FILM DEVELOPERS

Or the confessions of a mad photographer with a set of digital scales.

Every black and white photographer at one time or another goes on a quest for the Holy Grail - that perfect combination of developer and film. You know the one - it gives you 1600 ASA speed with Tech-Pan grain and 2 more zones that Ansel Adams ever could have imagined.

First off, I am sorry to report that to my knowledge it does not exist - at least its existence has eluded me. This has not prevented me from trying to find it though.

There are certain international standards - TRI-X in D-76 diluted 1:1 for 10 minutes at 20 C works all the time. Rodinal 1:100 for 20 minutes is another one. The negs are not perfect but as you can always get a decent print from it. The formulas listed here should only be taken as guidelines. Results may vary depending on your equipment, your skill, your meter etc. etc. There is no way I would eliminate your own screw ups from this listing!

Whenever I test a newer untried film I always run it with an already tried and true film (mostly TRI-X). First roll is run as my ideal TRI-X. Once the unknown film is done I check the TRI-X for standard development and see how far off the unknown film is. This way you can extrapolate the correct time/dilution/agitation for the next try.

There are variations that are impossible to gauge sometimes Cameras can shift their shutterspeed, manufacturers can change emulsions without warning, age of chemicals, I always try to stay with one or two films as my workhorses. Most stuff can be shot on TRI-X and a fine-grained slow film (Tech-Pan, Delta 100 or similar) and the really ragged edge shoots can always be handled by NeoPan 1600 or by pushing TRI-X to whatever speed is needed , although that carries the penalty of lost details in shadows etc.

My dream is to have everything standardized to give me negs that will print on #2 paper at 10 sec. with an aperture of f8, without having to burn or dodge. All right, I do stock papers from #0 to #6 + a variety of multigrade papers and filters and my timer goes from 0.1 sec. to 99 min. And I use the full range (including Seagulls Portrait which requires 6-8 minutes for 8 by 10 prints!). QED; We do not live in a perfect world.

The main reason for doing all of this experimenting is of course to entertain myself. I build custom winders for Leica M cameras. The Rapidwinder, an improved version of the rare Leicavit MP of the 50's and each Rapidwinder requires at least 2-3 rolls of film on several bodies to check for smoothness and precision, and of course if I happen to come upon that elusive magic concoction that would do it all, to receive the adulation and gratitude from millions of bl/w shooters all around the world.

I have tested more formulas and rejected others for testing , either because they contained chemicals that would have the drugsquad at my door for even asking for them or they are so esoteric that they are next to impossible to obtain.

Some of the older type of films required much harsher developers than today's emulsions . The grain was rough , the speed was slow and the lenses were uncoated and really slow . Now and then I load an old Leica II with 50 ASA film and its Hektor 50 mm/f 2.5 lens (uncoated, flary and soft) and go out and shoot. It does give you a new respect for the old masters. They really knew how to nail down a moment - decisive or not. Imagine what they could do today with high-speed film and the superfast lenses and auto everything cameras. It just goes to prove it is not the camera that makes a photographer.

As those of us who survived the 60's know in any pursuit of chemical pleasures let common sense prevail. Most photographic chemicals are of a reasonable low toxicity - but that does not mean that they are harmless , There are obvious dangerous substances around, ferrocyanide , mercury oxalate and pyrogallic acid, but if you keep the stuff out of the reach of children, pets and other non-photographers you should be OK. Finding the stuff is not always easy. Kodak is slowly getting away from supplying it to stores and it is often quite expensive to order small quantities. Major photomagazines usually have ads for suppliers such as "Photographers' Formulary," etc. As with everything, packaging costs money, it is cheaper to buy large volumes of stock and store it than buying 100 grams of this and that . Another source of supply is Cinelabs- they mix their own developers and buy by the drum. Get friendly with your local moviemakers, pick their brains, too. They know more about film and chemistry than just about anyone else . The local library also can pull out amazing information. They like a challenge so just ask them.

Some of the old manuals (Annual Leica manual from the 50's, the early British Journal of Photography issues from the 50's and 60's) used to contain lots of information. Remember that the idea of prepackaged chemistry is a rather recent one , even as late as the 60's most photographers mixed their own stuff. It is cheaper, the results are better and you feel like you did it all. Maybe the next step is to coat our own films?

Start your processing now, shoot lots of film and have fun - and do not lick your fingers while mixing chemicals.

