

SHOP MANUAL

UPON RECEIPT OF
THE JOB
FROM THE CLIENT

Upon receiving the job from the client, check the package for the P.O., layouts, stats, color swatches, etc. Check the package for extra envelopes, attachments or whatever, that may have been included or attached to the exterior.

Read the P.O., check the layouts, stats, etc., to get an idea of what is wanted.

Check the transparencies on the light-box. Look at the color and especially sharpness. Note any discrepancies and possible problems.

Make out a Shop Work Order, and assign Job#. Call client to acknowledge receiving the job and to get clear on any questions about the job overall, color of the transparency and desired results. Inform the client of any faults in the transparency (lack of sharpness, overall color cast or shift of color balance, out of focus, etc). Be sure that the client is aware of these items. If the background is either white or a light color, find out if they want us to drop the background. Remind them that it's usually less expensive for us to drop the background than to have the retoucher do it. Ascertain if a background is to be added later. If so, what color, how dark?

What is to be the final reproduction size? Possibly the size print ordered was too small, large, or inappropriate in some manner.

If the print is to be a strip, is there a detailed layout giving specific size and position information? If not, can the client supply us with one? The phrase "Just make it look good" doesn't have enough information for size relationship and positioning.

WHAT IS THE TIMING OF THE JOB? Try to get as much time as possible.

As this information is gathered, write it on the job order. Be as complete as you can. It's important.

Finally, staple the P.O. to the job order, gather the layouts, and other stuff together and put it into a job envelope. Hang it beneath the chalk-board and write the clients name on the chalk-board showing the delivery date, time, and other relevant information.

Then proceed with the job.

MOUNTING THE TRANSPARENCY

Except for 8X10 transps, evrything is mounted into a carrier sheet appropriate to the transparency. Sheet film transparencies are mounted into the center of a piece of 8X10 sheet film (usually a bad separation negative) while roll-film and 35mm transparencies are mounted into a piece of film more in keeping with the thickness of the film base and method of separation.

Try to find a place that is free of oil to work on. It saves having to clean the transparency later.

With 4X5 and larger transparencies (but not 8X0) select a clean sheet of scrap film. Try to find one that is free of oil spots.

Using a straightedge and a felt-tip pen draw a pair of diagonal lines across the EMULSION side so as to intersect at the center of the sheet.

Turn the carrier over, so that the base side is up. Using a knife or scissors, cut off the corners with the holes punched in them. These holes will not be used in further steps, and can only serve to confuse things later.

Remove the transparency from the sleeve and position it in the center of the carrier sheet using the lines you drew earlier as a guide. Tape along one of the edges to keep it in place. With a straight-edge and a sharp knife, cut through the carrier sheet OUTSIDE the edges of the transparency. Do this on all four sides so as to leave an opening for the transparency to fit into.

Now position a 21-step step-tablet in a vacant area of the sheet, and cut an opening for it. The step-tablet doesn't have to be immediately adjacent to the transparency, but must be in a place where it will receive the same light and exposure as the transp.

Using Silver tape, tape the transparency into the carrier sheet on the BASE side. Don't pull the tape tight while doing this. Set it down at one point, and let it come down while you rub along the joint. If the tape is tight, it will pull the transparency and the carrier, and form curves. It will be extremely to achieve register later. You want the transparency and carrier sheet to lie flat when you are finished.

Tape in the step-tablet in a similar manner.

Now insert the package into a sleeve.

MOUNTING ROLL-FILM

AND 35MM TRANSPARENCIES

The mounting of Roll-film and 35mm transparencies follows much the same procedures with these notable differences.

ROLL-FILM TRANSPARENCIES

First, select a scrap piece of hilite film (a reject hilite mask will do fine), and cut it down to 4X5. On the emulsion side, draw the intersecting lines, to give a center. On the base side, center the transparency and cut it in.

