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Feature Article: Troubleshooting

What To Do When You Can't Call JOBO

By Paul Rowe

Very often when our phone rings the frantic quality of the customer's voice shows that they have been trying to reach us and SOMETHING IS WRONG . Questions regarding the process and the problem are merely another annoyance—they just want to know what has gone awry. Unfortunately, we have to deal with details of the process in order to try for an answer.

There are some basic rules which will make your life immeasurably easier, and it is better to review them now when you are not faced with a crisis. Following these steps will often prevent problems from happening!

1. Read Directions: I am convinced the world is divided into two polarized camps. One group reads every dot and tittle of an instruction sheet, and follows it with fervor that might better be applied to the scriptures. The other group treats instruction with disdain—the manufacturer can't know what he is doing, and even considering the instructions is a sign of weakness. It is important to know what both the hardware manufacturer (like JOBO), and the software (chemical/paper) manufacturer says.

2. Work Methodically: Try to develop regular patterns in your processing, and chemical mixing. Until you have the experience to know what correct procedures are, and what correct results look like, this is not an area to try your creativity! Keep everything CLEAN! The easiest way to slip into a processing problem is contamination, and it can come from both expected and unexpected origins.

3. Don't Skimp: Another area where problems arise is in the workers fetish for speed and economy. It can be: "I can save a couple of minutes—this wash would be OK at three minutes instead of five." or "I am not going to bother with the prewarm time—that is five minutes I do not want to spend.", or " The tank says it requires 240 ml, but I think that is too much for a couple of rolls of film. I am going to try it at 190 ml". But you get the idea. Do all of the steps a process calls for, and use all of the time required. Use at least as much chemical solution as a tank requires, and if there is any question, use more!! Often people forget the initial cost in bringing an exposed roll of film into the darkroom for processing. It was not just the 3-6 dollars for the film, but the \$1500 spent on the extended motor trip to the National Parks. After this expense they risk the film in order to save 35¢ in developer costs, or save five or so minutes by cutting up the process steps.

4. Isolate The Problem: The photographic process is just that - a *process*. Often when we perceive a problem we zero in on the last step, that is the area where we recognized the difficulty. This approach can lead to a frustrating expenditure of time before we finally find our culprit, which is normally in another area of the *process*. A careful and critical analysis of a problem can often allow mistakes to be your best teaching aid.

5. Assume That You Are The Problem: Most all problems with the photographic process can be placed in one of four areas: #1-Hardware, #2-Software, #3-Environment, and #4-Technique. By far the largest number of problems can be placed in #4 -Technique. I know we all hate to admit this, particularly if we have been working in the darkroom for some years. The fact is that most often there is nothing wrong with camera, film, processor, chemicals, or paper. The problem is in how we are using them. The next most common problem is environment. Familiarity with our surroundings blinds us to obvious physical situations which can cause difficulties. One customer was experiencing problems with density and color balance in his film. We were covering the list of potential causes for the fifth time, when he casually mentioned that he never had problems loading his reels—he could see the film, the reel, and even the color of his shirt!!! When he got rid of the light leak in his darkroom the density and color problems disappeared.

6. Experiment—Persevere: Use your mistakes to learn from. Consider possible solutions, then try them. Very often you can solve the problem yourself. In addition to the following lists of processing faults we have included a one page list of facts and questions which you can use to help in analyzing a problem. This list is a valuable tool, either if you are trying to solve a problem yourself, or if you are preparing to call JOBO to get some help. As you read over the list, many of you will recognize that we will try to get answers to most of the questions when you call. If you have the answers written, you will already have considered many of these situations, and we will readily be able to discuss them.

You should note that there are many errors other than actual processing that may appear to be a processing fault. Some of these are: Out of date or improperly stored film or paper; over or under exposure; light leaks in the camera, drum or tank, or in the darkroom itself; exposure of the film or paper to X-rays, microwaves, or some chemical fumes; and incorrect identification of the process required for the film or paper you have exposed.