Tom Abrahamsson

WEIRD AND STRANGE FILMS AND HOW TO DEVELOP THEM

Now and then I get hold of strange films. A couple of 100 feet of Russian aerial surveillance film, an unknown Hungarian 21 ASA film - Foma 21 - supposed to be developed in Fomopan, a developer not readily available in Western Canada. The 64 ASA film from Russia, ominously named "Chernobyl" and a variety of black and white moviestock. Super XX by Kodak, AP-250 by Agfa and Kodak's Fine Grain release Positive film. Of course I cant resist these - although quite often it takes the whole supply to find the developer that works - all in the name of research.

The Russian film responded very well to Beutler and Rodinal developer - but their filmbase is far from the smooth, flexible one we use. Any use of motordrive or fast advance would separate the film into three parts - a top strip - a center area with the image and a bottom strip - and lots of chips from the torn perforation. These film are not commercially available - which is really too bad , as it did cost about $20 per 1000 feet. I will not dwell on them. Only state that I shot the first roll at 100 ASA and developed it in Beutler for 8 min. As these were about 2 stops over I figured out that the realistic speed was about 400 ASA. This seems to be the safe speed to use for testing. If the film is very slow or very old the negs will be very underexposed - but there will be enough details there to see what the correct speed should be.

The moviestocks are interesting to use - but check that they do not have an anti-halation backing on them. The Kodak fine grain release film is a type of film used to make positive images from a negative stock - thus the "reversal" designation. It is a very fine grained film, slightly low in contrast but works like a charm in Beutler. The speed seems to hover around 80 ASA. Another remarkable feature of this film is that it seems to last forever. The test I did was on a 100 feet roll with the expire date of 1972 and the test was done in 1994 and , no the film had not been refrigerated. It was found in a box of junk at a garagesale! The Super-XX and the Agfapan 250 are more "normal" films; daylight rating of 250 ASA and tungsten rating of 200 ASA. These films are capable of taming great contrast and they do have a reasonable fine grain. Unfortunately they are a dying breed. Today mostly the music video industry seems interested in using the black and white stock. The Agfapan is an interesting stock - it is an old formula from the 50's - that Agfa kept producing until 1994 with very little modification and upgrading. It tends to have a ton of midrange tones and it will work up in the bright ranges like no other film I have seen. Unfortunately it is now out of production . Moviestock comes in 100, 400 or 1000 feet rolls and you have to load it yourself. But 1000 feet is almost 170 rolls so if you can pick up outdated stock it is worth it. The developers used by the cinelabs tend to be very active but soft. D-96 or Fuiji Movie F8 would give too low contrast for normal bl/w printing - but most standard developer can be used. My recommendations are as follows: Agfapan 250 in Pyro for 11 min. (rated at 250) and 15 min. (rated at 400). In divided D76 it is 5 min. in A and 5 min. in B.
Super XX: Pyro for 12 min., Divided D-76 for 5 min. in A and 4 min. in B.
Kodak Fine-Grain Release film: Beutler 11 min./Rodinal 1:50 for 12 min.

DIVIDED D-76

A-BATH

Water (50 C.)	**3000 ml.**
Metol (ELON)	**7.8 grams.**
Sodium Sulphite	**190 grams**
Hydroquinone	**19 grams**
Potassium Bromide	**3.8 grams**
Water (cold) to	**3800 ml**

Add a pinch of Sodium Sulphite to the water before you put in the Metol. Allow each chemical to dissolve completely before adding the next. Let it cool overnight and check for undissolved particles. If you find these, filter the solution. I use a Melitta coffee filter for this, but do not reuse this for coffee later as it tastes really vile!

B-BATH

The B-bath is mixed fresh for every processing run, it can be reused 2-3 times if it is done with in a couple of hours.

Water (1/3 of required volume at 50C)	**500 ml**
Borax	**50 grams per 1000 ml of finished volume.**

Example: For a Paterson 5 reel tank, use 500 ml of water at 50 C, add 75 grams of Borax and once this is fairly well dissolved top up with 1000 ml of cold water. There tends to be small specks of Borax floating around in the solution, but I have never had a problem with specks on the film.

PROCEDURE

Pour the A-bath into the developing tank, agitate vigorously for 30 seconds, tap the tank to release airbubbles and then agitate for 10 sec/ every 60 sec. until the time is up. Pour back the A-bath in its designated beaker and pour in the B-Bath (no wash in between), again initial agitation for 30 sec and then 5 sec/30 sec or for more moderate contrast 10 sec/60 sec.

