KEEPING PACE

A Monthly Newsletter Devoted to the Darkroom Arts

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Back to the Basics

Making a color print, whether it be a Dye Transfer, Ciba, Type R, or even a Carbro pigment print requires that knowledge of contrast control is of paramount importance. For the majority of us, the "hand's on" approach is still valid. But even more important is the fact that we must understand what contrast control does, regardless of the process involved.

Let us take a simple problem.

Cibachrome (now called Ilfochrome) is an example of why contrast control is so important. The material has a built-in contrast level that is immovable. This has long been known by all the lab technicians that have dealt with Cibachrome. Some wizards have concocted methods and formulas whereby contrast is lowered chemically, but usually at the expense of overall color saturation. Ilford has recognized this contrast problem and has tried to solve it by producing a lower contrast paper, but this is still a far cry from accuracy.

Why?

The answer is very simple. Every transparency has a contrast range entirely of it's own. Will any transparency ever match the contrast requirements of the Ciba material? Who knows.

All I know is this.

Contrast can only be accurately controlled by photographic masking. Any other form of flashing, or chemical manipulation has little going for it. The color balance of the print can be affected by these methods of control, but photographic masking has no detrimental affect on the color or the shape of the image if made properly.

One company that specialized in chemically reducing the contrast said to me that using a silver mask will produce the silver or grey tones in the print. I still can't believe anyone said that, but they did.

What makes me such an authority in this field? I hope that over 50 years in the business of making professional color prints for the most demanding audiences in the world, the advertising agencies and the fine art photographers, has helped in shaping my judgement and learning.

I made it my business early on in the life of color printing to make color prints as good as it was possible. This meant that I had to have the taste required to see the differences in prints and how to correct what I have seen.

But, what kind of approach should we use when masking is involved? How do we make a mask is not the first thing to ask, but why we

must make a mask is more to the point.
With Cibachrome, the contrast is fixed, so we must change the contrast of the transparency physically. We have to reduce the contrast if we want to get a great print.
What is a mask? It is simply a low contrast black and white negative made by contact with the original and placed back over the original when it is dried. This negative added to the same positive will soften the contrast range of the transparency.
How do we make a mask? Simply put, we make a mask by exposing a sheet of Kodak's Pan Masking film, in contact with the original transparency and processing it to a specific degree of contrast (gamma) and when dry is added back to the original, the overall contrast will be lowered. No question about that.
How do we know how much to lower the contrast? This is a question of procedure and mathematics. Where do we begin?
Since the Cibachrome paper is an unmovable material, and considered the culprit, we must start with the paper. It is possible to determine the exact density range the transparency and your enlarger needs so that the paper can handle and produce a print with great details.

Your own enlarger? Yes. Your own enlarger, or any enlarger.
If you own more than one enlarger, you should find the transparency contrast requirements for each enlarger.
How?
Very simple.

1. Purchase a 21 step grey scale, either Kodak's or Stouffer.
2. Cut an opening in a sheet of opaque material, such as exposed and processed litho film and mount the grey scale into the opening.
3. Using your enlarger, project this assembly onto a sheet of Cibachrome paper and expose with different exposure times. Don't be concerned about color balance.
4. Process the sheet and examine it carefully.
5. Mark the areas that just begin to show detail at each end of the scale.
6. Using a densitometer, read the two identical grey scale steps in the original film grey scale scale.
7. Subtract the lower reading from the higher reading and you have a **density range.**

It is this density range that we needed to know. This number is our **"aim point."** If we can somehow reduce the overall contrast of any original transparency to this aim point, we can begin to see how the entire range of the transparency can be printed with ease.
All of the highlight and shadow areas will be visible. Compare this print to a straight print and the difference will amaze you. Remember, this aim point is only good for the specific enlarger you plan to use. If similar enlargers are used in a lab, then it is assumed that the reading for each similar enlarger will be the same. But if you change a bulb, watch out. Make another test.

How does one concoct a masking method out of this seemingly simple idea? This takes time and a little material.
You will need a densitometer for this job. Does it have to be an expensive color densitometer? Not at all. There are some densitometers that have been advertised for a low price. Photronix Delta DX is one such example.

