

KEEPING PACE

A monthly newsletter devoted to the art of darkroom photography

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SPLIT MASKING EXPLAINED

Color correction?

Just what does that term mean?

When making a principal mask, which happens to be the main mask for reducing contrast, how does "color correction" work.

Actually, what happens when making a contrast mask is understandable.

A contrast mask is exposed by contact with the transparency, using a film such as Kodak's Pan Masking film. If a mask is made from a transparency, using a sheet of film that has an absolutely even sensitivity to all of the colors of the spectrum, and a single white light exposure was made, then the contrast effort of the mask would work fine. No colors would be affected and the contrast could be reduced without any of the colors in the original photo being increased or decreased in strength. The

only material that can accomplish this task at the present moment is the Corning Glass system called "Minute Mask".

However, in order to accomplish a professional color masking system, more than glass is required.

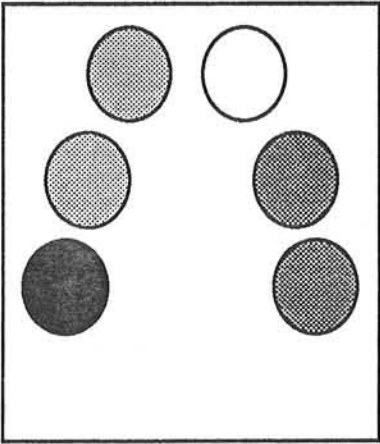
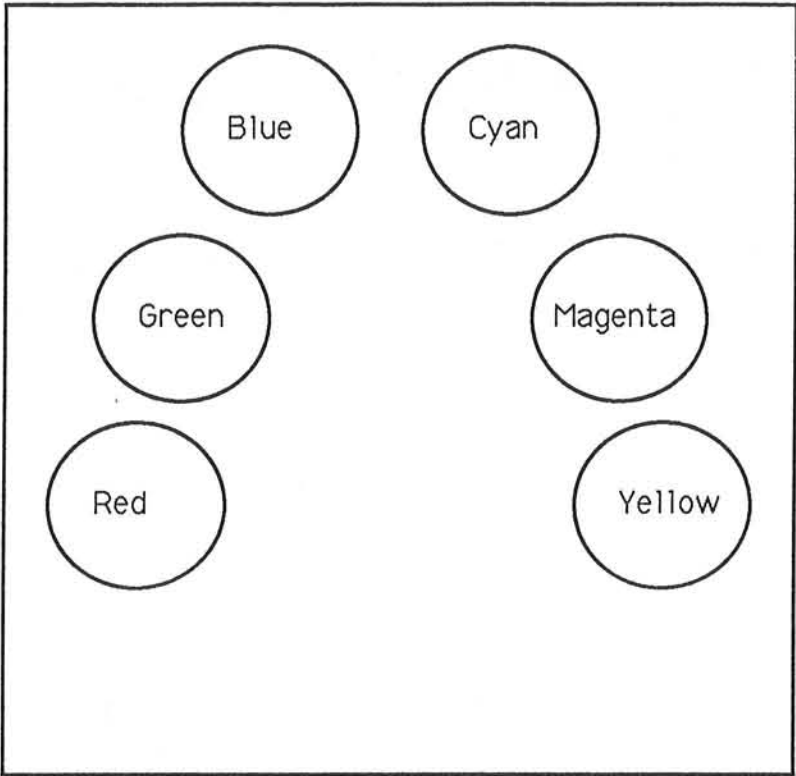
The advantage of using a panchromatic film for making masks is that it affords one the opportunity to add a color to the exposing system when exposing the mask thereby making it a tool for either increasing or decreasing the colored portions of the transparency, which in turn, changes the way the print will look.

For instance, if a red filter were used to expose a colorful transparency, the first thing that would happen is that all of the red areas in the transparency would be darkened because the red color would transmit through the filter and expose the

masking film with more intensity. On the other hand, the blue areas would not get through the filter, making the density in those areas lighter and eventually, the portions of the transparency that contained blues, would also look lighter.

