Making Daguerreotypes

-my first 12 months

by David G. Burder. BSc, FRPS, FBIPP

A professional photographer in London, England, David G. Burder presides over 3-D Images Ltd., specialists in all aspects of Stereoscopic 3-D imaging. Having attended two symposiums held by The Daguerreian Society, David decided to 'have a go' at making his own modern daguerreotypes. We met up with him in Savannah, Georgia during this year's symposium and were astounded to see on view his full colour daguerreotype as well as a Lenticular Stereo Daguerreotype, and to also learn of his world's largest daguerreotype – all by a novice working but twelve months with the process – Editor

This article is probably typical of many enthusiasts who plunge into unchartered waters, and summarizes the foolish efforts of someone who should have known better than to delve into this deeply engaging process, using only published articles as his primary mentor. In my first twelve months, I have had lots of fun and created lots of smells and new friends, albeit to the detriment of a responsible social and business life.

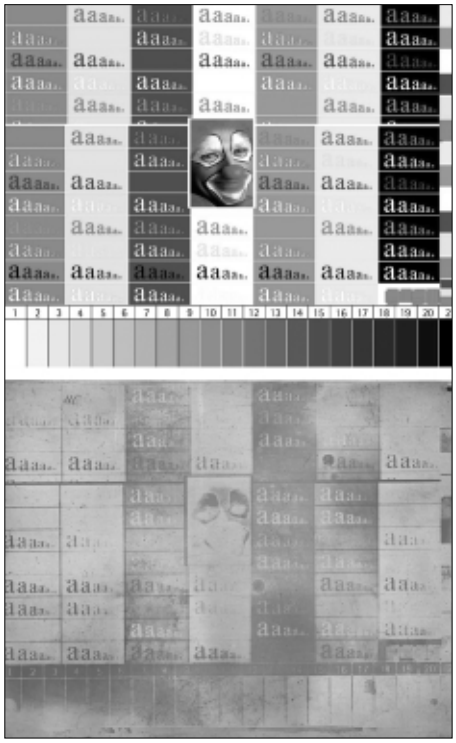
Making my first Daguerreotype

I wanted to prove to myself that Daguerre really could have discovered the existence of a latent image because of a broken thermometer in a cupboard. I found that it really did work, but only on two conditions. Firstly, I needed to over-expose the iodine-sensitized silver plate so much that it was on the threshold of printing out due to exposure alone. Secondly, I had to leave the exposed plate positioned an inch above a bath of Mercury for at least 36 hours before an image appeared. Interestingly, a further two days of Mercury vapor made the image start to look quite reasonable, and even comparable to a hot-Mercury developed daguerreotype. But all of this was far too slow, so I decided on the next safest process: The Becquerel Rubylith process.

The Becquerel Process

This process requires the daguerreotype plate to be coated and exposed as normal and then covered with a sheet of rubylith film through which light can shine onto the plate. The red light develops the latent image. Initially, I was using a Tupperware plastic food container as a fuming box but the leaking Iodine fumes were so awful that I soon invested in a suitable gas mask, plus a much safer pair of beautiful wooden fuming boxes from Gene Galasso. I wish I had seen Charlie Schreiner's "Safety" article a bit earlier.

I tried using projected and contact-printed transparencies as subject matter with the Becquerel (rubylith film) for development. This seemed the simplest and safest method of getting a result. As a wary chemical engineer, I was very keen in a home environment to avoid the potential dangers of hot Mercury development and optional bromine fuming.



PHOTOGRAPH COURTESY DAVID G. BURDER . BSc. FRPS. FBIPP

Colour chart of red, green, blue, yellow, magenta, cyan and black plus grey scale at bottom shows response after 36 hours of development. It required another two days to be fully developed.

Using Meagan's Becquerel article in a Daguerreian Annual as my bible, I struggled through fuming colours, and managed somehow to always achieve an image, initially using newly-silvered glass as my plate.

For consistency and to set up controlled parameters, I bored myself silly by making loads of contact prints from grey scale transparencies. When I had built up confidence on fuming and exposures, I adapted a wet-plate Stereoscopic camera to take 4x5 inch silvered plates of prints and table top subjects.