TroubleShooting:

Film Processes (P)=problem, (S)=solution

FOR E-6

(P) Transparency too Dark. **(S)** Increase time and/or temperature of the first developer.

(P) Transparency too Light. **(S)** Decrease time and/or temperature of the first developer.

(P) Transparency too light and color shift toward blue. **(S)** First developer contaminated with fixing bath. Mix fresh developer and clean equipment.

(P) Color Shift toward blue. **(S)** Be sure Reversal bath is mixed to only a 60% solution. Also check age of developers and conditioner, and possible contamination of developers.pH of color developer can be raised with NaOH.

(P) Strong color shift toward green with insufficient black density. **(S)** Reversal bath exhausted-Make fresh Reversal.

(P) Yellow spots and high minimum density. **(S)** Developer contaminated with Stabilizer. Clean reels.

(P) High minimum density (retained silver). **(S)** Increase bleach and fix times. .

(P)Color shift toward Magenta. **(S)** Extend wash after 1st Dev. Aerate bleach. Increase Color Developer concentration by 10%.

(P)Color shift toward Yellow. **(S)** All Films: Loss of Bleach activity. Check preparation, mixing, and times of all baths. Kodak: Reduce Color Dev. pH by adding H₂SO₄.

(P)Film end closest to center core of reel is undeveloped. **(S)** Increase the amount of chemistry used.

Please note that the complexity of the E-6 process can not be covered in a half page, as above. There are several publications that cover the subject in depth. They are:

*Kodak Z-119 Processing E-6, 5th Edition CAT #102-9693
Fuji Film Processing Manual for CR-56/E-6*

Both the Kodak and Fuji Manuals require the use of control strips and a densitometer.

FOR C-41

(P) Negative too light. **(S)** Increase time and/or temperature of the developer.

(P) Negative too dark. **(S)** Decrease time and/or temperature of developer.

(P) Low contrast-Color balance OK. **(S)** Increase agitation speed.

(P) Too much contrast. **(S)** Decrease agitation speed. (Note that change in agitation speed has only a minor effect on contrast.)

(P) No image on film. **(S)** Check sequence of process steps. Developer may be old or exhausted.

(P) Film end closest to reel center core is undeveloped. **(S)** Increase amount of chemistry used.

FOR B&W

(P) Negative too light. (Lacks density.) **(S)** Increase time of developer.

(P) Negative too dark. (High density.) **(S)** Decrease time of developer.

(P) Density streaks or clouds. **(S)** Developer time too short. Dilute developer to a concentration requiring a five minute or longer developer time. OR—*Developer too dilute*—Increase volume or concentration.

Print Processes (P)=problem, (S)=solution

FOR ILFOCHROME

(P) Spots, light to completely white. **(S)** Paper has been exposed to light.

(P) Gray or black spots on print. Spots are negative. **(S)** Processor not level, or drum is floating. Check for level. Lower level of upper water bath if drum is floating. Amount of solutions insufficient. Use amount recommended by Ilford.

(P) Print has reverse image, too dark, and orange. **(S)** Paper was exposed on the backing. Expose on the emulsion side.

(P) Faint, dark print. **(S)** Increase developing time.

(P) Brown spots on back side of print, and/or red stains on exposed side of print. **(S)** Decrease rinse time and rinse quantity of rinse step after developer.

(P) Black areas lack density, and some color shift. **(S)** Wrong safelight, or exposure to light.

(P) Yellow spots on print. **(S)** Developer contaminated by fixing bath. Rinse and clean drums carefully.

(P) Gradual diminishing of color and density on print from motor head end to end away from the motor head. **(S)** Level processor, and/or increase solution amounts. Check temperature and processing times. Lower water level in upper trough to prevent drum floating.

(P) Blue streaks on print. **(S)** Emulsion has been scratched. Remove from drum very care fully. Use less pressure on print squeegee.

(P) Print too dark. **(S)** Increase exposure time.

(P) Print too light. **(S)** Decrease exposure time.

FOR RA-4 (PRINTS FROM NEGATIVE)

(P) Print too dark. **(S)** Use shorter exposure time.