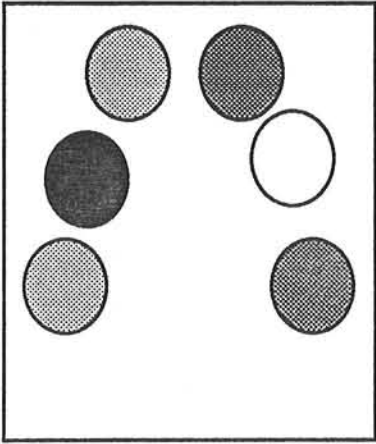
With today's masking techniques, playing with the color response is not a game, but a serious method of making a color print more exciting to look at.

How can we use this method to improve our own color prints, whether they be Dye Transfer prints, Cibachrome prints or any other process that needs reproduction. This system is called "split masking". However, there has been some confusion about split masking and how it works. I will now try to simplify the explanation so that it is understandable. For this demonstration, we will need a few drawings.



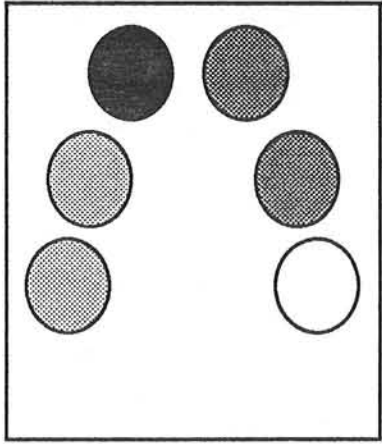
Red filter mask

allows the red color and its components to pass through the red filter



Green Filter mask

The green filter allows the green color and its components to pass through the green filter



Blue filter mask

The blue filter allows]the blue color and its components to pass through the blue filter

Remember, some of the components of other colors contain the same color as the originals components. They would, therefore, pass through the filter.

The original transparency consists of 6 different colored balloons. They are colored red, green, blue, cyan, magenta, and yellow. These are the colors that have been associated with color separation and color printing since the beginning of the color printing process. The only pure colors in this set are the cyan, magenta, and yellow. All of the other colors in the spectrum can be produced with these three colors.

Think about this for a moment. All of the other colors in the rainbow can be produced with just these three colors, the cyan, magenta and yellow. Red is actually composed of two colors. Magenta and yellow. Green is composed of two colors. Cyan and yellow. Blue is composed of two colors,. Cyan and magenta.

These three colors (red, green and blue) are considered **“subtractive colors”**. An example: if red consists of magenta and yellow, the subtractive color (cyan) is missing. If a separation negative were exposed through a red filter, the components of red, which consists of magenta and yellow, would pass through the red filter. The portion that did not get through the filter would represent the cyan image. Therefore, the positive print would repre-

sent the cyan layer. Green would let its two components through, (cyan and yellow), but not the magenta. The magenta would therefore be the positive component. Blue would let the magenta and cyan components through, but not the yellow.

In other words, the components would get through.

Now the system begins to make sense. A mask made through the red filter would allow the magenta and yellow to get through. What about the blue? doesn't it consist of two colors? (Cyan and magenta) wouldn't the magenta portion get through? yes it would.

Therefore, **some** density would occur through the blue filter, also.

A green filter would let the cyan and yellow to pass through the filter. It would also allow some of the yellow in a red area to get through, but not the magenta.

So if a mask were to be made that could be controlled by making split exposures through specific filters, then a certain amount of “color correction” would take place. The colors could be either increased or decreased in density.

This method of determining which filters to use with which principal mask, is more than a guessing game, but is far from perfect. My

Isolation masking system is the only method that I would consider using when confronted with real color correction challenges. (Volume 2, Aug. 1987)

If you would ever decide to expose Cibachrome prints via the “Tri Color” separation filter method, then split masking would be one definite way to improve the color saturation of the print. Split masking of the contrast masks therefore, is just another way to get some of ther colors in a print to more accurately reflect the original transparency, and sometimes, enhance it further. I have used all of the three main separation colors in making split masks.

