
TRADITIONAL PHOTOGRAPHY; PYRO STAINING DEVELOPERS

FROM THE jbhphoto.com BLOG

**Collection #01-A
10/2013**

**MUSINGS, OPINIONS, COMMENTARY,
HOW-TO AND GENERAL DISCUSSION
ABOUT TRADITIONAL WET DARKROOM
PHOTOGRAPHY TAKEN FROM THE PAGES
OF THE jbhphoto.com BLOG.**

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WHO USES PYRO?

February 27, 2009



We have been using Pyro based film developers for some time now. So, what is it about a Pyro negative that makes it so desirable? I have yet to completely understand the desirability of the Pyro negative, but I do know there is a depth that just isn't there with other more popular film developers.

We used Kodak HC110 for years. We even had our own dilution, that we used based on years of experience with the developer. But once persuaded to try Pyro, the HC110 negatives soon became undesirable. I guess the question is, if you have tried one of the Pyro formulas, did anyone else find that

little something extra? Or is it just the mystique of using one of the oldest known developers? There has to be something. I can see it in the negative and the print.

I have been doing a series of detailed tests comparing several of the modern Pyro film developer formulas trying to pick the one that best suits what we do. One thing that is odd is to see all of the different colors of image stain, ranging from near neutral gray to bright green. I have about reached a conclusion as to which formula best suits what we do. . . and. . . I may just write about what I found at a later date. . .

JB

PYRO & PROPORTIONAL TANNING

August 26, 2013



So, previously I discussed the subject of [PYRO & PROPORTIONAL STAIN](#) and I even did a little visual demonstration. Stain is the most acknowledged trait, and gets the greatest amount of attention when it comes to pyro developers. But it is not the only effect that plays an important roll in the unique properties of the developer. Pyro developers are also known as tanning developers.

Tanning is a term used to describe transforming an animal hide into leather. The process involves hardening the proteins in an animal hide. Since film emulsion is also made of protein, the same process

occurs under certain conditions during the developing process of film. Pyro is known for its tanning abilities.

Just like with stain, tanning of the emulsion is proportional to exposure. The more exposure; the more developer activity; the greater the tanning of the emulsion. This hardening of the emulsion slows the rate at which fresh developer can be absorbed into the emulsion. It also slows the rate at which spent developer can escape. This also aids in creating more stain as the exposure and hence the developer activity increases. Since the tanning effect is proportional to exposure, the tanning also acts as a continually variable restrainer to the rate of development of the film. The highlights' rate of development is slowed in comparison to the shadow areas. This results in a self compensating effect that is peculiar to pyro. The self compensating effect is especially valuable in helping to prevent the blocking of highlights. Pyro negatives have beautifully separated high values, as well as nice mid-tone vibrancy, while shadows hold their delicate deep values.

The tanning of the emulsion also adds acutance to the negative. The proportional hardening of the emulsion between areas of high and low densities slows the migration of grain in these transitional areas. This helps to increase the apparent sharpness.

Tanning is another desirable quality that helps make pyro developers unique. As I said in the previous post, the difference is subtle, but there definitely is a difference in the way a pyro negative looks and prints.

JB

PYRO & PROPORTIONAL STAIN

August 20, 2013



Not that kind of stain!