Silvered plates were a necessity, but until I found a supplier, I tried silvered glass, then silver-plated tea trays, and even silver spoons. Eventually I found a local silver plater who would polish and silver plates for me onto my copper sheets.

Armed with some success, with an old mink stole as a buffing paddle, and my locally-silvered copper plates, I began to wonder what other 3-D Stereo techniques could be applied to the Daguerreian Process.

Contact printing with Becquerel development

Let me mention at this point that 3-D/ Stereoscopy is my passion and profession. I collect and adore Victorian stereo images, especially those daguerreotypes by Claudet and T R Williams. The idea of converting various stereo cards into modern dags really appealed to me. The relative insensitiveness and long development times of the Becquerel process was of no real concern, as long as I could control the inherent contrast gain and solarization which can plague the process.

It was no problem to scan my favorite stereo pairs, both ancient and modern, and output them as grainless transparencies using an LVT film recorder. These were then contact printed under glass, being exposed to daylight or a fan cooled 500 watt Halogen lightstrip, before being developed using the Becquerel process.

It was so exciting to view old and new images presented as Stereoscopic Dags. Subsequently John Hurlock used my same films to create far superior results using Iodine, Bromine and his cold Mercury process.

HELIOCHROME BY DAVID G. BURDER . BSc, FRPS, FBIPP

Heliochrome in colour was in PHSC E-Mail Vol 3-6

Mercury beckons

In my quest for a Mercury-developed image, in January 2003 I visited John Hurlock who, by using his unique cold Mercury development, contacted my film onto the prepared plates. The first subject was a stereo pair of *Queen*, the rock group, which I had shot in 3-D at a concert in the '80's. It is an unusual image but even more relevant as a member of the rock group *Queen* happens to be a Stereo Historian. A special Mascher stereo case with built-in viewing lenses was designed and constructed for the 'Queen' image by Alan Bekhuis of Cased Images.

Lenticular Daguerreotype – a world's first?

To create a daguerreotype 3-D image that would require no viewer at all, I photographed 12 digital views of a unique Silver Microscope at The London Science Museum and converted those files into a lenticular image on film. John Hurlock contacted this (lenticular) image onto a daguerreotype plate and a lenticular lens was applied on top.

I was surprisingly pleased with the results because of the physical stability of the plate and resolution of the image. However, it took time to ensure perfect registration of the lenticular screen without damaging the incredibly delicate surface of the image. This technique is now being repeated using my series of stereoscopic views from a scanning electron microscope.

PHOTOGRAPH COURTESY DAVID G. BURDER . BSc, FRPS, FBIPP

Lenticular daguerreotype with inserted detail

Natural Colour – an attempt at Heliochromes

The claim by Levi Hill that he could produce colour Daguerreotypes, has been challenged for 150 years.

Natural colour daguerreotypes seemed my next challenge, so with the guidance of Darran Green of Lippmann fame, with whom I had shot a stereoscopic Lippmann image of a basket of autumn fare on a tartan rug, I retraced the steps of Seebeck, Chevreul, Niépce and Becquerel. This resulted in producing a fairly natural colour daguerreotype, apparently along the lines of Levy Hill *et al.*, in a single exposure. Although many combinations of chemicals can individually recreate one or more colours, the problem is to reproduce ALL the colours with a single chemical mixture in a single exposure.

From my limited experience, I can not believe that Hill's process would ever have allowed him to take instantaneous portraits as he claimed. I was never able to find or develop a latent image, but turned to exposures that were painfully long. A "breakfast, lunch and dinner" exposure was required if the day was dull. Unlike conventional dags, the surfaces of my heliochrome plates are so resilient to abrasion that you could happily bicycle over them. The colours appear largely true, albeit rather subdued.