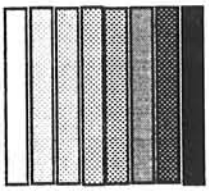
It looks like a toy, but it works great. It is a black and white digital densitometer and is all you need. You will be reading the high and

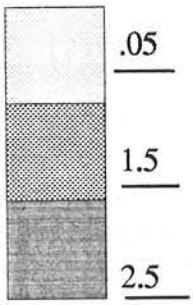
low densities of the original and a color machine is not necessary, although it is nice to have.

There are two important items to be aware of at this point. The first one is how to determine the mask strength, and the second is how much exposure should you give the combined mask material and the transparency?

Exposure is very important. If you make a mask and it is too heavy in exposure, the highlight areas will be adversely affected. If the density is to low, the shadows will have no chance of being opened up.
The contrast must be close enough in accuracy so that the effect is not one of producing a flat print or one that still has too much contrast.

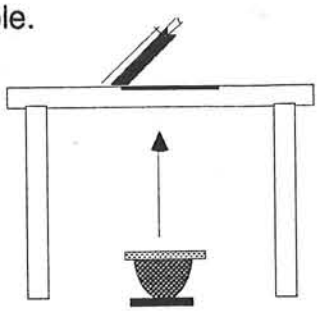
For this exercise we use a different kind of grey scale. Kodak's Q-6C color guide. It is a three step scale with a color swatch that I personally remove so that just the important three steps of grey are evident. However, Kodak has seen fit to discontinue the production of this little aid in preference to getting into the digitized world. You can and must make your own three step guide.
Make a series of strip exposures on a sheet of film, such as Kodak's Super XX or Tech Pan film, processed normally and then with the aid of a densitometer find the three areas that read .5 and 1.5 and 2.5 , cut them out and make your own assembly.





Here is a method to find the right combination of exposure and exposure time for making the mask.
Using two sheets of film, make **identical different exposures** on each sheet (by contact) but **process them at different times.**

How do we make the exposures?
We can use a contact frame, or we can use a printing platen, and the light source can be from below a work table.



or even above.
We need to use color filters (usually the kind used in making separation negatives.)
The light source must be steady and not be able to waver from it's original voltage.
(I suggest a voltage regulator)
A simple Kodak acorn safelight can be all the fancy light source you will ever neec

However, more complicated systems are available from Graphic Arts supply companies.

A simple processing area, such as small trays in a sink, will be all that you need for developing the sheets of film. Accuracy is a necessity in this department. I suggest some sort of temperature control and a method of flipping and flopping the film through the developer with repeatable precision I suggest using a simple device such as a metronome, as the time tool to keep a steady rhythm.
For the time being, don't concern yourself with the

annoying scratches and marks on the masking film instead, learn how to manipulate the films through the developer trays without scratching the film but concentrate on the timing, the temperature and the agitation.
Ifyou make a low contrast developer such as 15cc of HC-110 developer mixed in one liter of water, I would develop the first sheet at 1:30 min. and the other at 4:30 min.
Why?
Getting the results of the differences in contrast, as well as exposure is the **key** to finding out what degree of contrast you are capable of producing with Kodak's Pan Masking film.
If you want to make accurate masks, the level of density in the deep shadows must read around .35. If the exposure is such that the reading is lower, then the contrast correction will not be even and will cause trouble. The shadows will still be blocked while the rest of the image is being lowered in contrast.
All we need to do with these two sheets of film is to use a densitometer to find the reading in the lightest portion of the mask film grey scale that reads close to .35. Circle it when found on each sheet. If you recorded the exposure times then you will know which exposure time produced each grey scale. One will be considered low contrast and the other one high contrast.
So far so good.
Read the previous paragraph again to make sure that you understand what I just said.

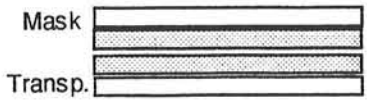
Then a simple mathematical chore. Subtract the low reading from the high reading on each of the circled grey scales and you will find the density range for each of the circled scales.
If you take the numbers, such as the density range of the original grey scale (which should be around 2.0) and divide that number into the range of the just processed grey scale range, you will have determined the gamma (contrast of development) of the specific sheet just processed.
Once you know what the different exposure and developing times are for producing these two new gamma's, the rest is simple. Using a chart, you can easily plot the differences in exposure and developing time for any contrast correction.