(P) Print too light. **(S)** Use longer exposure time.

(P) Black areas on print are blue. **(S)** Increase developer time and/or temperature. First developer is old or exhausted. Mix fresh chemical.

(P) Dark blotches in print. **(S)** Paper has been exposed to light.

(P) Print is light or off color on end away from processor. **(S)** Drum not level or solution volume too low. Check processor level, make sure drum is not floating.

(P) Print has light colored stripes. **(S)** Processor is not level, and/or drum is floating in upper trough. Check level. Lower water level in upper trough if necessary. Insufficient solution quantity. Use either amount suggested by JOBO or by chemical mfr., whichever is greater.

(P) Print has stripes from end near motor head to end away from motor head. **(S)** Use 1 minute prewash. Place drum on processor more rapidly after turning horizontal.

(P) Light spots on print. **(S)** Bleach-fix contamination. Clean drum and cap assembly very carefully.

(P) White in the print is impure. **(S)** Wrong safelight. Darkroom is not light tight.

(P) Print has purple/magenta swirls or cast. **(S)** Bleach-Fix contaminated with developer. Add 30 second stop bath and 30 second water wash between developer and bleach.

PRINTS FROM SLIDES

(P) Print is too dark. **(S)** Increase exposure time.

(P) Print is too light. **(S)** Decrease exposure time.

(P) Contrast is excessive and/or black areas are green. **(S)** Reduce time and/or temperature of the first developer.

(P) Dark areas and colors are uneven. OR Print with undeveloped (white) area. **(S)** Processor not level, and/or drum is floating. Level the processor and/or lower water level in the upper trough. Insufficient chemistry. Use the amount recommended by JOBO, or the chemical manufacturer, whichever is higher.

(P) Print too dark and has low contrast or impure black areas. **(S)** Increase time and/or temperature of the first developer.

(P) Stripes in print from end nearest motor head to end furthest from motor head. **(S)** Use 1 minute prewash and rotate drum immediately after turning horizontal.

(P) Print has light to white spots. **(S)** Paper has been exposed to light.

(P) Black areas of print lack density. Print has color shift. **(S)** Incorrect safelight or over-exposure to safelight.



Article II: Making Duplicate Color Negatives

by Darryl Nicholas

I'm sure that not too many of you have requests for duplicate color negatives. If that's the case, then you might be wondering why anyone is going to the trouble of writing an article on the subject. Well, it just so happens that the SAME TECHNIQUES and the SAME MATERIALS that are used to make duplicate color negatives are also used to make duplicate transparencies! And, these SAME TECHNIQUES and MATERIALS are used to make transparency copies of color flat-art. Copying color flat-art can be really important if you are trying to prepare a slide lecture and want to use

slides of certain photographic prints that you might have.

If you have the color negative that the print was made from, you can always make a slide directly from the negative, but you might not WANT to! For example, if the print needs something like critical color balancing, special dodging or burning-in, unique cropping, or maybe a deliberate processing condition, then making a slide from the negative won't demonstrate what the print can demonstrate. In that case the only solution is to make a slide from the print... a "copy slide".

Kodak makes two types of slide duping film: a "Tungsten" version, and an "Electronic Flash" version. The "Electronic Flash" version is available only in 35mm format - 135-36 and 100' rolls. I buy it in 100' rolls, with the designation SO-366. It works well in a camera when used for copying flat-art and photographs. Kodak's "Tungsten" version is available in both roll formats and various sheet sizes, and in both a "long" and a "short" exposure version. The long exposure version is called Ektachrome Duplicating Film, #6121. It is designed for exposures of about 10 seconds. The "short" exposure version is called Ektachrome Duplicating Film, #5071. It is designed for exposures of about 1 second. I have used the "short", #5071 film successfully with 7-1/2 second exposures on the Beseler 45A Color Head for duplicating slides. Kodak also makes a tungsten version designed for duplicating Kodachrome Films. It is called Type K/7121. I've never used it.