Very little development takes place in the A-bath as there is no Alkali present in it. It only saturates the film, once the B-bath is poured in it starts developing quickly. Even additional 30 sec over recommended time will show a marked increase in development. It is **CRITICAL** that you never contaminate the A-bath with any B-bath. One drop of B into the A will oxidize it quickly. Always use separate beakers and mixing paddles. The A-bath will last a long, long time. It is depleted by absorption into the film (each roll of 35 mm uses up 6 to 8 ml of A) and when it is down to 1/2 original volume I usually dump it and mix up a new batch (that represents 3-400 rolls of film). It will take on a rather disgusting color after a while, but it does not seem to affect its performance. I tend to filter it every 2 month to remove dust, filmchips, pieces of felt traps, loose screws from cameras or whatever else accumulates in it. The original formula called for 100 grams of Sodium Sulphite per 1000 ml, but I found that if it was reduced to 50 grams the grain was tighter.

The modern films, T-Max etc do not absorb enough developer to work well. It requires a thick emulsion such as TRI-X, Neopan 1600, Plus-X to really perform.

PROCESSING TIMES

TRI-X	**A-bath 5 min./B-bath 5 min.**
Neopan 1600	**A-bath 5 min./B-bath 6 min.**
Neopan 1600 rated at 800 ASA	**A-bath 5 min./B-bath 5 min.**
PLUS-X at 125 ASA	**A-bath 5 min./B-bath 3-4 min.**

The Divided D-76 is not very affected by processing temperature, not much change if you run it at 68 or 75 Degrees F, although be sure that all the liquids are at the same temperature, otherwise you might get reticulation of the emulsion. It is a great developer, TRI-X is easy to print and looks great, Neopan 1600 rated at 800 looks like a good 125 ASA film and it is cheap too, a couple of cents per roll!

The fact that there is a limited amount of developer absorbed into the film also makes it very difficult to overdevelop film, highlights stay nice and printable and the shadows holds a lot of details too. Almost the perfect developer!

E-76
or the healthy version of D-76

This is a more health conscious version of the tried and true D-76. The Metol has been replaced by Phenidone and the Hydroquinone by Ascorbic Acid (Vitamin C to the more health conscious of you). The vitamin C has to be in its pure powder form as the tablets contain a lot of binder that serves no worthwhile purpose in the developing. I buy mine at a Healthfood store, the only time I set my foot in one of those. I get nervous when I enter spaces where it looks like one sneeze would kill everybody in there!

Water (50C)	**750 ml**
Phenidone (Ilford)	**0.2 grams**
Sodium Sulphite	**100 grams**
Ascorbic Acid	**8 grams**
Borax	**10 grams**
Water (cold) to	**1000 ml**

Use time similar to regular D-76, TRI-X at 400 ASA, E-76 diluted 1:1 for 10 minutes at 68F/20C.

Phenidone is difficult to weigh in these small volumes; use electronic scales for it. remember that 0.3 grams instead of 0.2 is a 50% increase in the volume and the results could be quite different. The shelf life of the E-76 is similar to regular D-76, 2-3 weeks in 1/2 filled bottles and it can change in activity when stored too long.

The main reason for switching to E-76 is the fact that some people are metol sensitive and it is also less harmful to the environment, and your TRI-X will not catch a cold either.

THE PYRO

A truly great TRI-X soup. It will give your negs that khaki military look. Grain is not superfine but it allows you to print TRI-X negs that show clouds in the sky, without burning them in! It is a tricky developer and the Pyrogallol is toxic so treat it with great respect. Use face mask when mixing. In solution it is not to bad, but the dust is really bad for you!

A-BATH

Water(distilled, at room temp)	**750 ml**
Metol	**10 grams**
Sodium Bisulphite	**20 grams**
Pyrogallol	**100 grams**
Water (distilled) to	**1000 ml**

Dissolve a pinch of the Sodium Bisulphite before adding the Metol. This facilitates the complete dissolving of the Metol.

B-BATH

Water(distilled, room temp)	**800 grams**
KODALK (balanced Alkali)	**150 grams**
Water to	**1000 ml.**

PRE-WASH

Water (room temp)	**1000 ml**
KODALK	**5 grams**

PROCEDURE

I shot my TRI-X at 400. If you expose yours differently, please modify your times accordingly.