An example:
If your transparency density range reads .....2.75 and the **requirement** for your specific enlarger is 1.90 then divide the **requirement** by the original range of 2.75. The number will be .36. This means that if you make a mask developed to a gamma of .36 (%) and exposed so that the shadow areas are about.35 then the resultant print will be better because of your ability to capture most of the details in the original transparency.
Once you are able to produce a contrast reducing mask with accuracy every time, the world of color printing awaits you.

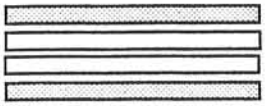
If you want to know more about masking and it's finer points, I have a book available called "Masking for Photographic Processes." Let me know. It is over 66 pages and costs $40. It wouldn't fit in my newsletter.

Colored filters.
Why is it necessary to use color filters to make the masks?
The main reason is the color response of the Pan Masking film. It is extremely sensitive to red light. If a simple white light exposure was made the reds would print darker in the final print. By using different color filters we can produce evenly exposed masks that are neutral . 33% of the red, reen and blue filters exposures will constitute white light.
By determining the correct exposure time for each color, one can easily find the correct percentage for making a white light exposure that is accurate.

Here is one way of positioning the films in order to make a mask.

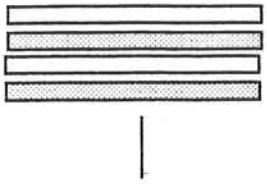


By placing the films emulsion to emulsion, the mask is perfectly positioned, but the chore of exposing the transparency in the normal way when making the actual print, emulsion of the transparency facing the emulsion of the paper, means that the mask must be re-positioned and thereby can (and usually does) go out of register.



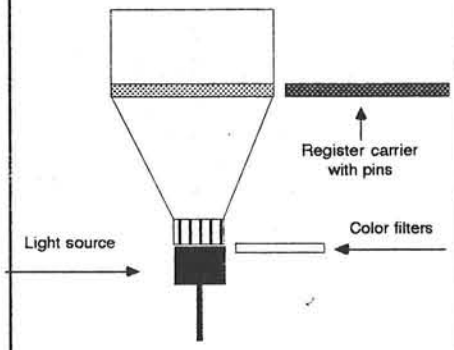
The different emulsions are miles apart and accurate reistration would be impossible to achieve between the ywo images.

So, a different solution to the problem is to place the films as shown in the next diagram.

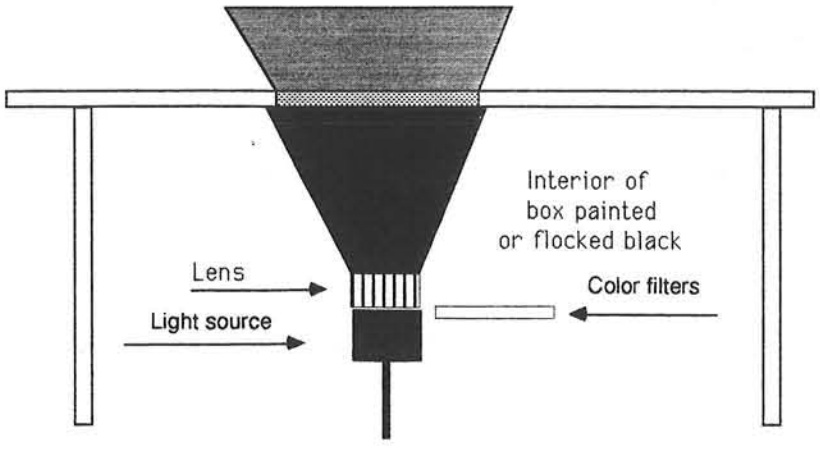


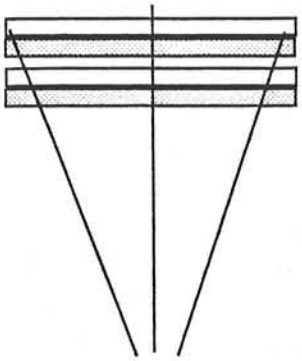
This will allow the mask to be exposed through the back of the transparency while further allowing the transparency to be positioned properly when exposing the paper.

Is this a perfect answer for the positioning of the mask to the transparency?
Normally, I would say yes. But on some occasions, a misalignment will occur. This can produce edge effects that look like a bas-relief image.
The solution to this is as follows.
You can use your enlarger or a reasonable facsimile as the main instrument for making the mask. But this is done in an entirely different way than ever proposed before. (Except by me.)



