

Chrysotype Rex and Cyanotype Rex A Revolution in Iron Based Processes

by Terry King

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Many of you will have seen my article in *View Camera* on platinum over gum prints last year. I hope that you will learned from that article that I believe that it not good just to accept what one is told if there appear to be grounds for doubt. It is a good scientific principle going back well over two thousand years which can be summed up in the phrase 'take no man's word for it'. It was on this basis that students on my long workshops at Hands-On Pictures were given the opportunity to try out recipes from the past. The success of those experiments led us to a programme of 'retro-invention' where we took the materials and knowledge of the time when a process was invented to see what we would have done ourselves if our purpose was to 'invent' photography or a particular process. The results were revolutionary because it was a fresh approach. We had cleared away all the writings of the 'experts' since. We gave this the name COC, standing for 'cut out the crap' which is a little confusing as it also means 'circles of confusion'.

The sort of things 'retro-invention' has covered have included finding:

1. that 'the first photograph' at Austin is unlikely to be an asphaltum print as everyone has thought for nearly 180 years.
2. that cyanotypes can be produced simply and

cheaply with exposures cut down to a few seconds or minutes.

3. that chrysotypes (gold prints) can be made simply and cheaply with a beautiful colors and range of tone.

4. that it is not easy to recreate Muybridge's Palo Alto experiments unless you have a lot of money behind you

5. that making wet collodion negatives using 1850s recipes is not learned quickly and that is likely to shorten your life!

Being Chairman of the Royal Photographic Society's Historical Group gave me the opportunity to explore the retro-invention through a series of conferences and re-enactments. There appeared to be a need to spread the word as some modern photographic education does not give adequate training in the craftsmanship and judgement needed to produce fine prints. It was also not unknown for 'experts' just to swallow what had gone before while passing on this inaccurate information to those without scientific knowledge.

I started the Alternative Processes International Symposium in 1997. Bostick and Sullivan organise APIS in Santa Fe in the alternate years. As APIS was in Santa Fe in July this year, we decided to try a trial run for a conference on science for photographers and photo-historians at Oxford University in September. The idea was to get back to basics avoiding the 'pointy hat' stuff.



Wet Collodion Camera : Toned cyanotype Rex

This is printed from a digital image; the negative was made on Kentmere back projection material. The camera was used in our wet collodion experiments in checking Julia Margeret Cameron's claim that she learned wet collodion photography in just over a month in 1863/4.

The presentations included

1. Francois Brunet on the international co-operation in the development of photography between the US and France in the 19th Century .

2. Bill Alschuler of CalArts and David Burder of 3D imaging on full color photography produced in the 1850s in America and elsewhere.

3. Graham Haddon on early high speed photography

4. Ron Callender on how Hurter and Driffeld established the H&D curve in the 1890s, later to be known as the characteristic curve, which plots the relationship between exposure and development. Anyone trying to make a fine negative or using the curve tool in Photoshop, is using their work. Ansel Adams said that the H & D curve is the foundation of the science of sensitometry

5. Dusan Stulik of the Getty Conservation Institute on how the latest scientific equipment and techniques help us to understand the history of photography.

6. I gave a talk on how my retro-invention had led to the production of the cyanotype rex and chrysotype rex processes and how going back to the original paper written by Sir John Herschel in 1842, available to anyone who cares to call in at the Royal Society in London, led to a revolution in our understanding of how the 'iron processes' had been over complicated and misunderstood for 160 years. To use Michael Maunder's words 'The methodology Herschel specified actually worked better than later variants'

My own experiments had produced cyanotypes which were so fast that in camera negatives could be produced. They were so flexible and so easy to tone that a range of beautiful effects could be achieved. We called these cyanotypes rex. The cyanotypes had grown out of experiments on the chrysotype process where we had obtained beautiful blue blacks with a hint of pink in the high lights. Earlier modern versions of these processes appeared too complicated and



Dogana: Cyanotype Rex
In camera 10 x 8 negative on fixed out RC paper using cyanotype rex process. The View from my studio window. We have subsequently made a positive from this negative.

expensive. Retro-invention has shown that the cyanotype rex and chrysotype rex are simple and cheap. Of course it is important in experiments like this to check on the chemistry to see whether the prints are likely to be permanent, where Dusan helped us, and to double check on how the processes compared with Herschel's ideas in 1842. You also need to ensure that others can duplicate it. Ken Keen has done so in the UK and Gustavo Castilla in the US

I asked Michael Maunder, who has been researching cyanotypes as an astronomer and who has an international reputation as a no nonsense chemist, he develops new photographic chemistry both for industry and for fine printers, to go back to the original pa-

pers to see how his results compared with mine. The results were revolutionary. We both got cyanotype exposures in seconds. Ultra violet light proved so unnecessary that a demonstration print was grossly exposed after three minutes under a dull cloudy sky late in the afternoon when the level of UV would have been negligible.

The received wisdom, based on scientific papers published over the years, was that making a cyanotype in camera would be impossible. This was because the level of light in the camera would be between 100 and 10,000 times less than if the cyanotype coated paper was in a contact printing frame. When I checked with a meter I found that there was little difference between the two. Back in the 1840s no-one thought that there was a difference

And what was the fancy chemistry associated with this revolution. There wasn't any!

It was all a matter of method. Simple but elegant method. Michael Maunder has produced his own approach for educational purposes which he calls the Herschelotype.

My own methods, using a different salt, produce



Dogana Venice: Cyanotype Rex. - Made on unsized paper to give an impressionistic image.

results which are better for fine printing.

The method itself is very important.