Pyro works best on a continuos agitation. I use an old UNI-DRUM roller agitator and 5 reel Paterson tanks. Just plug the roller unit into the Gralab timer and the buzzer will inform the entire neighborhood when the time is up!

Mix the prewash (5 reel tank), 7.5 grams of KODALK in 1500 ml of water at processing temp. and pour into tank, put on the agitator for 4 minutes. While it is grinding away, I mix the PYRO solution. Take 1 part of A (15 ml A), and 4 parts of B (60 ml B) and 100 parts(1500 ml) of water at processing temperature and mix. The solution first has a light tea color and then turns dark brown. Once mixed the solution has a fairly short lifespan (20-30 minutes I think). Now pour out the Prewash (can be reused once if it is done within 60 minutes) and pour in the PYRO, agitate 30 sec., tap and put on agitator. I run TRI-X for 11 minutes at 70F. Once the time is up, pour the used developer into a beaker and save. Wash with water (2 changes) and fix as usual, pour out the fixer and POUR THE USED DEVELOPER BACK IN THE TANK. Agitate for 5 minutes. This serves 2 purposes; it stains the film and also the residual Hypo neutralizes the PYRO.

Wash as usual after the stainbath is through. The negs are going to look denser than they are, the brown tinge fools you. They will print great though.

TIMES

TRI-X	**11 minutes**
Neopan 1600 at 800	**16 minutes**
PLUS-X	**9 minutes**
PAN-F Plus	**7 minutes**

Pyro likes a touch of overexposure. If you err on the exposure, give it a bit more rather than less.

STOECKLERS DIVIDED

Another great divided combination. Not as sharp or tight as the Divided D-76 but it can handle great contrast ranges and is more flexible.

A-BATH

WATER (50C)	**800 ml**
Metol	**5 grams**
SODIUM SULPHITE	**80 grams**
SODIUM BISULPHITE	**20 grams**
WATER (cold) to	**1000 ml**

B-BATH

B-bath should be made fresh each time, can be reused once if it is done within 60 min.

WATER (Room temp.)	**1000 ml**
BORAX	**10 grams**
or	
KODALK	**10 grams**
or	
SODIUM CARBONATE	**10 grams**

PROCEDURE

Again, this is a developer that has to be treated carefully, no B-bath should be allowed to get into the A-bath.
I have been using it with TRI-X, Neopan 1600, DELTA 400, Neopan 400, Agfapan 400 and HP5+.
It requires 6 minutes in the A-bath and 3 to 4 minutes in the B-bath.
TRI-X: 6 min. A/4 min. in B (BORAX)
NEOPAN 1600 at 800: 6 min. in A/3 min. B(KODALK)
NEOPAN 1600 at 1600: 6 min. A/4 min. B(SODIUM CARBONATE)
HP5+ at 400: 6 min. A/4 min. B (KODALK)
DELTA 400: 6 min. A/4 min. B(KODALK)
NEOPAN 400: as TRI-X
For slower film try 3 min. A and 3 min. B with Borax. If the negs are too thin. try with KODALK or add up to 20 grams of BORAX/1000 ml.
Agitation is very active in A-bath(5 sec./30 sec.) and very gentle in B (10 sec./90 sec.)
It is a great developer for portraits and contrasty beach scenes. Also works well on cars. The chrome is nice and shiny without being fried.

LEICA 2 BATH DEVELOPER

The Leica company was one of the pioneers in the use of 35 mm film. They put in some considerable research into getting good prints made from what was known as "miniature" negs. They aimed to get full tonal values and fine grain from the rather crude prewar emulsions. Of course todays emulsions would have been dreams for the shooters of the 30's and even the 60's.

This is one of the best of the Leica formulas. I suspect that it was designed as a 2 bath formula to avoid overdevelopment and frying of highlights. Too bad that nobody has come up with a developer that will save us from overexposure!

A-BATH

Water (50C)	**750 ml**
Metol	**5 grams**
Sodium Sulphite	**100 grams**
Water to	**1000 ml**

B-BATH

Water(50C)	**750 ml**
Sodium Sulphite	**6 grams**
Sodium Carbonate	**15 grams**
Water to	**1000 ml**

Pour in A for 3-4 minutes (TRI-X works well with 4 minutes), Pour A back in its beaker and pour in B for 3 minutes. Agitation for 5 sec./30 sec. in A and in B. If you wish to drop the contrast, reduce agitation in B to 5 sec./60 sec.

The A bath is a slightly less active D-23 and the B-bath adds some punch to the negs. The capacity seems to be about 10-12 rolls in both baths.