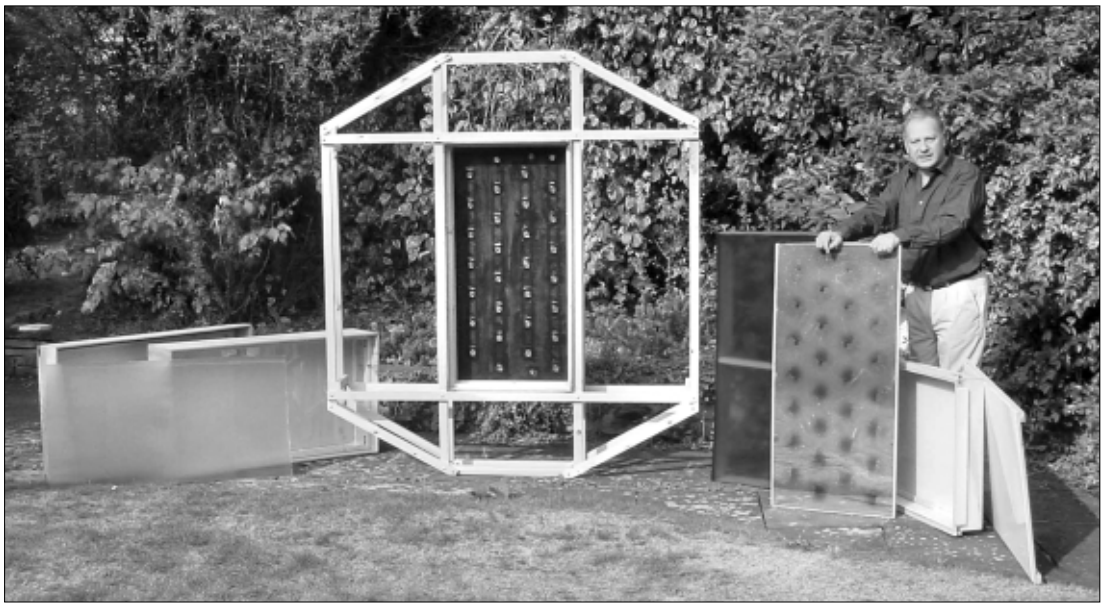
Amazingly, the colours and brightness of the final image are positively improved by firmly polishing the actual surface with a cloth before each viewing session. These Heliochromes (Burderchromes?) are created without any filters, or developing or even fixing! I find it totally weird that a simple mixture of common chemicals can produce a full colour positive print; just point and shoot and wait ...and wait ...until the image appears sufficiently strong. Even a contact print in sunlight can take 10 minutes to start to appear. Then put it away in a dark place until you want to see it again. Not being able to fully stabilize them, the problem remains that the images are not permanent. But I have even left them out on a table for a day without any significant deterioration.

When observing the coating process, the plates pass through an amazing multitude of visible phases, and I have yet to determine the ideal stage when to remove the plates.

Encouraged by e-mail Feb 22 from Roger Watson, formerly of the George Eastman House and now Lacock Abbey, who witnessed and rubbed my initial colour plates during a visit, I decided to see how far I could progress using basic chemicals. Watson kindly called them “nothing short of miraculous.”

Having researched the writings by prior workers in this field who called for the oddest, most complicated and fearsome of chemicals, as well as flowers, plants, eye of newt, tongue of toad and other extracts, I homed in to a simple 1 – 2 mix of two simple and relatively safe chemicals: Copper Sulphate and Ferric Chloride. Stabilization was enhanced by washing the dried sensitized plate with Lead Chloride, prior to exposure. Alas, true fixing still evades me, as it did most previous workers.

This is such a simple yet amazing process that I hope others will be encouraged to try it for themselves. I do not believe that it has any future or potential for better results, but it exists as one of the most extraordinary photographic processes.



PHOTOGRAPH COURTESY DAVID G. BURDER . BSc, FRPS, FBIPP

David Burder displays the Big Bertha apparatus including fuming box, camera body with lenses, developing box, fix and wash tanks.

Next? Colour daguerreotypes in Stereo? Of course my next aim was to make a 3-D stereoscopic pair using this colour process. I used several methods of exposing the plates – all were able to give successful results. These included using the stereo plate camera, or from colour transparencies as contact prints, or by projection from colour slides. When using the stereo camera, I used reversing roof prisms behind each lens inside the stereo camera to eliminate the problem of reversed, pseudoscopic images.