At one time in my printing carreer, I tried to use a Kodak film called “Tri Mask”. This material was actually a color negative with the color resposes in the correct pl;ace. It was originally made for the lithographic field. I made some great prints using this film. Unfortunately, this film has too high a corrective system as it was originally intended to be used in the making of lithographers continous tone separation negatives. It produced too garish a color correction system for most transparencies used for the Dye Transfer process. Experiment with split masks and see what they can do for you.

How does changing the proportions of Matrix Tanning developer really affect the exposure?

The following article was written by Charles Cramer. Charles is one of the countries finest art photographers, and a fine Dye Transfer printer, as well.

Have you ever wondered how accurate that little bit of information about the matrix developer, and its relationship to exposure, really is?

Exposure and Contrast Control with Matrix Film

When I ran out of my stockpile of Kodak Tanning developer for matrix film, I decided to switch to the formula recommended by Bob Pace. I did a few comparison tests...which led to more tests...which led to quite a few tests.

I will share some of my observations, since I have seen almost nothing written on the quirks of matrix film developing. Although I have been very careful, I offer these results not as definitive, but with the hope that they will lead to further investigation. I would be most happy to learn of other people's experiences.

Chemicals

In the early 80's. I did a lot of black and white film devel-

oping using a pyro formula, so I had a nice quantity of the most expensive ingredient (pyrogallic acid, \$100 per lb.) on hand.

As I later discovered, the pyro and my old sodium sulfite had both lost some of their potency. A friend who was the stocking clerk at a local University said that they would discard chemicals after one year. (However, my pound of ten-year-old Elon was still good). So, watch out for old chemicals.

Processing.

A device that saves me incredible amounts of time and frustration is the Zone VI Compensating Timer. Using a probe in the developing tray, this unit will slow or speed up "time" in order to correct for temperature. I have used mine for four or five years with superb repeatability for black and white paper and film. I tested it with matrix film for temperatures between 64° and 71° with basically identical results.

Also, when printing a picture that has a lot of even-toned middle gray-type values, I drop the developer temperature to 64° so that I will have extra time for agitation (and hopefully, very even results).

At 64°, the 2:30 developing time is more like 3:10 real time.

More on this device can be found in "Keeping Pace", November 1987.

My procedure for developing the many step wedges was to use 1/2 sheet of 11x14 film developed in an 11x14 tray with 400cc of Part A. When changing dilutions, I always kept the part A at 400cc. Since I was only doing one sheet at a time, I would lift the film out of the tray briefly, every ten seconds, to simulate the agitation that three sheets would receive.

AERATION.

Before exposing a set of 16 x 20 mats, I would expose and develop an 8x10 test strip in an 8x10 tray. Then, when I used that result to expose the three large mats, (developed in 16x20 trays), the results would be different.

Also, in repeating some of the testing of the step wedges recently, I decided to save some developer by decreasing the amount of part A from 400cc to 300cc.

To insure coverage of the film, I would hold the tray at an angle.

Suddenly, with this procedure, **nothing was repeatable.**

When I went back to the larger amount of developer with the tray level, I got repeatable results.

These incidents lead me to believe that the surface area of developer exposed to air is important in determining developer activity.

I exposed 4 sheets of matrix film identically and developed them as follows:

Part A/B	Tray size	Exp.
400:800	11x14	6 sec.
500:1000	11x14	6 sec.
500:1000	16x20	6 sec.
500:1000	8x10	6 sec.

the resulting densities were as follows:

..19	.43	.87
.19	.46	.90
.20	.46	.88
.12	.34	.76

I'm still not sure what is going on here, but I guess the moral is to develop test strips in the same size tray as the final mats.

Nowadays, I don't worry about that as much because I use Polycontrast RC paper as a stand-in for matrix film in doing exposure tests.

With my enlarger, I use a grade 22 filter and print the cyan-printer negative.

From previous prints I have determined an exposure "factor" which references the speed of the RC paper to the matrix film.

This system works absolutely beautifully!