D-23

This is the developer that can really tame contrast. It reduces filmspeed slightly (TRI-X at 320 ASA) but it is great for nightshots with lamps and shopwindows, stageshots with billion watt spots everywhere and total darkness in the shadows!

Water(50C)	**750 ml**
Metol	**7.5 grams**
Sodium Sulphite	**100 grams**
Water to	**1000 ml**

Try TRI-X at 320 for 17 minutes, agitation 10 sec./60 sec. I have not tried it with Neopan 1600 but I would venture a starting time at 20 minutes. It is not a "sharp" developer. The large quantity of Sodium Sulphite ensures that, but the grain is soft and not too obtrusive. Works fine up to 11x14 prints, but at 16x20 it starts looking mushy.

GERLATZ 2 BATH DEVELOPER

A-BATH

Water(50C)	**750 ml.**
Sodium Sulphite	**50 grams**
Hydroquinone	**5 grams**
Phenidone	**0.3 grams**
Potassium Bromide	**0.5 grams**
Water to	**1000 ml**

B-BATH

Water(50C)	**750 ml**
Borax	**20 grams**
Boric Acid	**10 grams**
Potassium Bromide	**0.5 grams**
Water to	**1000 ml.**

Interesting developer. It can be reused extensively, both A and B seems to last for quite a while (2 months at least). Works well with TRI-X and AgfaPan 400. Use for 4 minutes in A and 4 minutes in B with 10 sec./60 sec. agitation. Has a slightly "edgy" look to it - like a snappier D-76.

DIVIDED D-25

A-BATH

Water(50C)	**750 ml**
Metol	**6 grams**
Sodium Sulphite	**100 grams**
Water to	**1000 ml**

B-BATH

Water (room temp.)	**1000 ml.**
KODALK	**10 grams**

Make B fresh each time. A will last at least for 20 30 rolls or 4 weeks.

This developer will handle very contrasty light without blocking up. It seems to give a reasonable filmspeed. The heavy concentration of Sodium Sulphite does mush up the grain a bit. This could be changed by reducing the Sodium Sulphite to 50 grams and by adding 25 ml of 0.1% Potassium Iodide to the A-bath. It would then be close to a Beutler but in a 2 bath formula.

In its standard form TRI-X works well at 3 minutes in A and 3 minutes in B and I would add 2 minutes in the A-bath in the modified formula (50 grams Sodium Sulphite/1000 ml) and see what came out of it. I have not tried it yet. When trying to modify developers, always use the same film and run it as a standard first, then change only 1 component at a time, Test each change. If you do not do that you have no idea why it behaves a certain way. It is also a good idea to shoot a whole bunch of film for this purpose, and preferably all under the same condition. This way you eliminate factors like cameras, changing light etc. Ideally you should try to shot in a situation that resembles the situation you normally shoot in.

RODINAL

Probably the longest continuously used photo product. Developed by Agfa in 1889 and still active (sorry about that pun!). It is still a great product, it never was a fine grain developer but it has saved many a neg in its 107 year history. I use it still, it is convenient and reasonably economical. Some shooters cant stand the grain, but it is oh so sharp. With high speed films the grain is distinctly noticeable but by diluting it more it can reduce it somewhat.

It is also a great developer for establishing "base lines" to work from. Just about every film, from Tech-Pan to Neopan 1600 can be developed in Rodinal 1:100 for 21 minutes at 68F/20C. It might not be the perfect neg, but they are always printable and once that base has been established you can try all the combinations. Agitation is critical with Rodinal, 5-7 sec./60 sec.seems to keep it from getting too contrasty and never use a acid stop bath with it. I find that the thinner emulsions of the modern films pinholes easily when using a "surface" developer like Rodinal.

If you find the grain too acute, try adding Sodium Sulphite to the developing solutions. 100 grams/1000 ml of mixed developer (10 ml Rodinal:1000 ml water). It will soften the grain slightly and reduce the sharpness. Rodinal requires that you know your equipment well. It will not tolerate sloppy focusing or sub standard lens. I find that with the slower films like Delta100/ Agfapan 100 and Tmax 100, you get razor-sharp negs with Rodinal 1:100/20 minutes at 68F/20C. If you like Tech-Pan and can live with the contrast try it at 1:150/9 minutes at 68F/20C and rate it at 50 ASA. The tonal range is limited and it is contrasty, but you will find out if you are in focus!