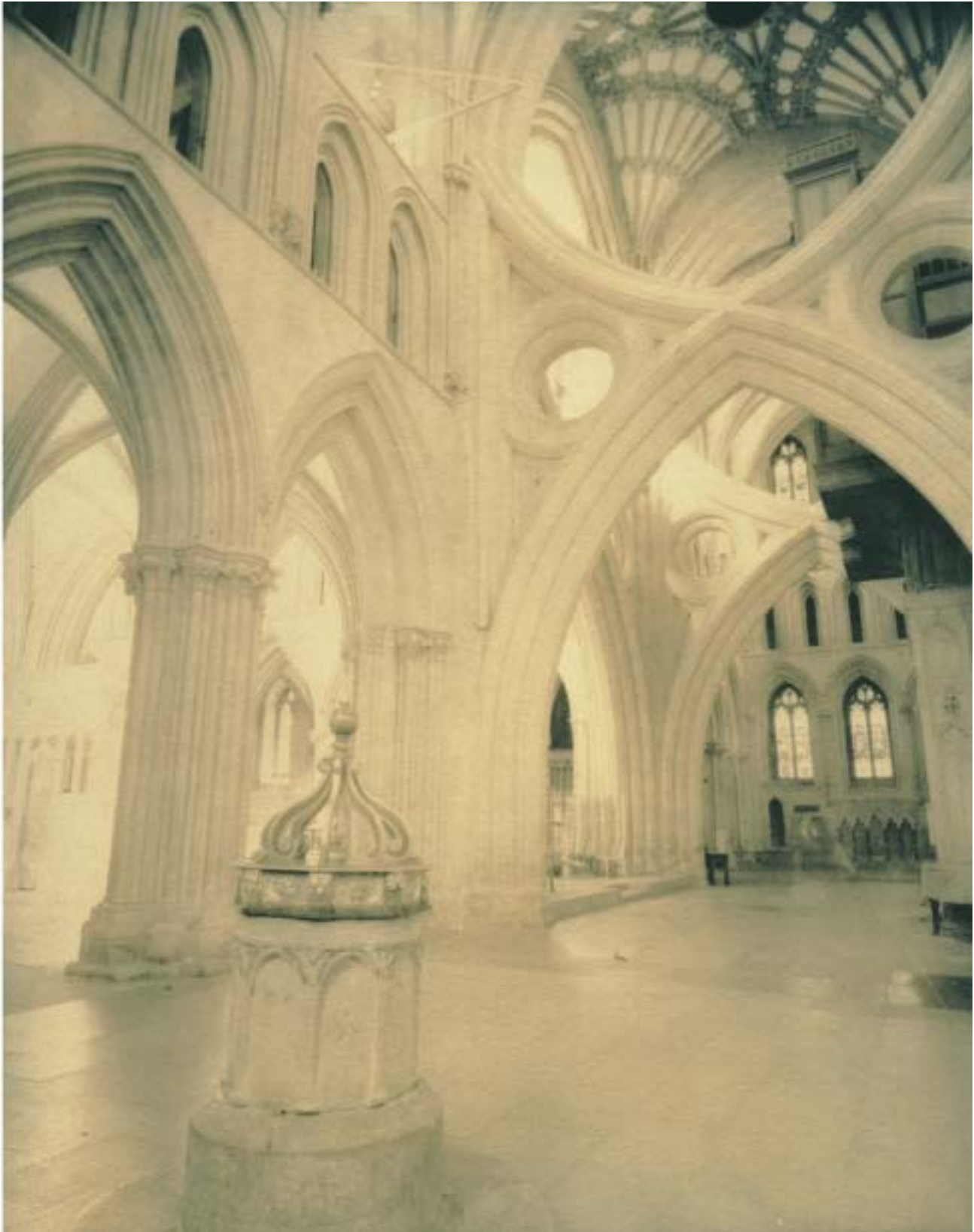
Firstly, for each one of the processes, one applies the light sensitive iron salt first. This increases the speed and reduces risks of chemical contamination. Michael uses ferric ammonium citrate while I find that for finer prints it is better to use ferric oxalate. I do not get the brown sludge which Michael suggests arises from the use of the oxalate. When it has dried, it is exposed in camera or under a negative in a printing frame to produce a faint printed out image. Then the print is developed in the second metallic salt. This is a physical development where there is no need for ligands or 'mole crunching' and the results are permanent. Different effects can be obtained by using different proportions and different papers.

If one's objective is speed you only need a short exposure. Michael Maunder then adds some sodium sulphate, as Herschel suggested, to the wash water to fix the image rather than giving the cyanotype an exposure long enough to reverse the image before it is brought back to normal on washing. I found that I did not need the extra salt at the washing stage when making cyanotypes rex using ferric oxalate rather than ferric ammonium citrate.

The proportions themselves are based experience rather than theory. The proportions for the cyanotype rex turned out to be much the same as those used for the traditional cyanotype. But as the concentration of gold for the cyanotype rex is very low, so is the cost; even then as the physical development allows the solution to be used more than once and anything left over can be used as gold toner, the cost is even further reduced. This low concentration reduces the chances of instability in the chemistry.

The only complications are that the surface of the prints is very delicate until the prints are dried at the finish of processing. All this means is that one has to flow the liquids over the print rather than pouring them on or using a brush to develop.

I have now given demonstrations of these processes at APIS 2004 in Scotland and APIS 2005 in Santa Fe. Both Michael Maunder and I demonstrated this 'revolution' before scientists, historians, photographers and printers at the Object Glass of Science conference in Oxford in September. There will be a CD of that conference and a 'how to' pdf available from my web site. I also hope to be making a presentation at the View Camera conference next in 2006."



The Scissor Arch at Wells Cathedral : Toned Cyanotype Rex
Although the print had to be exposed for three times as long as for a straight cyanotype rex
very careful judgment was needed given the very large density range of the Ilford FP 4 negative.