Position an 11-step step-tablet immediately adjacent to the transparency and cut a hole for it. The position of the step-tablet will depend on the format of the transparency. The step-tablet must close to the transparency so that it will show up on the separations later, after enlargement.

Tape the transparency and step-tablet the same as with the 4X5's. Once again you want a package that lies flat after you're complete. You will want to cut a narrow strip of tape to fill in the juncture of the step-tablet and transp.

35MM TRANSPARENCIES

Cut the carrier sheet to 2 1/2" square. Center the transparency by the usual method, and cut it in. Tape the transparency on the BASE side. On 35's tape over the sprocket holes along one edge, and leave the holes exposed along the other. Do NOT put a step-tablet on this carrier.

The step-tablet will be handled at a later point, and does not carry with the transp.

All transparencies are inserted into the appropriate sleeves upon completion of mounting.

READING THE TRANSPARENCY
TO DETERMINE MASKING EXPOSURES
AND PROCESSING TIMES

This Will Be The Same For All Formats

The important areas of the transparency that we are concerned with in this section are the Detailed Hilite, and the Detailed Shadow.

A visual inspection will immediately tell you where the Brightest Hilite is. What you want here is the brightest hilite with detail. Bright specular hilites (reflections of the Sun, etc) hold no information and are thus irrelevant to this discussion.

Next, determine where the Deepest Detailed Shadow is located. You may have to hold the transparency near a bright light while inspecting it with a loupe. DO NOT OVERHEAT THE TRANSPARENCY! What you are looking for is a deep shadow that still contains detail. A flat featureless black has no information and is of no use for this purpose.

NOTICE: Hilites and Shadows are not necessarily always black and/or white. Hilites and shadows can have definite color information. For instance, you could have a bright patch of yellow, that if it had detail, would might be the hilite that you would want to select. The same applies to the shadows.

Calibrate the densitometer. The densitometer should have been turned on at least 15 minutes before initial calibration. Use the calibration standard provided by The ESECO Corp. It is usually kept to the right of the machine. ALWAYS CALIBRATE THE DENSITOMETER BEFORE USING.

The calibration procedure is:

Depress the foot-pedal on the floor, and set all channels to Zero. the various color channels are selected by turning Knob on the front of the measurement probe. Use the upper row of knobs, above the colored lights, labeled "Transmission Zero". The lights on the front panel show which color channel is active.

With the selector knob set for the neutral channel (white lamp), set the calibration by placing the high density of the calibration standard over the aperture, depressing the foot-switch, and adjusting the Transmission Calibration knob until the proper value appears in the readout on the front of the machine. Remove the strip, and recheck the zero. Recheck the calibration. Inasmuch as these controls interact, somewhat, it may require going back two or three times. Now go back and check the zero of the color channels, adjusting if necessary.

If you are going to read the transparency while it is in the

sleeve, you can save some time by calibrating the densitometer through a sleeve that is the equivalent of the one covering the transp.

Start a data sheet for the transparency in question.

With the transparency still in the sleeve, read the shadow densities. Check through the color channels to get the highest density reading. Density readings of more than 3.15 are generally unusable. There are times when you will want to use a shadow density of more than this, though. If the whole transparency exhibits evidence of underexposure, and seems to be fairly normal otherwise, a shadow may read as far down as 3.8 or so. On a normal transparency, you will be looking for a shadow density reading in the range of 2.78 to 3.18. Record the shadow density on the Data sheet as Trans High Reading.

Now, read the hilite. You should expect a reading of .20 to .40 or .45. Anything less than .20 is a specular hilite and pretty well represents Base Fog. If the transparency had a shadow reading over 3.0, the hilite reading may reach .75 or even higher. This depends on the transparency. If the transparency is normal otherwise, the hilite readings may be quite high. Record this reading on the line Trans Low Reading.

Subtract the hilite from the shadow reading, and enter the result as T. Dens Range. This is the Density Range of the transparency under consideration.