Fuji makes only one type of slide duplicating film: Fujichrome Duplicating Film, CDU. However, the Fuji film can be used with BOTH tungsten and strobe light sources! And it can be exposed at times of 1/1000 to 20 seconds! Now, THAT'S a lot of versatility! I have used it successfully in cameras with strobe lighting for doing copy work, and I've used it for slide duplicating with my Beseler 45A Color Head as the light source. The 45A Color Head produces an exposure of about 7-1/2 seconds. The film is available in 35mm rolls of 100' as well as the common cut-sheet sizes.

No one currently makes a slide duplicating film in 120/220 formats... which is too bad, since a duplicating film is basically a fine grained, low contrast transparency film. I know people who use 35mm duplicating film as a camera film for shooting in high-contrast lighting situations... such as snow scenics, desert scenics, etc. Once they get past the color balancing problems, they tell me that it does an excellent job of recording a nice long contrast scale in what would otherwise be a difficult situation.

The real problem with using duping film is getting it properly color balanced. Each different emulsion batch of film has its own unique, color balance. In that way, it's a lot like a positive version of Internegative Film. You have to run a series of color balancing tests on each emulsion batch to determine the precise, EXACT filtration settings that are needed. Once you have determined the proper color and density settings needed, the hard work is over. Whether you want to duplicate a transparency or a color negative, you would use the SAME settings!

There is a slight exception to the above generality. Different brands of transparency film act as a slightly different filtering medium to the light being used to create the exposure. Thus, while some brands will pass some portions of the spectrum, other brands will pass different portions and/or different quantities of the same group of light waves. Therefore, the settings used to produce a critically color balanced duplicate made from one brand of film might not produce such color precision from a different brand of film. It's largely a matter of how critical the quality of the color balance has to be. This is not a problem when making duplicate color negatives, since such small color differences are easily adjusted for when printing the negative.

When you perform the color balance testing on a new batch of duping film, use a "test" image that has been made on a brand of transparency film that you expect to be using most often. Then, as other brands of transparency film come along, you'll easily be able to tweak the setting to fine-tune the color balance.

In order to establish the color balance of an unknown emulsion batch of duping film, you will need some type of a "calibration slide" that you can use. If you'd like to make your own, you can. It should be on the brand of film that you expect to be using most often. For that matter, if you go to all the trouble of setting the thing up, you might as well shoot it on SEVERAL brands of film!

A calibration slide should contain several key image elements. Ideally, here's how to go about it. You'll need a human model...girl-types are nice to work with (if you're a boy-type!), but any model that can present a "skin tone" will do. Have your model wear a BLACK colored skirt, preferably made from a shiny fabric that has a characteristic to the weave of the fabric known as "black on black". It will produce a GREAT "shadow tone" in the slide. Then have the model wear a WHITE (not off-white) sweater. The weave in the sweater will produce delicate highlight tones that will be a great test of the high end of the scale. Position near the model a large card on which you have mounted a B&W Step Tablet (such as Kodak's Q-14, Cat No. 152-7662), an 18% Gray Card, and a 90% White Card (such as Kodak's R-27, Cat. No. 152-7795). Use strobes in soft boxes or umbrellas for lighting. They will most likely be closely "matched" to the color balance of the better professional transparency films. Don't waste your time shooting this on an "amateur" film. It won't even come close to producing a neutral gray tone.

Arrange the lights so that you have a soft, diffused skin tone on one side of the face, diffused white highlight tone, and a diffused black shadow tone. Then use a hard, direct hair light to produce a near-washed out patch of skin tone on the side of the face and the hair. These near-washed out areas will "test" the contrast buildup that you don't want to occur in your duping effort. The B&W Step Tablet will provide an area (in its lighter step values) where it will be possible to observe the presence of trace amounts or erroneous color. The Step Tablet also offers a way to judge contrast buildup. The 18% Gray and 90% White areas will give you places to put an analyzer probe and create color analyzer programs if you want to. Finally, if it makes you feel any better, you can include some color patches with the JOBO Color Control Card #6817.