BEUTLER FILM DEVELOPER

This developer was created by Willy Beutler, supposedly to test Leica lenses for sharpness and flare. It will certainly show up any flaws like that, as well as challenge you to have your focus dead on.

A-BATH

Water (50C)	**750 ml**
Metol	**10 grams**
Potassium Iodide 0,001%	**50 ml**
Sodium Sulphite	**50 grams**
Water to	**1000 ml**

The Potassium Iodide enhances the adjacency effect (fancy words for making it look sharper!) according to W. Beutler. Your local pharmacist can make you up a 1% solution of Potassium Iodide (1 grams of P.I. in 100 ml of water), take 1 ml of this and dilute with 100 ml of water and use 50 ml of this, dump the rest. The 1% solution will last a long, long time.

B-BATH

Water(50C)	**750 ml.**
Sodium Carbonate	**60 grams**
Water to	**1000 ml**

PROCEDURE

Take 1 part of A and 1 part of B and add 8 parts of water. Example: 100 ml of A, 100 ml B and 800 ml water will give you 1000 ml of developer. I usually do not prewet my films but with Beutler it seems to work better. Just plain water for 2 minutes prior to pouring in the developer. I have also tried to run a prebath of 5grams of Kodalk/1000 ml of water on some moviestocks. This seems to clear the anti halation backing, at least the prebath has a rather nice purple/black color to it when it is dumped. Beutler is sensitive to agitation, 5sec/60 sec seems to work well, with an initial 30 sec to get it started.

TIMES

TRI-X/NP400/DELTA 400	**11-12 minutes**
HP5+	**12 minutes**
TMAX 100/DELTA 100	**9 minutes**
PAN F+	**7-8 minutes**

The 400 ASA films have a distinct grain in Beutler, certainly not "fine grain" but it is very edgy and sharp. 100 ASA looks really good and PAN-F+ is incredibly sharp and smooth. I have done some Neopan 1600 in it too, but the grain looked like golfballs sharp golfballs mind you. It is a great developer for Kodak's Fine Grain release film. Rate it at 80 ASA and run it in the Beutler for 8-9 minutes.

If you really want enhanced adjacency effect, try this; shoot TRI-X at 400 ASA, mix up the Beutler as per normal. Pour it in the tank and agitate vigorously for 30 seconds and then leave it for at least 30 minutes, no agitation, no touching etc. Rinse and fix as usual. Solid edges and almost a glow on the whites. Interesting effect with the enhanced bromide drag in the neg.

FX-1

This is one of the Crawley developers (there are at least another 20 of them, some are obsolete and some require compounds that are difficult/expensive to find). It is very similar to Beutler. Most of the Crawley developers were designed to either give more speed out of the film or reduce the grain. FX-1 seems to be designed for sharpness.

Water (50C)	**750 ml.**
Metol	**5 grams**
Sodium Sulphite	**50 grams**
Sodium Carbonate	**10 grams**
Potassium Iodide 0.01	**5 ml**
Water to	**1000 ml.**

For use, dilute it with 9 parts of water (100 ml FX-1/900 ml water). It is a rather slow developer, times with TRI-X is almost 18 minutes at 68-70F. You can also develop with continuos agitation (use same roller as PYRO) and the times then become more reasonable TRI-X:14 minutes. Neopan 1600 is supersharp with this developer and gives you full 1600 ASA. Needs about 20 minutes though with 10 sec/60 sec agitation or 17 min. with continuos agitation. If the contrast is too high, reduce agitation to a bare minimum 30 sec initial and 20 sec every 5 minutes. This is one of my favorite developers for stuff that is only going to be blown up to 8x10, any larger than that and the grain looks like it has been applied with a shotgun! Works fine with 100 ASA films too, TMAX 100 for 12-13 min. (normal agitation).

TRULY STRANGE D-76

I found this formula in an old magazine. The writer was probably a dropout from the 60's . Mix up a regular batch of D-76 , dilute the required volume for you processing run. To this diluted volume add Ammonium Chloride, 100 grams per liter. Develop your TRI-X for about 18-20 minutes with normal agitation and rinse and fix as usual. It is an amazing effect, very little grain, very smooth tonal range but a very thin neg. I have tried it a couple of times and always gotten a printable neg, not easily printable neg, mind you. Probably a process worth investigating more, if I can find more Ammonium Chloride. Could be interesting with something like Beutler or FX-1 or even Rodinal.