Subtract from this the factor 1.66 and enter the result on the next line. Then divide this by the Transp Density Range. This number, rounded to the nearest .05 will be the desired mask contrast (or gamma) for this transparency. This is also referred to as mask percentage.

Next, add the transparency shadow and hilite densities together, and divide this by 2. This will give you the average density of the transparency. From this number, subtract 1.35. This result is the factor used to modify the basic mask exposure times, either increasing or decreasing. This factor is a logarithmic number, and is added (or subtracted) using either a slide rule or electronic calculator with $\log(10)$ functions.

On the Data sheet, at the top of the right side, write "FM XXX" where the XX represents the desired mask contrast. Below this write the appropriate processing time.

This will be determined from the chart "Principal Masks" which is on the wall immediately above and to the right side of the light table next to the densitometer.

Now, are you going to use two masks, or three? If there are no important reds, or no flesh tones to be reproduced, then two masks will probably be adequate. If there are flesh tones or reds (or other warm colors) which are important to the shot, then three masks will be necessary.

In any case, determine the exposure for the Red filter mask from

the same chart. The numbers on the chart are the basic exposures and may have to be adjusted using the factor for exposure difference determined from the average density of the transparency. The exposure for the Green filter mask will be 3 times that of the Red.

If you are using three masks, it is quite often safe to divide the exposure between the Red and Green (that is, use $1/2$ the Red and $1/2$ the Green exposure), exposed sequentially onto a single sheet of film. For warmer tones, you might want to bias the exposure toward the Green ($1/3$ Red, $2/3$ Green). And, to cool colors off, bias toward the Red.

With all of this written down on the data sheet (exposures for all of the masks that you will be using), determine the proper exposure and processing for the Mid-range Neg Masks.

Simply divide the PM exposures by 10, and double the processing times. This will do the job.

EXPOSING AND PROCESSING
THE MASKS

Now is the time to move into the Separation Room. Take the transparency and Data sheet with you.

It is a very good idea to practice all of the steps of the following procedures in the light, until you are sure of what you are doing. Be comfortable in the job. If you are unsure of what you are doing, or have questions, ask someone. Please!

At the vacuum platen, select and install the proper set of pin glass. For 8X10 transparencies and carrier sheets, this will be the one with the pins in the upper-right, lower-left corners. For the 4X5 and 2 1/2" square carriers, the pins should be in the reverse; i.e., upper-left & lower right. On the 4X5 platen glass, run a piece of black tape along left and bottom edges to seal light leaks. Make sure that the glass is clean. The Translite must be clean and free of oil spots, scratches and dirt. If necessary, fix out a new piece and use that.

On 8X10 transparencies and carrier sheets, the registration holes will be punched EMULSION UP. For the other sizes, punch EMULSION DOWN. For 8X10's the punch is to the left of the platen. 4X5's, just to the right, and 2 1/2's on a box to the extreme right.

Now place the transparency on the pins of the platen. At this time, ALL transparencies should be EMULSION DOWN.

This is the time to set up the step tablet for 8X10 transps. At the end of the transparency with the widest black bar, tape down a 2-step tablet. Tape the step tablet onto the glass, not the transparency. Mark on the transparency the approximate center of each step. Lift the chrome off the pins CAREFULLY, leaving the tablet alone. Using a hand-held paper punch, nip the edge of the film so as to leave three half circle shapes through which the step tablet will show. Put the transparency back on the pins.

With 35mm transparencies, again, the procedure varies. Before the glass is set into position, punch the carrier Emulsion Down, and place it on the pins. Now turn the glass over and tape a 3-step tablet to the bottom of the glass so that the grey tablet will be seen through the sprocket holes when you turn the carrier upright, with none of the image on the chrome blacked out. Secure the tablet along one edge and at the ends so that it will remain flat to the glass. Now put the glass in place and tape the edges.

A note of caution. Be very careful with the chrome when either putting it on or removing it from the pins. If you pull one of the holes and deform it, the chances of achieving good register are almost

nonexistent.