When you get your model all rigged up, and the lighting all set just right, compose for a near-head & shoulders type shot and blaze away! Make a series of bracketed exposures - 1/3 f/stops if possible - onto your favorite slide film.

After the film is processed, pick out the best exposure, and WALLA! You have a custom made calibration slide!

When using the "calibration slide" you want to adjust the density of the test image to be the best compromise between being able to see some detail in the black shadow tones (of the model's black skirt) and still not washing out the white highlight tones (in the model's white sweater). You then want to have the color balance established well enough so that the lighter tones of the Step Tablet look "clean" and do not show any trace color. The near-washed out area of skin tone and hair light will also help you to establish a density level that will be an acceptable compromise. These near-washed out areas will easily alert you to any undesirable contrast buildup that might occur.

Now, armed with your new calibration slide, you should proceed to run a series of density step exposures in an effort to establish the proper density level for the new batch of duping film. If you're working with an old fashioned dichroic enlarger, you might need to start with color settings of 30C 50Y 00M. If you're using one of the new, modern Beseler 45A Color Heads, try starting color settings of 010-030-000. They won't be correct, but they'll be close enough to use for a "starting point".

Run a series of density exposures, process the film and determine what setting produced the best density level. Then study that particular image and decide which way to change the color settings

in order to improve the image. Make the change in the settings, and proceed to run a color ring-around... in maybe 10CC increments.

Be sure that the light table that you use to evaluate your slides has 5000K light, and NOT common fluorescent lamps. Also, be sure that the white plastic diffusion sheet that's used in the light table is really white, and has not turned yellow with age. If you think I'm being picky about these things, you've never spent three days producing a batch of slides only to have to do them over when you found out that the color balance was wrong!

It will also help in your color evaluations if you will get a small transparency B&W Step Tablet (T-14) to hold up against the test image when trying to determine if the neutrals are truly neutral.

As you get the color balance adjusted close to the balance point, EVERYTHING will start looking good to your unaided eye. Try using a Kodak Control Scale, T-14, (Cat No. 107-7999). It will help to keep your eye "honest"!

You'll probably have to run 3-4 color ring-around tests. Each subsequent ring-around test should be run at a little tighter increment of change. Your final color ring-around should be run at about 3CC of increment change. Each time you run a color ring-around, be sure to make a density correction. That is, study the best image from the ring-around test, and decide how you want to change the color settings for the next ring-around series. And at the same time, decide if and /or how much you want to change the density settings to fine tune them.

Once you have established what settings to use in order to produce the most optimum duplicate of the calibration slide, then all other slides can be duplicated with the same settings. Of course, as I explained above, different brands of film will need some slight color tweaking in order to be "perfect".

Color negatives can be duplicated very nicely by this procedure. Don't expect a duplicated color negative to be printed with the same settings that were used to print the original. That won't work! But, a properly duplicated color negative will produce prints that will be near-perfect matches to the prints that were produced from the original color negative.

By the way, if you're wondering why anyone would want to duplicate a color negative... there are several good reasons. Some customers have needs requiring hundreds of prints from a single color negative. Most lab technicians report that after 6 or 7 hundred prints, a given color negative will have faded enough so that it should be replaced. Some customers have color negatives that are so valuable that they don't want to take a chance on the loss or destruction of the precious original negative. A duplicate negative fulfills their needs.

Article III: Bad News In The Darkroom

By Bob Mitchell

Seriously folks, you and your lungs and hands had better listen up. There are evil gremlins lurking in your darkroom - just waiting to lay you low. Your eyes too, for that matter.

Some of the materials with which we all work in our little photographic dungeons are really deadly.

Ask me! Not all that long ago, Mr. Smarty Pants (me) began to develop a cough, the likes of which you have never seen - or heard. It was one of those coughs which one doesn't take to the concert or the opera. For one thing, you'd scare the hell out of everyone around you. Even the conductor would be wont to turn around and give you such a glare!

I tried everything to cure this 'cold' but to no avail. I even tried strong pills that produced absolutely no effect. The doctor offered his wisdom - and bill. Still, the cough persisted.