Printing. (transferring)

To print my step wedges, I dyed them in two to three liters of cyan dye (for at least nine minutes with automatic agitation), and used de-ionized water for the 1% acetic acid rinses.

Being very aware of how quickly the dye can "poop-out" (especially with dense step wedges), I ran control strips before and after the step wedges to insure the dye was full strength. I read the prints with a reflection densitometer set to the visual filter.

Fogging.

Initially, I encountered a lot of fogging, which I traced to my safelights! I was using the much brighter # 1 A instead of the Kodak-recommended # 1. However, even with no safelight, I had some fogging, especially at the stronger dilutions (1:3, 1:4). To help reduce this "chemical fogging" I now double the amount of potassium bromide in mixing part A. This slows the film slightly, but gives cleaner whites. At 1:2 dilution, I get a maximum white reflection density (RD) of .08-.09. At 1:4 dilution, this goes up to .13. Extra amounts of a 5% solution of potassium bromide can be added—using 10% (of part A volume) of this 5% solution brings the RD down to .11.

Exposure compensation

When remaking a set of matrices, I often would alter the ratio of Tanning developer A to B to change the contrast.

By following the exposure recommendations of Kodak information found in E 80, (Kodak's book on the Dye Transfer process), I would end up with a too-dark print (or going to less contrast—way too light!)

I decided to contact print a Stouffer 41-step step wedge (which has increments of .05), onto matrix film and vary the developer dilutions. My resulting exposure compensation factors were:

1:1	x 1.9 to 2.0
1:1 1/2.....	x 1.4
1.2.....	x 1.0
1:3	x.80
1:4.....	x.66

I then re-exposed my step wedge using these factors, and got very close agreement.

I judged the exposure on which step first showed a paper reflection density of .20.

In all my subsequent tests, these factors remained about the same, both for contact and projection printing.

You can see that these are quite a bit more than the Kodak recommendations.

I was surprised that the step wedges did not seem to change contrast as much as I anticipated. Which brings me to...

Contrast Control.

With my Chromega diffusion enlarger, printing a fairly soft (contrast-wise) image, using the correct exposure changes in going from a 1:3 dilution to a 1:4, I found not that much change!!

Back to the step wedges! Also, Bob Pace thought that projecting a *masked 3-point gray scale* would give more "real-life" results.

Actually, a masked 3 point grey scale is very dense—so I made my own.

I first tested with a scale range of .05 to .91. There was not much change in contrast from 1:1 to 1:4! I then added more range to my scale, eventually using five steps from .05 to 1.31. This made more sense.

Using 1/2 sheet of 11x 14 matrix film, I would print nine of these gray scales at different exposure times, projection F inted with my diffusion head.

This usually insured that one of them would be right for comparison purposes.

To compare these wedges in a meaningful way, I decided to shoot for a reflection density in the lightest step of .03 over the paper white (including fog).

This paper white would vary from .08 to .13 depending on developer dilution, so my target density would also change.

Citric Acid

Bob Pace told me that "in the old days" they would keep the developer dilution at 1 part A to 2 parts B and control the contrast by adding varying amounts of citric acid.

A 10% solution of Citric Acid added in a quantity of 12% of part A didn't do much.

A 35% solution added in the same way slowed the film speed down over five times! I therefore decided to try it with the higher dilutions. At 1:4, I found that adding 5% to 10% (volume of part A) of this 35% solution, increased the contrast, reduced the fog level, and brought the film speed to just a little below normal. Adding higher percentages of citric acid caused the contrast to drop—so 5% to 10% is optimum.

I keep the citric acid in its own graduate, and add it at the same time that I mix part A and B together.

Adding the citric acid creates a brief entertaining "fizz" in the developer.

Condenser versus diffusion

Since I was disappointed in the amount of contrast control with my diffusion

head, I decided to put my condenser head on and continue the step wedge orgy. Besides printing the 5-step gray scale, I also printed the Kodak five-inch 21 step gray scale as another way to verify my results.