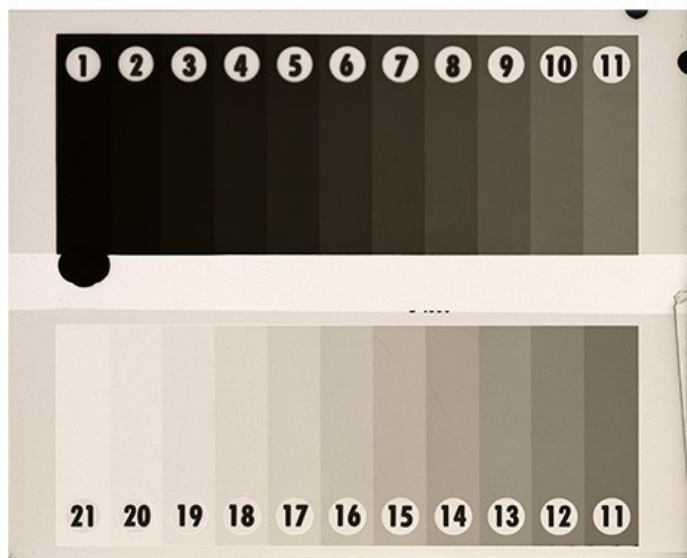
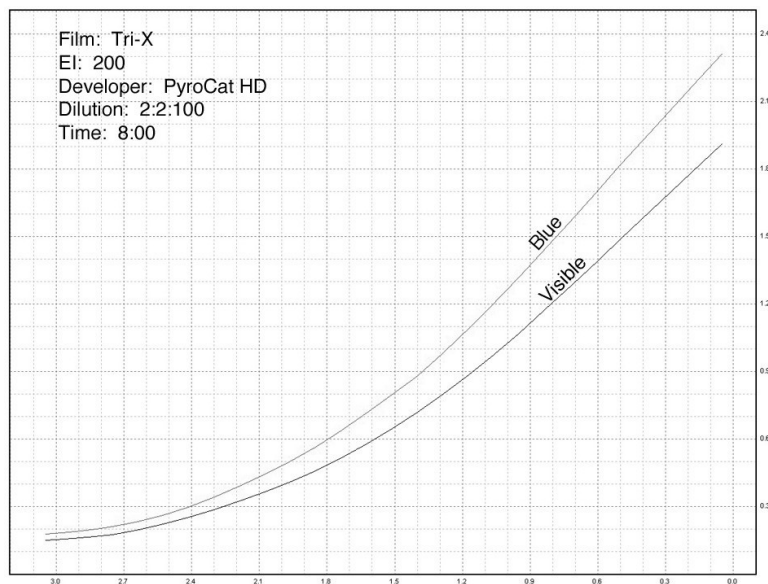
a Pyro negative is produced as an oxidation product of the Pyro developer as it is exhausted. All developers act upon exposed silver in the emulsion. Realize that the more exposed silver there is (the highlights in the photograph), the harder the developer works and the faster it is exhausted. In the less exposed areas (shadows in the photograph), the developer works less and exhausts at a slower rate. In normal development, you agitate the film to replenish the exhausted developer, which keeps the process going. This disproportional exhaustion of the developer is what causes proportional stain in the Pyro negative. This is what makes Pyro film developers unique. Part of the printing density of the negative is made of stain. Therefore to achieve a certain print density you need less silver. Less silver means smaller grain and adding the stain helps mask that grain. But, keep in mind that the stain is proportional. The harder the developer works (the highlights in the photograph), the more stain you have. But also remember that the stain is all over the negative, even in the shadows. It is just that the shadows have substantially less stain.

You can prove this by measuring a step wedge negative density with a densitometer. Measure the visible channel and the blue channel, then plot the data and you will see the blue channel shows more density. The blue channel more accurately measures the stain plus silver in the negative. If you study the resulting plot, you will see that the two lines steadily separate as the negative density increases. This is proportional staining of the film. Here you can see this plot from a film test I did.

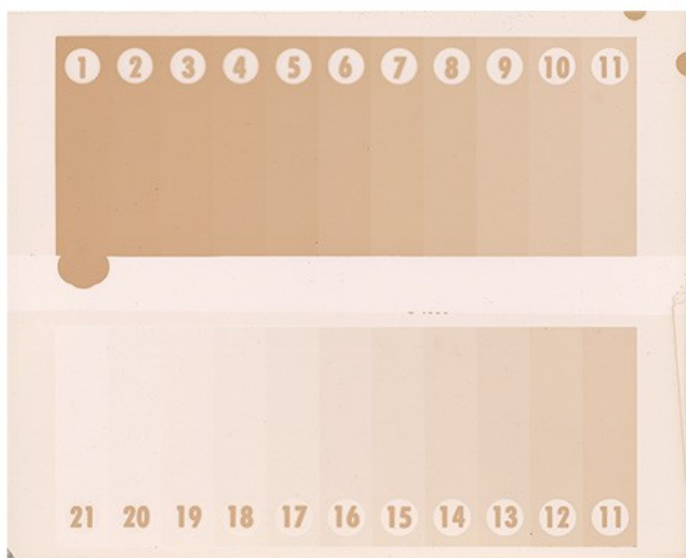
I know there has been a lot written about Pyro film developers and about how they stain the film. And I know there has been a lot of information published about how this stain is proportional. But it seems that there is still confusion about exactly what a proportional stain is, and how it affects the negative. I would like to delve into this and try to explain this in as simple terms as possible. I do not want to get really technical with this. So, let me see what I can do to explain this a little better.

We have to first understand what a Pyro stain is and how it is formed. In the simplest of terms, the stain in

Thing is, I realize that looking at a graph is not that compelling to some. Photographers tend to be visual people, so I took another tack to try and demonstrate this even further. I exposed two sheets of 4×5 film to a 21 step-wedge using my DIY Sensitometer. (Want to build a Sensitometer? More info [HERE](#).) I developed the two sheets of film together in PyroCat HD and finished as usual, stop and fixer. Next I took one negative and bleached all of the silver from the emulsion using Potassium Ferricyanide. The bleach only removes the silver and has no effect on the stain. What you see below is a scan of the two negatives side by side. Here you see a graphic representation of proportional staining. Look carefully at how the stain density (negative on the right) increases as the exposure, and hence the developer activity increases. Hopefully this is more of a visually convincing demonstration than plotting graphs.