PAPER DEVELOPER

By now you should be thoroughly confused and probably have decided to forego any black and white shooting and trading it all for a point and shoot and a large stock of discount color negative film. Just in case you are still with me, let me try some more confusing formulas on you. We now have the film developed and it looks good, how do we extend the search for more chemical perfection. Simple, by making our own paper developers!! These are all one shot deals. You mix them up before a session and dump them after. This way you have always fresh chemicals and can not blame them for foul ups (of course there is always the paper manufacturer to blame, they change the base of the paper, they remove silver, they mess up the grading on multicontrast and they cant agree on any surface name between them, bless their little silver coated hearts, it is not my fault that it doesn't work, its theirs!)

Most of the information in this section is valid for Fiber base papers only. I do not like RC paper. Yes it is convenient, but so is "chateaux collapsible" plastic bagged red wine and processed cheddar cheese, but raw milk Brie and corked Bordeaux taste better and fiber based paper still gives the blacks that you can sink into and the whites that look like they glow. RC paper still makes me think of dirty eyeglasses and unwashed windshields, not that I am biased or opinionated or anything like that.

Some of the great papers have fallen by the wayside; Oriental Seagull is gone, it has been reincarnated as New Oriental Seagull but I have not tried that yet. Kodak's Elite is gone (no great sorrow followed that miserable paper) and is replaced by PolyMax Fine Arts (what Elite should have been. It is now my paper of choice). Agfa's new Premium Insignia is good, albeit a bit too ivory for me. Ilford has a new Galerie out and Zone VI is still there. Forte is interesting. Their Portrait is probably the slowest paper around, but looks good and their Multigrade is all right, but again too ivory for me.

D54-D

A true blue black paper developer gives you almost 3D blacks, you can fall into the print and it has that elusive velvety smoothness of tones you can get (when everything works right).

Water (50C)	**1000 ml**
Metol	**2.7 grams**
Sodium Sulphite	**40 grams**
Hydroquinone	**10.6 grams**
Sodium Carbonate	**88 grams**
Potassium Bromide	**0.8 grams**
Water(cold) to	**3000 ml**

Use without dilution. Works very well with Seagull, Polymax and Insignia. It requires a heavy exposure and is not very subtle with dodging and burning. Develop for 3 minutes and use a non indicator stop bath. With fiber base paper I always double fix; 5 minutes in each tray. If you don't do that, it can stain the paper in the selenium toning.

This is a great developer to use as a split developer, a soft developer to start with and a final boost in the D54 D. You can warm up the tone of the D 54-D by adding more Potassium Bromide, up to 1 grams/1000 ml working solution. It will noticeably affect the tone of the paper. If you want even cooler tones you can add Benzotriazole to the finished volume (maximum 1gr/1000 ml, more than that will severely affect the paperspeed.

This is my normal paper developer and it will do up to 40-50 prints (8x10) before it is exhausted. It will go in one shot too, suddenly it will not develop at all and that's it.

AGFA 130 Paper Developer

A smooth developer that gives clean whites and very smooth blacks, needs more exposure than the D 54-D. It tends to mix as a light brown liquid due to the Glycin. Lasts well and dies slowly.

Water (50c)	**750 ml**
Metol	**2.2 grams**
Sodium Sulphite	**50 grams**
Hydroquinone	**11 grams**
Sodium Carbonate	**78 grams**
Potassium bromide	**5.5 grams**
Glycin	**11 grams**
Water (cold) to	**1000 ml**

Dilute with 1000 ml of water and develop for 2 minutes. Can be left in for 3-4 minutes without problem. It is a good developer for portraits and architecture as it has nice clean highlights and moderate blacks.

DASSONVILLE D3 WARM TONE

Water(50C)	**750 ml**
Sodium Sulphite	**83 grams**
Sodium Carbonate	**138 grams**
Glycin	**27 grams**
Hydroquinone	**9 grams**
Potassium Bromide	**4 grams**
Water (cold) to	**1000 ml**

Dilute with 2000 ml of water. Pronounced warm tone on Elite, Oriental, Ilford and Polymax. With Oriental Portrait and Forte Warm tone it goes almost brick red. Can handle long development, up to 6-7 minutes without bromide "drag". Very unpredictable with selenium toning. Test first!

DEFENDER PAPER DEVELOPER

A favorite with Larry Clark ("TULSA" and "Teenage Lust"). It gives absolute massive blacks and it is the developer to use if you want to print down to very dark and then ferrocyanide the print for local highlights. Clark does it, Eugene Smith did it and Jean Loup Sieff does it, why not you?