I was also intrigued with the old question of which is better—**condenser or diffusion?**

Therefore, I contact printed the 21 step gray scale onto a few sheets of T-Max 100 and developed them for varying times so that I ended up with two sheets with a difference of .30 on the same steps. In other words, ranges of 1.15 and 1.45.

I then printed the smaller range negative with the condenser, and the larger range negative with the diffusion head.

Drawing graphs of these two prints gave results that were fairly close. This would seem to duplicate the findings of Richard Henry in his wonderful book, Controls in Black and White Photography.

Henry showed that he could get identical results with condenser and diffusion enlargers by using negatives developed to **match each light source**.

I use diffusion mainly because there is so much less spotting to do in the final prints.

Conclusion.

It would seem that the contrast control provided by changing developer dilutions does not affect the lighter values (up to a paper RD of about .70 (middle gray)) much at all.

Also, the contrast controls available with a condenser or diffusion head would seem to be about the same, assuming negatives developed to the proper degree for each light source.

Of course, the condenser head does give more inherent contrast than the diffusion head.

To increase contrast, I found adding extra amounts of citric acid to be very effective.

I also tried increasing the developing time in the tanning developer, but there was not much change except for a higher fog level. I have reproduced a chart showing the resulting paper RD's for my five-step gray scale for all the different developer combinations that I tried.

The densities in parenthesis at the top of the page show the densities of the steps in my gray scale. The proper exposure times and exposure compensations are also shown.

Perhaps Bob Pace could draw some further conclusions from these tests.

I would be interested in hearing from anyone with questions or comments.

Comments about Charles Cramer's article can be addressed directly to:

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Comments from the editor:

Charles Cramer's experimenting with the developing and exposure of matrix film is a valuable bit of information.

Most of us have been in the dark when the time came to change the proportions of A to B because of contrast requirements. This information also leads me to believe that every enlarger will produce a slightly different effect. This would also include the many variables that are inherent in any photographic process. Some of the results of the experiments that Charles has conducted have been slightly different with my own tests, which leads me to believe that one must actually test his own equipment and procedures before coming to any definite conclusions.

If any of my readers has a comment about what he or she has discovered about this fantastic world of Dye Transfer, or Ciba, or any other color process that may be of interest to our readers, please don't hesitate to send it in to "keeping Pace".

Making Cibachrome prints using professional paper and the new P 30 processing chemicals.

I have used the new chemistry with the new Cibachrome A 2 paper. It works fine. I have discovered that the contrast level of the newer paper compared with the Cibachrome 2 (professional) paper is lower.

But, to my pleasant surprise, I have developed the professional paper in the new developer with this simple modification.

At 24 degrees Celcius, develop for 3 minutes, wash for one, bleach for 3 minutes and agitate, wash for 1, then fix for 3 minutes and wash for 5 minutes.

If you are using the P 3 chemistry, you should work at 38 degrees celsius (100 F).

In fact:

If you should ever run out of Ciba developer, in an emergency, try straight Dektol. It works great.

Rapid fix works great also. The real mystery and "invention" about the entire Cibachrome process is the staggered bleach.

Here's to **Dr. Gaspar**, the original inventor

One of my subscribers to this newsletter called and asked me to write something meaningful about easel anylizers, and densitometers. The anylizers that I have had contact with were about the best that I have ever seen.

The main thing to look for in any easel meter is **accuracy and repeatability**. Both items are a must.

The current group of meters are all great. I personally like a rather inexpensive meter known as the DPL 2001 made by Wallace Fisher Instrument Co. PO Box 451, Swansea, MA 02777.

This meter is digital and can produce a density reading of the projected image on the easel. Most meters only give you a difference in the color balance and leave the rest of the thinking to you.

This meter has a 6.0 range and is very accurate. I use it for more than just an easel meter. It can also be used as a densitometer.

If you have ever had a problem trying to read a small white spot, and a still smaller, dark spot, on a 35mm transparency and found that your densitometer didn't allow you to properly place the transparency in the correct area and that the probe was too large, anyway? Well, with this meter, simply place the transparency into your enlarger and read the enlarged version of this small original.

The density range will be easy to determine.