There is a very good reason for all this manipulation and specifying the exact position for exposing the mask. It is important that the masks are exposed in the same position relative to the transparency that they will be used in the exposing of the separations. Failure to do this will result in a set of masks that will not only not fit the image (the masks image size will be different from the transparency), the possibility of good register is questionable.

With the data sheet at hand, and a carry-box ready, get the paper safe marked Pan Masking Film and set it in a handy spot. Turn on the timer, set the power selector to TAP 5. The power selector is to the right and higher than the timer. It has a switch on the left end that is marked with six positions. Turn the knob with the pointer on it to the desired number. Turn on the exposing light to make sure that the point-source is operating. If not, the switches to the right of the timer should be reset. The switch marked 110 should be OFF and the 20V switch on. Now set the vacuum valves toward the platen.

Set the timer for the first exposure, and select the #1 Red filter on the wheel below the platen. Check to make sure that everything is clean with no dust or dirt particles showing up at the last moment.

Turn off HLL lights. Open the film safe, get a sheet, and punch the reg holes.

On 8X10 transparencies and carrier sheets, punch the masking film Emulsion Up and expose Emulsion Down. With the other sizes, the film is punched Emulsion Down, and exposed the same way. For 4X5 carrier sheets, punch one end of the film, along the 0" edge, turn it around and punch the other. On 2 1/2 carriers, punch reg holes in three of the corners, starting in corner with the emulsion type coding notches.

Place the film on the pins Emulsion Down, and close the platen. Turn on the vacuum. The switch is below the timer. Press down on the platen to get a good seal, then wait about 30 seconds before starting the exposure.

If you are doing a split mask, as soon as the first exposure is complete, and before turning on the lights, set the second exposure time, and move the filter wheel over to the #2 Green filter, then make the second exposure. When that is complete, turn off the vacuum, lift the platen, and remove the film, and punch the color code along the edge. The punch to do this is located to the immediate right of the platen. The codes are as follows:

#1 MASK RED FILTER NEGATIVE
Split R/O mask
3 Punches

#2 MASK GREEN FILTER NEGATIVE
Red mask
2 Punches

W3 MASK BLUE FILTER NEGATIVE

Green mask

1 Punch

On the 4X5 carriers, expose the first mask on the end of the film with the emulsion coding notches. Do not bother with punching the color code at this time. With 35MM transps, make the first exposure in the corner with the emulsion coding notches. The notches for the color coding will be punched in later, when you can see what you are doing. This will save you from accidentally punching out the register holes, which are quite close to the edge of the film.

As you expose and mark the masks, store them in the carry-box and continue until the necessary masks are all exposed.

Time for processing.

In the processing room, check that the fix is fairly fresh, and that the stainless steel tray is clean.

Use approximately 350ml of HC-110 per 8X10 film. If you are processing 3 sheets, 1 liter of developer will be fine. Use the amount appropriate to the number of films you have to process.

Set the timer for the time you are to process the films, plus ten seconds and another three or so. Hold the timer in front to the light box to charge the face of the timer. This will make the numbers easier to read in the dark. Turn off all the lights, and remove the films from the carry-box. Arrange the films so they are emulsion down, with the 3-punch on top, so that it will go into the developer first. Start the timer, and when the timer reaches the process time plus ten mark, put the first (top) film into the solution, emulsion down. Rock the tray, roll the film over, rock again, and roll once more. At plus five, insert the second film and treat it the same. At the time equal to the process time, do the same with the third film. The idea is to make sure that the surface of the films is wet thoroughly and evenly. This initial agitation is probably the most important.