The ultimate challenge for the truth of the colour process was to see if it could hold the colours needed to reproduce a 3D anaglyph picture. Fortunately, it could but only just!

Throughout the experiments, I kept in constant communication with John Hurlock, who backed up the experiments using scientific colour test-chart transparencies to help verify the choice and mix of chemicals and methods.

Since the only imaging chemicals were Copper Sulphate and Ferric Chloride, which when mixed produces Copper Chloride – the 'needle-form crystals' mentioned in the Hillotype process, John Hurlock proposed that Copper Chloride alone might work. His subsequent experiments verified that indeed it does, albeit with a more restricted colour range.

Big Bertha – a rather large Daguerreotype camera and plate

During a Spring 2003 visit to The London Science Museum to research early persistence-of-vision devices, I could hardly fail to notice the very large (frame size 29 x 25 inches) daguerreotype portrait of a gentleman, claiming to possibly be the world’s largest daguerreotype. That invited an immediate challenge; so by the time I arrived home I had already sketched out plans for a 30-lens camera –"The Big Bertha!" The resulting equipment and processed plate are shown. The 30 lenses have insufficient covering power to merge to the adjacent images, resulting in this unusual array of disk-like images.

The plate size of 48 x 24 inches was determined by the maximum size of the copper sheets (1.2 metres by 0.6 metres) that I purchased. I subsequently discovered that this was also the largest size that my electroplater's tanks (and his patience) could handle. To my delight, I found that all the boxes for fuming, camera chassis, rubylithing, and fixing, could all be rip-sawn out of standard 4 x 6 ft. sheets of marine plywood.

The camera serves as a self-supporting functional camera platform – functional in both portrait or landscape mode. The design was only the start of the problems to be sorted out. What optics to use, which process to use – hot Mercury, Becquerel or Heliochrome, and what sort of subject?

The choice of optics came in a flash of inspiration that solved many problems simultaneously. The use of 30 lenses of 4 inch focal length with wide maximum aperture, allowed me to make a most compact camera requiring minimum exposure, yet still give reasonable depth of field – and all in 3-D too. Had I chosen to use a conventional single lens, I would have needed a camera that was at least 6 feet long, full of bellows or sliding boxes that would have ended up with a depth of field of next to nothing, and a maximum aperture that would prohibit sensible exposures.

Even so, I ended up with a system that was neat but rather awkward to manipulate, polish, fume, inspect, load into the camera, unload, develop, fix and wash. It became a two man job just to handle the silvered plates on their plywood support. Buffing was a heroic team effort with up to four people and a dog kneeling over the plate, scrubbing away. Chemicals were no longer measured in grams but as a kilogram of Iodine and four buckets of Thiosulphate. I have not contemplated gilding such a large plate – yet!

On September 16th 2003 at midnight in the garden, the plate was fumed. Loading had to take place at night because due to a slight oversight I had forgotten to design a dark slide. The plate was fumed in the garden before being carried inside for installation within the camera. To play safe, I always wore an iodine absorbing gas mask to protect myself from the substantial fumes emanating from the coffin-size fuming box. (I'm now testing wet-iodine sensitization using Iodine in solution, in order to make large-size coating easier.)

On the 17th, the plate was given substantially over-exposure in bright autumn daylight to ensure an image, then it was ruby-lith developed, Sodium Thiosulphate fixed, and finally washed. The resulting plate yielded 30 little circular images which are clearly visible – but would not win any prizes. When the plate was mounted, the image was protected by affixing a 2 mm acrylic sheet, 30 mm away from the plate to avoid the risk of flexing onto the delicate surface.

I intend to use my remaining 48 x 24 inch silvered plate for a Heliochrome colour version. The process is simply to dunk the plate into the single solution in order to sensitize the silver surface. The lack of sensitivity will make daylight loading and unloading of the plate a lot easier. And all without needing any development!

All in all, I have been having lots of "Dag" fun. Thanks especially to Modern Daguerreotypist John Hurlock, and Historical Processes specialist – Darran Green for guidance and encouragement.