This system will allow you to take advantage of the normal misalignment that occurs with most films and is relatively simple to do.
All you really need is a register carrier and a heavier than normal cover glass. or a simple contact platen.
Place the films in the carrier or on the platen on register pins as shown in the diagram. Use a light source as shown.
Gelatin color filters can be placed by hand where they belong. With this method of producing masks, you can say good-bye forever to the edge effects that can ruin a perfectly good effort.
If you want a permanent table top device you can easily build something like the larger image below.
I hope I have convinced you that masking is a necessity in producing Cibachrome prints.
What about the Dye Transfer process?
It is not only necessary, but is an opportunity to improve the final outcome of the print.
Depending on your needs, you can easily build your own devices that will work for you and make masking a simpler chore.





The above illustration shows how the light source can go through the emulsion of the transparency (bottom sheet) and how it is transferred to the top sheet (The mask material)
Since the position of the two sheets are the same as when they are used to make a print, the problem of registration is completely gone.

Now we have some idea of the intricacies of the making of masks for the Cibachrome process. The same problems occur with the Dye Transfer process.

However, with the Dye Transfer process, you are virtually on your own.
You are given a box of raw film with which to make separation negatives and another box of raw film with which to make highlight masks, and still another box of raw film for making principal masks, and finally another box of raw film to make the matrices.
Then you are supplied with a set of dyes, which you must mix accurately.
The receiver sheet is only a sheet of prepared white paper.

Remember, with every other process, the paper or film has been accurately and miraculously manufactured with all of the silver halides, colors and dyes in place, and is made to be exposed through a specific color and kind of light. All you have to do is to discover and use the exact exposure and color balanced filtration, and then process the film in a prepared chemical batch produced by the manufacturer. 90% of the work has already been done for you. Not so, with the Dye Transfer process.
Has Kodak been a help in promoting this process? Not really. Except for the fact that Kodak had manufactured the necessary materials they have done little else. If it weren't for the labor of the professional labs in the world, and mainly here in the States, it would be an almost impossible task to produce an acceptable print using any printed information supplied by Kodak.

Remember, in producing a Cibachrome print, the mask strength accuracy is imperative, and so is the actual exposure and filter pack.

The processing of the print is strictly academic.

When a Dye Transfer print is made, it is made using all of the skills you can muster in order to produce the correct contrast masks, and the corrective highlight masks. And let us not forget the correct separation negatives. Different manufacturers make panchromatic films that can, and are, being used for the separation negatives. I prefer Kodak's Super XX. However, at the rate that Kodak is discontinuing making the materials we need, I wouldn't be surprised if they decided to drop this great film too.
If you have been making Dye Transfer prints or would like to learn how they can be made, don't throw away the materials or the equipment yet. The Dye Transfer process is about to get a new lease on life, thanks to Dr. Jay Patterson.
Dr. Patterson has informed me of the following situation. Apparently the gelatin of the matrix film had something to do with it's ability to hold the dyes more accurately.
Animal **hides** as well as bones were used to produce this strange gelatin. Kodak bought a tremendous amount of hides over 30 years ago and when the supply ran out they decided to call it quits.
Dr. Patterson has found a source for such a hide supply and the material is being produced as a test run. I will be getting a sample of the

material to test and so will a few others. Once we have established that we can use the material, Kilborn Photo of Cedar Rapids Iowa, will make a short run. Sometime in September we will know what the future of the Dye Transfer process will look like.
The prices for the matrix film will be about what Kodak has charged. The dyes will probably be lower.
As I said, it isn't over yet. Thanks to the efforts of Dr. Jay Patterson.
I also had a conversation with Charles Berger. He has sent me a sample of a new sensitized black and white pigment for me to test. Using a black and white negative I will expose a sheet and see just what it can do. I will let you know.
He also sent me a set of images with the actual pigments on a sheet of polyseter film. These sheets can be dyed and used as matrix film. The transfer was great. The images were screened, but the dyes ran just enough so that the print looked like a continuous tone image. Pretty ingenious. Charles feels that any separation negative can be used to make a print, whether it is screened or not. I will be examining these new revelations and will be reporting on them in the next issue.