Finally, I visited an allergist to see if there was something he could do. After several tests of my blowing into a funny looking machine, he said that I had a real problem. No Kidding!

In tracking all the obvious possibilities down, he finally asked me if I was into any special chemicals. Aha! When I showed him the poop sheets on the various chemistries that I use in the darkroom, he nearly fainted.

"Do you have any ventilation in your darkroom?" "No." "Well, now, I think we're getting somewhere."

He gave me a couple of little gizmos that allowed me to inhale some magic powders directly into my lungs with added instructions for me to provide some sort of ventilation in that darned darkroom.

I built in an exhaust fan and guess what? The cough is gone and I am pleased as punch. Now, I can go to concerts, quietly.

That takes care of the lungs. Now for the hands: The skin on my hands began to develop a funny looking (not really all that funny) rash that I wasn't able to cure with the usual salve. Man, I hadn't been doing anything new in the darkroom.

The same doctor said I probably had lost any immunity I had to some of the chemicals with which I work. Solution - rubber gloves! Glory be to JOBO - the rash went away. Now, I can applaud at concerts too. JOBO's cotton lined, durable, chemically resistant gloves are available in Medium #3344 or Large #3345.

Moral - be cool in the darkroom. Ventilate and wear rubber gloves and life will be ever so kind to you.

I still don't wear a helmet like the guys in space, nor do I wear a respirator. The exhaust fan and gloves are keeping me on the right track. Think about it!

Article IV: Protectan Kicks Oxidation

by Ken Owen

Did you ever reach for your bottle of developer concentrate, pour it into the graduate to mix some working solution, only to find the solution had turned brown? Of course with most developers, the brown color means it has died. This is generally caused by oxidation; air getting into the solution, before you had a chance to use it up. It's frustrating, and it can be somewhat costly, since now you have to throw away this unused and no longer useful chemistry.

Tetenal has come up with an answer to this problem. It's called PROTECTAN SPRAY. It's an aerosol type product, but free from CFC's. (Chlorofluorocarbons for those of you who prefer names to initials.) Just point the flexible nozzle (which fits under the cap) into your open bottle of developer concentrate and spray. It flows into the bottle at about 50 ml per second, so you can estimate how many seconds you will need to spray to fill the empty space in your bottle. You can also

hear its pitch change as the bottle fills with gas; just like the sound changes as you pour water into a bottle. A single can of Protectan has enough heavier-than-air gas in it to displace 100 liters of air from your bottles, and getting rid of air can get rid of oxidation.

In a simplified description, there are two "time-bombs" ticking in every open bottle of developer. The first is the simple age of the solution. From the day it was manufactured, it's starting to die of old age. As long as it is sealed from the factory, you can generally count on the same results from the developer for up to 2 years with color developers and about 4 years on black and white developers. After that, the "time-bomb" of aging has made it unreliable. The second "time-bomb" is oxidation. Once you open the bottle of developer, oxidation takes over the race against time, in using up the developer. If you only remove a little of the concentrate from the developer bottle, you can probably still use it for up to 6 months. As the air space increases, the oxidation accelerates, and when the bottle is half full of air, you may only expect up to 2 months of usable life. When the bottle is 3/4 or more full of air, you are probably only dealing with a few weeks left to the life of the developer.

Using Protectan can nearly defeat the oxidation gremlin from killing your developer. Just spray it into the bottle immediately after you use the concentrate to displace the air in the bottle. It's like keeping the bottle filled so almost no air can reach the developer. Then you are only dealing with the age factor from the time you opened the bottle. Even when the bottle has only a little developer concentrate left in it, as long as you have been using Protectan each time it is opened, you should be able to get a full 6 months of usable life, starting from the time you first opened the bottle.

Protectan can also help to extend the storage life of working solutions. But since they are less concentrated they will have a shorter life available. Unused developer working solutions may be able to be stored for up to 2 months when using Protectan Spray.

All things considered, this little can of spray, can help protect your investment in developer, and the images you will process with it.