When all the films are in the developer, keep the agitation going vigorously. This is done by grasping the bottom film, lifting it free of the solution, and placing it back down, emulsion down with a hearty rock. Keep this cycle going for the period necessary. You should go through a cycle of three films each five seconds or so. Vigorous and continuous agitation is important here. Full development and contrast will not be realized if agitation is gentle. When the timer is showing fifteen seconds left, stop the agitation, with the three-punch film on the bottom. At ten seconds left, transfer the three-punch film to the top. At five seconds, move the two-punch. At 0, the last film is moved. It is important that the films are completely submerged, with moderate agitation. This to stop the development. Interleave the films a couple of times. When about thirty seconds or so have elapsed, turn on the lights.

Finish fixing (about two to three minutes) and washing. Squeegee well, and hang to dry.

Now, go make the mid-range masks. The procedure is the same using different exposure and processing times. Also, the masks are to have an extra punch along a different edge to differentiate them from the Principals.

CALCULATING THE EXPOSURE
FOR CONTACT SEPARATIONS

With a dry set of masks, the transparency and the data sheet in hand, head for the densitometer. After calibration (always calibrate the densitometer before using it), read the grey scale on the 3-punch mask to make sure that they are close to the target contrast.

Visually inspect the masks to make sure that they exhibit good density in the shadow areas. Ideally, you want a density of about .14 to .17 at these points if you had a neutral shadow. When the shadow was colored, you may see more density here than you might think desirable. If this is the case, check the patch on the grey scale that most closely corresponds to the shadow density, and extrapolate.

Basically, we are using two different methods of exposing separations by contact. One is for 8X10's only, and the other method is for the other sheet film sizes. We will go into the 8X10 procedure first.

GENERAL PROCEDURE FOR
EXPOSING SEPARATION NEGATIVES
FROM 8X10 TRANSPARENCIES

On the data sheet, you have a figure for the exposure increase on the masks. This same number will be used to calculate the exposure for the separations. Exposure time varies not only with the density of the transparency-mask sandwich, it also changes with the desired contrast of the separations. In this case, we are developing to a gamma (contrast) of .65.

In any case, add the exposure increase to the basic negative exposure. Remember that the Exposure Increase is a logarithmic number, and must be added logarithmically using a slide rule or scientific calculator.

The basic exposure times are:

Red Filter Negative
6.7 seconds

Green Filter Negative
10.1 seconds

Blue Filter Negative
10.5 seconds

When you have the new times calculated, take the transparency, masks, and the data sheet back into the separation room. At the platen, change the glass to the one with the pins in the upper-left and lower-right corners. Make sure that the Translite is clean and free of dirt spots, scratches, and oil. If necessary, change it. Also make sure that the glass is clean. Dirt, dust and/or fingerprints will show up in the final negatives if allowed to stay on the glass.

With the #1 Red filter in place, swing the ND flap over the filter. Set the power selector to TAP 6. Set the timer for the first (Red) exposure.

After dusting it, place the 3-punch mask on the pins Emulsion Up. Be sure that the grey scale is properly oriented, that is, the high density patch on the mask should be over the low density patch on the step tablet. If there is no step tablet in place, add one at this time, taking care with the orientation. Place the transparency on the pins Emulsion Up. Put the paper safe labeled Super XX in a handy place. Have your carry-box in a place where it will be easy to locate. Turn off ALL the lights.

Open the safe and remove a sheet of film. Punch it Emulsion Down and place it on the pins Emulsion Down. Swing the platen down and turn on the vacuum. Wait about 30 seconds before beginning the exposure. This ensures that all of the air has been evacuated, and that the mask, transparency and film are in intimate contact.

When the exposure is complete, mark the film on the end opposite the grey scale. Use the same coding as you did for the masks; 3 punches for Red, 2 punches for the Green, and 1 for the Blue filter exposures. Put the exposed film into the carry box. If all raw stock packages are closed, turn on the lights. Lift the transparency off the pins, and then the mask. Select the 2 punch mask, dust it, and put it onto the pins. Replace the transparency on the pins. Select the #2 Green filter on the filter wheel. Set the timer for the second exposure. Turn off the lights, get the next sheet of film and proceed as before. Repeat for the Blue exposure.