The old Speedmaster easel anylizer (A10) was a great machine. It is accurate to within one one hundredth of an F stop.

The parent company (Speedmaster) still maintains them. This unit is capable of programing unlimited amounts of programs. Just place the probe on an already determined, balance and exposure area, and record the numbers after you have "nulled" the color balance.

Speedmasters new version is called the **SM 1400**. It is the state of the art.

The price is a little high, but when you realize what it can do for you, you will conclude, as I have, that it is a bargain.

Densitometers are another story. There are plenty of models around. The good ones are not cheap. The older MacBeth TD 102 is still around and is being sold by lithographers that have been bitten by the "scanner bug." You should be able to purchase one for around \$600. In fact, Condit Mfg. in Sandy Hook, CT has a few for sale. If you do decide to purchase one of these older models, I would reconmmend that you send it to MacBeth, in Newburgh, N.Y. for a check-up. It will be worth it.

Do any of you remember the visual type densitometer?

Kodak made such a model. I still have one in my possession, and still use it.

A rather cheap, but very accurate visual densitometer can be made for practically nothing. All you need is a calibrated grey scale, or a grey scale that some one can calibrate for you. The next issue of "Keeping Pace" will include a diagram of how to make this simple but moderately accurate densitometer

Here is some news about my upcoming video.

It is almost finished. We discovered that we need one more shooting session. Then the last stage of editing.

If any of you are anxious, believe me, I know how you feel.

In the meantime:

My book "The art of Photo-composition" (\$50) and my newsletters (\$50 per year) are still available.

If you would like any of my back issues, (\$4. ea) let me know and I will send you a list of articles, and the months they appeared.

ManyThanks,

**Bob Pace
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619 241 0905**

DEVELOPER DILUTION	ADDITIVES (expressed in % of Part A)	PAPER FOG	Resulting Paper Reflection Densities					EXPOSURE TIME (sec.)	EXPOSURE COMPENSATION (referred to 1:2)
			1 (1.31)	2 (.89)	3 (.57)	4 (.24)	5 (.05)		
1:2	<u>WITH DIFFUSION HEAD</u>	.09	.12	.29	.62	.93	1.08	12	(x1.0)
1:2	(repeat of above)	.09	.12	.31	.63	.94	1.11	12	(x1.0)
1:2	(developed for 3½ minutes)	.12	.15	.35	.65	.96	1.13	10	
1:1		.09	.12	.31	.64	.93	1.05	18	x1.6
1:1	(repeat of above)	.09	.12	.33	.66	.93	1.05	24	x2.0
1:1½		.10	.13	.33	.65	.96	1.11	15	x1.25
1:3		.12	.15	.31	.61	.94	1.18	10	x.85
1:4		.13	.16	.33	.65	1.02	1.30	8	x.67
1:4	+ 10% of 5% potassium bromide	.11	.14	.33	.68	1.05	1.32	10	x.84
1:4	+ 5% of 35% Citric acid	.10	.13	.35	.72	1.18	1.44	15	x1.25
1:4	+ 10% of 35% Citric acid	.11	.14	.33	.64	1.22	1.44	16	x1.34
1:4	+ 20% of 35% Citric acid	.10	.13	.30	.59	1.09	1.35	16	x1.34
1:4	+ 30% of 35% Citric acid	.10	.13	.32	.63	1.06	1.31	21	
1:6	+ 10% of 35% Citric acid	.10	.13	.34	.70	1.24	1.52	13	x1.1
1:6	+ 20% of 35% Citric acid	.10	.13	.29	.59	1.23	1.52	14	
1:8	+ 20% of 35% Citric acid	.10	.13	.28	.62	1.37	1.68	10	x.84
1:1	<u>WITH CONDENSER HEAD</u>	.10	.13	.47	.91	1.21	1.33	16	x1.8
1:2		.11	.14	.45	.90	1.37	1.52	9	(x1.0)
1:3		.12	.15	.44	.93	1.45	1.63	6	x.67
1:4		.13	.16	.44	.95	1.62	1.74	7	x.8