NOTE:
David Burder is happy to assist anyone wishing to "have a go" at Heliochromes. He may be contacted at Burder3D@aol.com. Address: 31 The Chine, Grange Park, London, N21 2EA, United Kingdom. Tel 0044 20 8364 0104.

The BBC Television featured the author and the construction and imaging of Big Bertha on its Industrial Science program on BBC2 on Nov. 18th 2003, hosted by Adam Hart-Davis.

Return to 620

Many excellent American cameras used 620 film. Other than as collectibles, this makes them less desirable. Still many continue to function just as well as their 120 cousins so the need to re-spool film to the 620 is answered by this article.

Unlike other offbeat and no longer manufactured films, a 620 film is exactly the same as a 120 film, except that the 120 is wound onto a larger diameter spool. There is rarely enough room in a 620 camera to take the larger spool. Some cameras may be converted but the cost is considerable and only the real enthusiast would consider it worth the expense. Some companies still do supply 620 film but it is expensive and the range of available films limited.

One of our members simply puts the 120 rollfilm in his lathe and turns down the ends of the reel. But not all of us have a lathe so the answer is to rewind the film. First, the film needs to be wound through, end to end. The best way to achieve this is in another camera. I use a Rollei TLR and put the film over top of the rollers. Once the film is reversed end to end, it can be re-wound, this time onto a 620 spool. This is possible, feeding film from one hand to the other, but it is a bit of a fiddle trying to hold the spools and at the same time feed the film square and accurate while doing it in total darkness.

The illustration shows a simple re-winding jig. It comprises: one side of 3/4 inch pine and the other side 1/8th ply. The ply is flexible enough to allow the reels to be inserted into their respective locations. Rubber bands tension the sides to stop the reels falling out. The spindles to hold the reels are bolts filed to fit the end-holes in the 120 reels and the slot in the 620.

The film can be set up in the jig as per the illustration and wound onto the 620 spool. In the dark while the backing paper is being wound, carefully feel for and feed the loose end of the film square onto the receiving reel. Both film and backing paper wind easily onto the 620 reel until the taped beginning of the film is reached. Usually there is a bulge in the film here, the result of winding it onto a reel of smaller diameter. Carefully pull the tape off the backing paper and allow the film to flatten. The tape will restick itself to the backing.

I have re-wound close to twenty 120 films onto 620 reels and have run them through a Kodak Medalist without any problems, other than some minor static markings initially which were resolved later by raising the humidity.

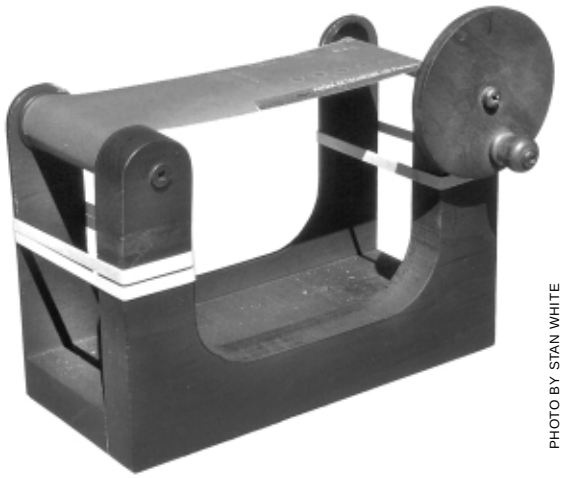


PHOTO BY STAN WHITE

The jig was made from whatever bits and pieces were lying around. The dimensions are not critical. The base overall is 7-1/2" by 3-1/2"; the height is 5-1/2". The important measurement is that the distance between the panels should be close to the width of the spools or 2-5/8 inches. The diameter of the handle, which could just as easily be made out of bent 1/8th diameter rod, is a little less than 3 inches, as seen here. It is important to keep the axes of each of the spools parallel. This is best achieved by temporarilly tacking both sides together with double-sided tape before cutting and drilling. The jig works best when clamped to the darkroom bench.