When the last exposure has been made, all the boxes are closed, go process them.

PROCEDURE FOR EXPOSING
SEPARATION NEGATIVES FROM
4X5 TRANSPARENCIES

In exposing the 4X5 and other sheet film sizes, the procedure is quite different.

At the densitometer, roughly register the 3 punch mask with the transparency and read, in the same place as you used to determine the shadow density for the transparency, the Masked shadow density. If the shadow had color in it, then go to the gray scale and read the step that most corresponds to the shadow density. Record that number on the data sheet. Subtract the masked shadow density from the factor 3.05. If the result is positive, then add the result logarithmically to the exposure basis to derive the new exposure time. If the result was negative, then logarithmically subtract the result from the exposure basis to get the new time. The basic exposures are:

FOR A MASKED SHADOW DENSITY OF 3.05,

RED FILTER	1.1 SECONDS
GREEN FILTER	1.4 SECONDS
BLUE FILTER	1.2 SECONDS

As you can see, the times are quite short.

Using a dull knife, score the emulsion side of the masks and the carrier sheet for the transparency so as to make channels for the vacuum. Be careful not to score into the image, or across the register holes.

In the separation room, remove the glass from the platen frame and store it in the cabinet to the left. Get out the wooden vacuum easel and connect it to the vacuum line that normally goes to the enlarger. This is usually stored under the enlarging area.

With the easel set across the opening in the platen, open up the flap and let it lie to the right. Do not remove the flap from the easel. Connect the vacuum hose from the enlarging easel to the pipe on the end of the easel, and set the vacuum valves appropriately. Have the transparency in a handy place, as well as the mask that you are to use for that exposure. Set the time for the first exposure on the timer, and be sure that the proper filter is in place. DO NOT USE THE NO FILTER FLAP. Set the power selector to TAP 6. Get the Super XX film safe in a handy place, as well as your carry-box. When everything is set to your satisfaction, turn off ALL the lights.

Open the film safe and remove a sheet of film. Punch it Emulsion Up and put it on the pins of the easel, Emulsion Up. Locate the transparency, and put it on the pins, Emulsion Down. Put the appropriate mask on the pins, Emulsion Down. BE CAREFUL HERE! THE MASK AND TRANSPARENCY MUST BE ORIENTED IN THE SAME DIRECTION. FAILURE TO DO SO WILL RESULT IN A VERY WEIRD LOOKING (AS WELL AS UNUSABLE) NEGATIVE. Turn on the vacuum and roll the flap over onto the easel. Run your fingers along the edge of the flap where the main vacuum channel is located. Press down on the areas covering the pins. The idea is to get the flap down so that there is no leakage, and all of the vacuum is used to pull the sandwich together. After about 30

seconds or so, feel along the side of the mask to see if the mask has pulled down. If it has, the fact will be very apparent. You will feel fairly sharp ridges where you cut the channels. Also, the hissing sound will diminish to a very low level.

When the sandwich has pulled together, lift the easel and turn it over so that the transparency is toward the exposing light. Orient the easel so that the vacuum line is pointed toward you, the easel is centered left-to-right (you can feel this with your fingers), and all the way to the back of the platen. When this has been accomplished, start the exposure. When the exposure is complete, turn the easel back over into the starting position. Then turn the vacuum motor off. Roll back the flap, remove the mask, transparency, and exposed film. Punch the edge of the film and store it in the carry-box. Now turn on the light.

Set the next exposure, select the next filter, get the proper mask and repeat the above procedure. When all of the negatives have been exposed, move to the processing room.

THE CARE AND FEEDING OF ENLARGED SEPARATION NEGATIVES

One of the blessings of making enlarged separations is that all transparencies are handled essentially the same. The one main difference is in the exposure of the Red negative on Kodachrome transparencies.

When the masks have dried, punch the edges of the individual masks to identify the order of usage, then cut them out of the sheet.