Normal PyroCat HD Negative



Bleached PyroCat HD Negative

Pyro negatives look different. They print differently, though the difference may be subtle, it is different and allows, what I feel, for a more convincing finished print. We use Pyro and love what it does. Hopefully this demonstration will help to illustrate, in a little more understandable way, the mechanism of proportional stain.

JB

THE PYRO-CAT IS OUT OF THE BAG

October 3, 2010.

Back in February 2009 I posted an entry titled "[WHO USES PYRO?](#)" and ended it with this statement, "I have about reached a conclusion as to which formula best suits what we do. . . and. . . I may just write about what I found at a later date. . ."



One thing I can say for certain is that for us, and let me be very clear about this, I repeat, FOR US and the way we work, most any staining developer out performs any non-staining developer we have used. It was just a matter of finding the right developer that suited us and one that would allow us to produce prints that have the presence and feel that best suits our vision.

After working with several of the more popular staining film developer formulas we have finally chosen our favorite. There was a lot of research and comparisons, followed up with field testing in order to ascertain what best fit our needs. I defined the main criteria and judged each developer on how well each performed in each area.

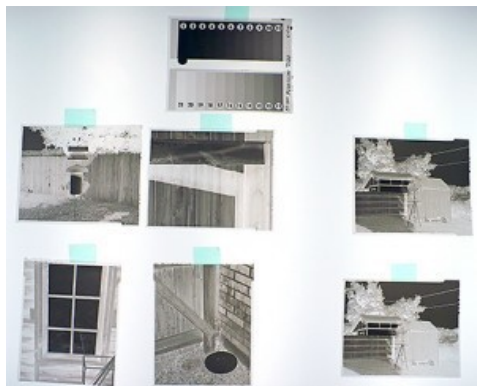
Here is a short list of the main points:

- the formula had to be published
- we considered how we work
- what we expect from the negative and developer combination
- ease of use
- consistency of the developed film
- stability of the developer formula
- stain color
- general stain and stain density
- the look, feel, and overall print quality
- last, but not least, the cost

I prefer to always be able to mix my own chemicals from scratch. This became my first issue, since I do not want to depend on the availability of the developer from an outside source. I am a strong believer in vertical integration. Also, if I want, I can modify the formula, and I always know who to blame if something goes wrong.



One thing I have learned is that Pyrogallol is cranky. Nearly all of the formulas we tried that were based on Pyrogallol, at one time or another, under certain circumstances, gave inconsistent and sometimes unpredictable results. The problems could have been caused by any number of variables. We tray process all sheet film using the shuffle method. Some of the Pyrogallol formulas showed signs of aerial oxidation in the tray at the end of the developing cycle, while others did not. The biggest problem was that every Pyrogallol formula we tried, performed erratically and at one time or another, produced an occasional unevenly developed negative. One formula was especially sensitive to wash time. The longer you left the film in the washer, the more the general stain increased and the film went from a near neutral color to deep green. Never did understand what caused that. I am sure it was something that I did, but I do not like to have to deal with something that is that sensitive to slight variations of process.



One thing I did learn was that Pyrocatechin is a much more stable and user friendly developing agent. The Pyrocatechin formulas showed little to no aerial oxidation in the tray after a processing run. No matter what I did, the negatives have not shown any uneven development or any other problems. I prefer to have the confidence that even if something is a little different during processing, it will not cause inconsistent results with the finished negative. In other words, I like to have a little wiggle room.

One other quick observation has to do with the general stain color. I know there has been a lot of discussion about the stain color and again this is what we have found to work best for us. Through our experimentation we quickly learned that green negatives do not work well for us. We print on numerous different papers, and use both graded and variable contrast materials. There is no one magic paper! The right paper is the one that works for any particular negative you are printing. We have found, that for us, the more neutral to brown stained negatives work the best. That is just us. . . if you find otherwise, then use what works for you.

With all of that behind us and a notebook full of test data, I can say it is time to stop the experimenting and get on with what is important, creating photographs. We have now chosen our favorite standard film developer. Pyrocat HD by Sandy King has proven to be the best choice for the way we work. What else can I say. It works. . . works consistently. . . and meets all of our expectations.

I would like to thank Sandy King for all of the research and work he has put into this formula. If you are not familiar with Pyro developers and Pyrocat HD, click [HERE](#) to learn more.