Water (50C)	**1500 ml**
Metol	**7.5 grams**
Sodium Sulphite	**142 grams**
Hydroquinone	**39 grams**
Sodium Carbonate	**283 grams!!!!**
Potassium Bromide	**3.5 grams**
Water (cold) to	**1900 ml**

Dilute 1:1 for use. Works great on premium papers, black are truly BLACK. If you use an indicator stop bath it will go purple on you after a couple of prints! This is a strong soup here, use Acetic Acid stop and change often. Definitely requires 2 fixbaths too. Do not overdevelop in this soup, 2-3 min. maximum, adjust your exposure instead.

PAPER DEVELOPER (FRENCH)

This is an interesting developer as it allows you to balance tones of a print very precisely; by varying the dilution and the amount of Benzotriazole that you add. It is used by the printer who prints the Lartique and Bettina Reims negs for exhibitions.

The quantity of Hydroquinone changes the contrast of the print. You can add up to 40 grams of it in extreme cases. The more Hydroquinone, the higher the contrast. The "Phenidone" changes the "look" of the print, it is very subtle but quite noticeable. The Benzotriazole shifts the print from warm to cooler. The dilution can be varied too, the higher dilution the warmer the tone.

This is a 1 print developer, you pick your neg and work with it until you get it right, it is not for massproduction. When it works it is a beauty!

Water(50C)	**750 ml.**
Sodium Sulphite	**40 grams**
Hydroquinone	**20-40 grams**
Phenidone	**0.2 -0.5 grams**
Sodium Carbonate	**50-60 grams**
Potassium Bromide	**2 grams**
Benzotriazole	**0.5-3 grams**
	0.5 grams cold tone
	3 grams warm tone
Water (cold) to	**1000 ml**

Dilute 1:3 for colder tone (0.5 Benzotriazole)
Dilute 1:5 for warmer ton (3.0 Benzotriazole)

Develop for 3 minutes. Can go up to 7 minutes with the 1:5 dilution.

PICTORIAL SERVICES PAPER DEVELOPER

This is the developer used by Georges Fevre who is the printer for Cartier Bresson, Joseph Koudelka, Marc Garanger etc. He does know how to print.

The 56D is a warmer version of the 54D. It has considerably more Potassium Bromide in the mix. This also means that you can develop it for longer times without bromide "fog", but check your safelights before testing this developer.

The 56 D tends to favor smooth, midtone negs. The European style of printing has always favored the midtones, versus the American style towards the dramatic skies and Ansel Adams' full tonal range. In short, Adams printed for exhibitions and Bresson for publications.

Water (50C)	**750 ml**
Sodium Sulphite	**34 grams**
Metol	**3.3 grams**
Hydroquinone	**10 grams**
Sodium Carbonate	**68 grams**
Potassium Bromide	**6.6 grams**
Water (cold) to	**1000 ml**

Dilute 1:1. You can leave these prints in the soup for up to 7 minutes, or by increasing the exposure pull them after 3 minutes, the latter tends to block up the blacks a bit!

GLYCIN BLUE BLACK DEVELOPER

This developer is used undiluted and the print almost explodes on impact. It is truly fast, but do not be tempted to pull it too fast. Give it at least 60 sec or even 90 sec and modify your exposure instead. Agfa Insignia has a nasty greenish cast in this one, Polymax and Seagull have "ice-cold" blue black.

Water	**1000 ml**
Glycine	**13.6 grams**
Hydroquinone	**13.6 grams**
Sodium Sulphite	**124.8 grams**
Sodium Carbonate	**176.8 grams**
Potassium Bromide	**1.4 grams**
Water to	**2000 ml**

SUPER SOFT DEVELOPER FOR SPLIT DEVELOPING

This is the A component for the famous Beers formula. I use it as a "soft" developer for two developer runs. Times may vary but I find that 2/3 rds of time in this soup and 1/3 in the Glycin Blue black works well. You can fine tune the paper grade with this type of developer.

Water (50C)	**1000 ml**
Metol	**8 grams**
Sodium Sulphite	**23 grams**
Sodium Carbonate	**20 grams**
Potassium Bromide	**1.1 grams**
Water (cold) to	**2000 ml.**

This developer is a bit unpredictable but so is life!

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Tom Abrahamsson
Vancouver, B.C. Canada, May 27, 1996