In the separation room, select the oil-carrier appropriate to the size of the transparency and take it to the light-table in front. In the cake tin on the light table, (or on the light table itself,) locate the palette-knife. Check the oil bottle to be sure that you will have enough to do the job at hand. Get down a couple sheets of paper (an attempt to keep oil off of the table). Arrange all of this so that it will be handy, and go to work.

Insert the end of the palette-knife under the edge of the top glass in the oil-carrier. Do not jam it in. Moderate pressure and a twisting motion will serve to finally lift the glass. When the glass is out of the carrier, wipe the oil off with a (fairly) clean towel. Set it in a clean place (on a sheet of paper). With another towel, wipe all of the oil possible out of the interior of the carrier.

If you are working with 35mm, when this is done, put the transparency on the pins and turn the carrier over. On the bottom of the carrier, tape a 3-step tablet in place so that it is beneath the open sprocket holes, and oriented so the heavy density on the mask will be over the light density of the tablet when the carrier is rolled over. Then turn the carrier back up.

If you have put the transparency on the pins, use the palette-knife and lift one corner off the pin. Be careful that the pin holes are not forced out of shape. Check that there isn't any dust or other nasties on the glass. Select the 3-punch mask and with the same orientation as the transparency, put the one corner on its pin. Holding the opposite corner of both the mask and the transparency in one hand, gently lift them and squeeze a small quantity of oil directly on the glass where the transparency touches. Slowly lower the carrier and put the corner on the pin. The idea is to keep a film of oil between the transparency and the glass. Squeeze another thin film of oil between the transparency and the mask. Lower the mask the same way as the transparency and put it on the pin. Squeeze a small pool of oil on top of the mask.

With your finger, gently press the mask down on top of the

transparency, slowly circling around and moving the excess oil out to the perimeter. This will remove most (if not all) of the bubbles and dust. Check the sandwich with a 5-power glass and look for bubbles and dirt. Also check the register of the mask. Bubbles are not always easy to see. Especially if they are small and/or in the shadow portion of the transparency. If any dirt or bubbles are seen, you might want to wait and see if they move out of the image, or you may just lift the one corner again and start the oiling procedure over.

Assuming that the sandwich is clean and bubble free, run a small bead of oil along one edge of the sandwich, lower one edge of the cover glass in place, and slowly lower the glass down, keeping a small bead of oil moving just ahead of the point of contact. If you see any bubbles or dirt at this point, stop, lift the glass out, and pop or remove them. Then start lowering the glass again. Note that on the 35mm carrier, the glass will fit only one way.

Now that the glass is down, press lightly along the outside to force some of the oil out. Now move the carrier into the separation room. Turn on the light table and the vacuum pump that is here. Take down the hose that is wrapped around the string across the room, and start to remove the excess oil. Go all around the cover glass and get all that you can. Then press down on the glass again to squeeze out more oil. Vacuum again to make sure that all of the extra oil is removed.

With a towel, wipe the oil off of the carrier outside of the cavity. Then, with a different towel, carefully clean the top of the glass over the image. Pay particular attention to removing all traces of oil and all of the dust. Check the sandwich with a magnifier to be sure that there are no bubbles or dust inside the carrier. If the dust is out of focus as you do this, it is more than likely that it is either on top of the glass or on the light table beneath. Lift the magnifier or move the carrier. If the focus changes, or the dust spot changes position, no sweat. Finally, lift the carrier and examine the underside. Check for the presence of oil and dust here. When everything is clean, put the carrier into the enlarger, sliding it all the way in, and locking it securely. **THE LOCK POST MUST BE ALL THE WAY DOWN, OR THE SUBSEQUENT NEGATIVES WILL NOT REGISTER!**

Check to make sure that the power switches are in the right position (the opposite of contacts), and that the vacuum is directed toward the enlarger.

