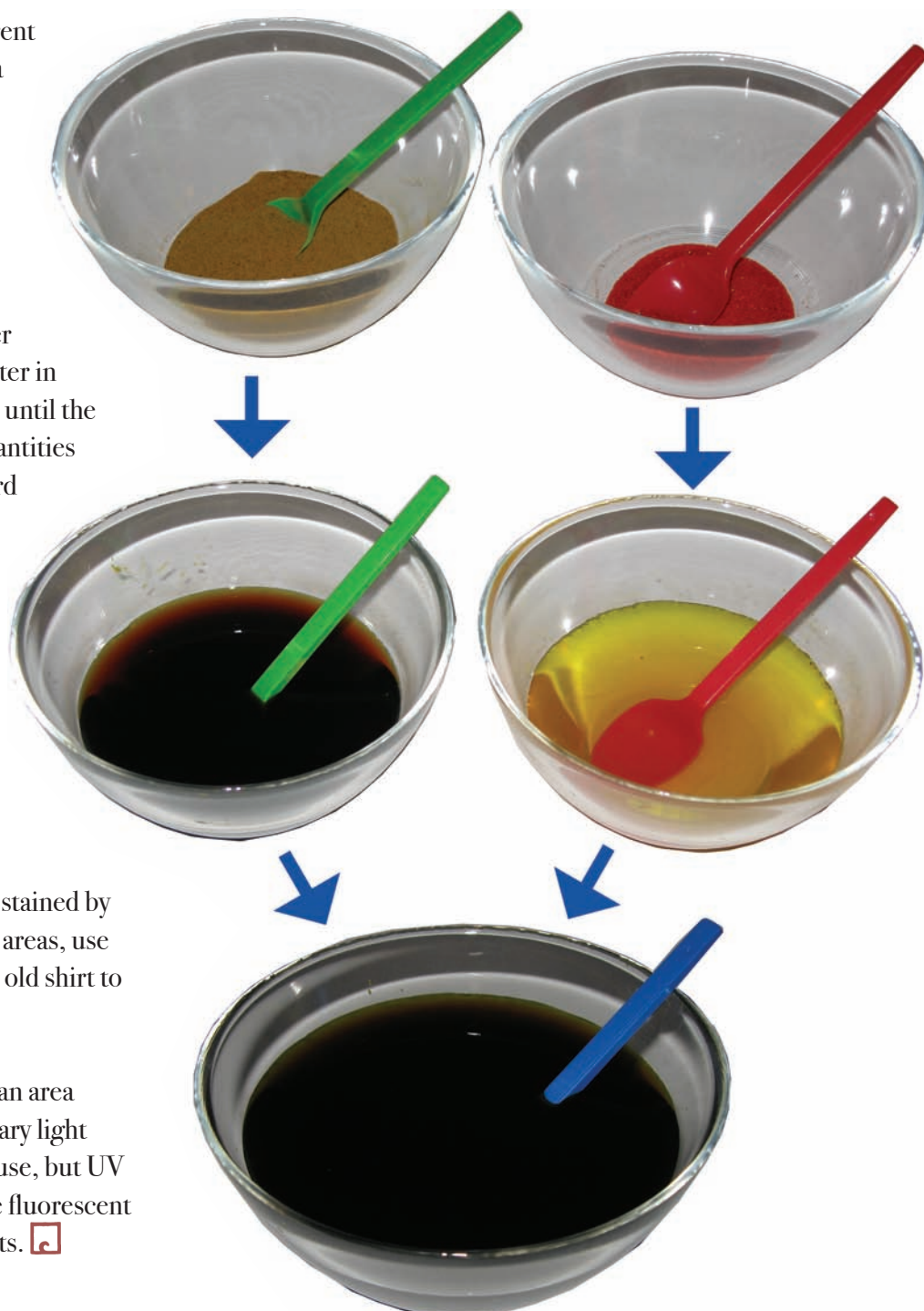
Dissolve the chemicals in water to make two separate solutions. Add Ammonium ferric citrate to water into one container and Potassium ferricyanide to water in another. Stir with a plastic spoon until the chemicals dissolve. Mix equal quantities of each solution together in a third container.

Unused solutions can be stored separately in brown bottles away from light, but will not last very long once they have been mixed.