I have been asked by more than one subscriber about the possibility of using a color head when making black and white prints. It is not only possible but a great advantage. The worst place to place contrast control filters is under the lens. The manufacturer of the color head is eager to supply you with the information about what the filter head can do when it is used to make black and white prints on variable contrast paper. With a little experience, you will find that with the addition of yellow into the light source, the resultant print will be less contrasty, and if magenta is added,it will increase the contrast.
I would suggest that a variable contrast rag bond paper be used instead of paper manufactured with an RC base. The difference is easy to see. Kodak and Ilford make such papers.
One of my subscribers is going to try to use Luminos paper as the sensitizing agent in making his own Carbro prints. When he makes his first prints I will let you know how he has made out.

The hand's on approach to fine art printing, whether it be in black and white or color is here to stay.
I have received a few calls about the possibility of making our own personal pigment prints without going into then digitized world. There are a few sources that are doing just that, but most of them are reluctant to describe what they do. They will not discuss any specific formula's and especially not the source of pigment colors.

For any serious color printer who would like to dabble in the color carbon field, try writing to Rene' Pauli at 438 Apt C Tehama St. San Francisco, CA 94103.
He coats his own pigments. He purchases his pigments from an art store that carries Winsdor Newton water colors. He has a formula that was probably derived from the book "Modern Carbon Printing" By Luis Nadeau, whose books are available through Light Impressions magazine. Another man called Reece Vogel, who has a lab in Los Angeles, uses the original pigments derived from the old McGraw Color co.
He can be reached at 818-585-9322.
The field of Carbro is very interesting, indeed. The quality of the bromide paper was the main ingredient that made the process work. The assembly was painstaking, but with today's polyester materials, the registration is a snap.

If you are interested in reaching Mr. Nadeau try:
Box 7 Site RR4
Fredericton N.B.
Canada E3B 4X5

Here are a few tips for darkroom enthusiasts.

When working in a darkroom, must the room be painted black? I tried that just once. It was the most demoralizing period in my life. The room was black, of course, and we had no problems due to fogging. If your enlarger leaks light, it would be better for you to find the leaks and repair them than to hope a black room would kill any fog problem.
One of the best small "one man" labs I have ever seen belongs to Ron Silver of Mariposa, CA. His darkroom size was only 5x10 feet and was painted a smooth white. His safelights were two Thomas safelights that emit a very narrow spectrum of light that fall into the safe area for black and white paper. An opening in one wall contained two 4x5 Durst enlargers. These were the top of the line machines. Under the table top there were light tight drawers that contained the various kinds of paper needed for any job. The opposite wall contained a clean home made fiberglass sink and a CCP2 Jobo rested in it on a set of blocks.
The chemistry was in bottles sitting on a shelf over the sink and easily delivered. The quality of his temperature faucet and the rest of his darkroom was immaculate.
The enlargers were bolted to the table top and secured from the sides so that when once locked into position, no movement was possible.
His main work consisted of producing annual reports and his clients gave him a great deal of freedom to experiment with what was expected from him.

Another item I used quite frequently was the glow in the dark paint or tape.
I placed this tape wherever I needed to know where I was. The first place is on your enlarger. I have bumped my head on the solid part of the enlarger many times. A small dot of tape is all that it requires. Light tight drawers that need to opened in total darkness are easier to find if you can see the glow of light from the tape. I had at least 18 spots of glowing tape in my small 12 x 18 ft. darkroom.

The light source used in your enlarger may be detrimental to your timers health. If your timer is rated at 600 watts and you are using a 250 enlarging bulb, you will have no difficulty, but if you are using 800 watts or as I did 2000 watts of light, then the amount of "juice" going through your system will eventually burn out the timer. Usually, right in the middle of a job.
The solution to this problem is simple.
Purchase a system that allows you to bypass the electrical load. It is called a **Relay.**
With this device, the electrical load is run through the relay but only a small voltage is required to set the relay in motion. It triggers a magnetic charge when turned on. As a result, the timer is hooked to the relay and the main electrical load then activates the bulbs in the enlarger head.
This device has been around since Edison and is used in many variations. If I knew of this relay system earlier, I could have save the repairs on many timers.

If you should ever need great optics with your transparency viewers try the items found in the Edmund Scientific Catalog. I use a 6X wide field magnifier. I also use a 12X compact folding pre-coptic magnifier. When examining 35mm transparencies and if you are concerned about sharpness, this will tell you the truth.
I recently finished a book on masking. This is masking for all photographic processes. It costs $40. Let me know if you are interested. Thanks.

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