JB

PYRO STAINING FILM DEVELOPER

May 26, 2013



I had written about my experiments with Pyro Staining Developers back in October of 2010, and that should make it very clear that I have chosen my favorite film developer. Take a look at my previous post, [“THE PYRO-CAT IS OUT OF THE BAG.”](#) Of all of the Pyro Staining Developers I tested, PyroCat-HD by Sandy King has proven to be, hands down, the best of the best. If you are seriously looking for the finest all-around film developer, I would strongly suggest you take a serious look into PyroCat-HD.

Sandy King has done his research and formulated an excellent developer. Also, he has a new web site that is outstanding. I was pleased to find that he has a section dedicated to his technical writings which contains his original article on Pyro Developers. If you are seriously thinking about working with Pyro Developers, I would highly recommend you take a look at the article, [“AN INTRODUCTION TO PYRO STAINING DEVELOPERS, WITH SPECIAL ATTENTION TO THE PYROCAT-HD FORMULA”](#) by Sandy King.

There is no need for me to go into the details of my experiments with Pyro Developers since I have covered what I learned in my previous BLOG post. I would also recommend the above mentioned article by Sandy King, which covers a lot of what you need to know about Staining Developers. All I can add is that PyroCat-HD is the only developer we now use. Maybe you should try it yourself?

JB

STOP & FIX WITH STAINING DEVELOPERS

July 28, 2011



As most know by now, we use staining film developers. To be specific, we use the classic PyroCat HD formula from Sandy King. This developer gives us the type of negative we like. Keep in mind that creating art, no matter what may be your chosen medium, is a very personal thing. What works for me may very well not be at all acceptable to you. My father used to say, “that is why they paint cars different colors.” Personally I do not care for red cars.

All of that said, I have experimented with numerous staining developers and have chosen the one that works best for us. Along my journey of research I have found many opinions and myths that I have found to just not be true. Everyone seems to have an idea of what they believe to be true, but few have actually gone to the trouble to, as Fred Picker would say, TRY IT.

One area of great debate when it comes to staining developers is what stop and fix is appropriate. I find that this is not that great an issue and even John Wimberley agrees. Just in case you have not heard of John Wimberley, he is the father of modern Pyro developers. Even Gordon Hutchings the father of PMK, and author of “The Book of Pyro” was preceded by Wimberley and his first modern formula, WD2H. From an article titled “PyroTechnics Plus: Formulating a New Developer” in Photo Techniques magazine, March/April 2003, Wimberley has the following to say about Stop Bath and Fixer:

“Myths abound concerning the correct stop bath and fix to use with pyro, but it is not a critical issue.

Either an acid or plain-water stop bath may be used, and any standard or rapid fixer is acceptable. . . However, avoid hardening fixers. I recommend the manufacturer’s minimum recommended time to avoid the possibility that sodium sulfite in the fixer might weaken the dye mask.”

Wimberley goes on to say that you should follow the manufacturer’s suggestion as to the proper stop for any type of fixer. If you use an alkaline fixer, use a plain water stop, or follow the instructions. He also says Hypo Clearing Agent (HCA) should not be used, since they are mostly sodium sulfite and “the enemy of the dye mask.” He recommends a 10 minute wash time in running water sufficient to complete five changes of water by volume.

If you do much research on this subject, you will find a lot of differing opinions. The thing is, you finally have to draw a line and choose what you intend to do with your processing procedures. So, having said that, here is the way I process film using PyroCat HD.

- Film is processed in open trays by the shuffle method
- Acid stop using 3ml 28% Acetic Acid plus 1,000ml water
- Fix in Kodak Rapid Fixer (no hardener)

- Rinse in running water 2-3 minutes
- Wash in a vertical washer 15-20 minutes
- Bathe in 2 drops wetting agent plus 1,000 ml distilled water
- Hang to dry

This is how I process film using my chosen staining developer. I am sure there are those that will point out all of the reasons this will not work, but I can assure you, it works for me. The most important thing to do is to be consistent. If you do things exactly the same every time, there is a very good probability that you will see consistent results. Fred Picker would say, “different is not the same.”

Remember, the best thing you can do is finalize your procedures and get on with creating your art. The finished print is what is important, how you get there should not get in the way of your creativity.

JB

DARKROOM FORMULAS WE USE

We keep a page of formulas that we use in the darkroom on the jbhphoto.com BLOG. If you are interested in mixing your own chemistry, drop the site to see what we use.

<http://jbhphoto.com/blog/formulas-6/>

Each volume of TRADITIONAL PHOTOGRAPHY is derived from years of past writing on the jbhphoto.com BLOG. These are short articles about advanced wet darkroom, film and view camera techniques. Each volume contains selected writings about a specific topic.

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