Your work area

Your floors, carpets, walls, work surfaces, clothes and skin can be stained by the chemicals. Cover all possible areas, use rubber gloves and an apron or an old shirt to work in.

If you have the space, choose an area where you can spread out. Ordinary light bulbs or tungsten light is safe to use, but UV light will affect your prints. Some fluorescent lighting may also affect your prints. 



Preparing the canvas: cloth, paper and natural fibre fabrics

The cyanotype process is very “slow” which means the chemicals take a long time to react to light, so you can use dim lighting when you are coating the material. Since drying the material takes considerably longer than coating it, drying should be done in the dark.

Cyanotypes can be printed on any natural paper, cloth or fabric. Cotton, linen or silk are all excellent canvases. The printing will not work on synthetics, like polyester, since the chemicals won't stick to the fibres in the fabric. A blend of cotton and polyester can work, although the colors may be less vibrant.

Prepare a flat surface for coating with a brush or a rod

Tape some newspaper or manila paper to a flat non-absorbent surface – such as a piece of glass - and tape your paper or material on top of the newspaper.

Then lightly mark the area you want to coat using a pencil and a ruler. Most of the pencil marks will wash away in the final step when you rinse your print.



Tip!

If you're coating a lot of papers of the same size, it may be quicker to cut a cardboard template to the right size, and use this as a "frame" when coating.



"Magnolia" by Anne Storm van Leeuwen ©

Anne took this photo during her last visit to her husband's antebellum family home in Georgia. It is a magnolia from one of the trees on the property. Anne is not from the American South but has lived there for a while now, and she feels that the magnolia is an icon of this region.

The cyanotype was printed on 4x6 inch handmade paper, Abaca/flax blend using the classic cyanotype formula with 1 layer yellow gum bichromate. The original image was taken with a Nikon Coolpix 2500, a negative made in Photoshop and printed on generic overhead transparency material.

More of Anne's work can be seen on www.AlternativePhotography.com/artists/anne_storm_leeuwen.html



"What's on?" by Wendy Currie ©

"What's on?" is an advertising bollard at The University of Melbourne. As soon as Wendy saw it with all its colored posters, she thought it would make a great cyanotype. Wendy visualized it toned & hand colored. Wendy was delighted when it turned out the way she imagined. The image was taken with a SLR camera & the large negative was made from a 6x4 inch colored image using a photocopier onto transparency film (at the time Wendy didn't have access to a darkroom or computer). The contrast was increased and the image reversed creating the negative. Wendy used the traditional cyanotype sensitizer and brushed it on freely as she wanted the brush strokes to be part of the image. She then toned it with tannic acid and sodium carbonate, handcolored using soft pencils smudging the color so there were no hard lines. The work was printed on a cold pressed cream paper. More of Wendy's work can be seen on www.AlternativePhotography.com/artists/wendy_currie.html

Three different coating methods

There are a few different ways to coat your material or paper. Whichever method you choose, remember to stir your chemicals to keep them well blended as you apply them.

The paint method


Using a brush, simply paint the chemicals onto the material. Choose a brush without a metal ferrule, since metal may react with your chemicals. A Japanese hake brush is excellent and will give you a nice even coat. A cheaper bristle household pastry brush, or a foam brush can also work well. Nylon brushes aren't as effective.

With this method it is best to coat the material several times, in both directions, until it is completely covered. Cover an area slightly bigger than your negative. The solution is yellowish green before processing, so it is quite easily seen if you've missed a spot.

You can use the brush strokes around the edges of the print as an effect. Wash your brushes in cold water when you're finished.

The dip method

You can pour out the solution in a tray, and submerge the material. Keep your gloves on and move the paper or fabric around the tray until it's fully saturated. If printing on fabric squeeze as much excess liquid out as possible before hanging it to dry. If printing on paper, drain away as much excess fluid as possible before hanging.

More chemicals will be used with the dip method, but you're pretty much guaranteed an even coating. Just make sure you don't get streaks when you hang it to dry. 

The coating rod method

A coating rod is a very economical way of coating your material since it doesn't retain any chemicals after application. You will be able to do more prints with the same amount of solution.

Use a syringe or a small cup to pour the chemicals onto the rod. Alternatively, pour the solution in a line onto the top of the paper. Pull the rod back and forth a couple of times over the material until it is covered. This method is a little tricky to get the hang of, but once you do, it works very well.