With very few (and very notable exceptions) all enlarged separations are to made with the 105mm APG- EL Nikkor. The only time that you would have to use another lens/ is if the enlargements are beyond the range possible with the 105mm, or are too small to do easily with this lens. When the size is too large, use the 63mm El-Nikkor. It is markedly superior to either the 88 or 50mm lenses. For small sizes, the 135mm Schneider is preferable. If the enlarger must be resized, loosen the visegrip pliers on the left side and the lock on the back support girder. Move the head to the required height and relock. Move the easel under the lens and do a quick focus. For 35mm, the enlarger will be very near the top of the column, while other sizes

will, of course, be somewhat lower. With a scrap sheet of Super XX on the easel, and using the Omega grain focuser, bring the image to sharp focus. Do this with the lens at its maximum aperture, if you are using the 105mm. All other lenses, focus at two stops down.

When using the grain focusing aid, it is quite helpful to adjust the eyepiece, while looking through it, until the reticle is sharp to you without straining your eye. Do this using regular room light. Then, in the dark, with your eye focused on the reticle, focus the enlarger until the grain in the transparency-mask sandwich is as sharp as the reticle. After this, don't touch the focus.

Center the image on the easel and tape the easel in place. Also, make sure that the visogrip is in place.

Get the Ciba meter and set it for the negative exposure level. This should be on the card under the power selector box on the wall. There are two ways to set the proper white light level. One is to set one value on the meter, and place it under the brightest highlight in the transparency. The other, is to set a different value and place the meter under the light patch on the grey scale. In either case, stop the lens down until both lights on the meter are equal in intensity.

Select the first filter and insert it into the head of the enlarger. If you are working with Kodachrome, this will be the #24 Red filter. For all other transparency films, you will use the #28 Red. Set the timer for the filter you are using (#24, 8 sec. #28, 20 sec.). Close the enlarger head. Put the Super XX safe in a good spot, and have your carry-box handy. Now, turn off the light.

With all the lights off, open the film safe and remove one sheet. Punch the film Emulsion Down, and put it onto the pins on the easel Emulsion Up. Start the vacuum pump, and when the film is fully pulled down, start the exposure. You may have to run your fingers along the edge of the film to get it to lie flat. You will know when the film is down by the absence of the sound of hissing.

One thing that may help you is to ALWAYS put the Emulsion Code punches in the same place, i.e. in the lower right corner. There is no purpose for this. It just makes things more convenient, and eliminates one more variable.

When the exposure is complete, identify the film and store it in your carry-box. Check the film safe to make sure that it is closed. Open the enlarger head and turn on the exposing lamp. If the lamp has burned out during the exposure, you will have to start over with a new bulb. If all is well, turn on the room lights.

Remove the carrier from the enlarger, and go back to the light-table to change the mask and get the second exposure going. Don't forget to change the filter. Repeat until all of the negatives are exposed, and then go process.

PROCESSING THE
EXPOSED SEPARATION NEGATIVES

In the process room, ascertain that the fix is still fairly fresh, and that the stainless steel tray is clean. Put the other plastic 8X10 tray on the counter near the sink. Measure out 1 liter of DK-60 and pour it into the stainless tray. Wash the beaker and put a quantity of water into the plastic tray. The amount isn't critical, just make sure that the tray is more than half full. Locate the card with the latest processing times. It is located on the wall near the door. There are two cards. One of them will have the times for gamma .65 on contact negatives, and the other one has times for gamma .75, both contact and enlarged.

It is important to remember that two different developing times are used. We are currently using a gamma of .65 for contact separations, and .75 for the enlarged.

With the timer set for the longest process time (Blue), hold the face of the timer to the light box for a couple of minutes. This will charge it and make the timer easier to read in the dark.

Off with the lights. Open your carry-box and remove the exposed films. Holding them so that the emulsion is down, place them one at a time into the tray of water. The first in will be the Green, or 2 punch film. Make sure that it is fully immersed. You may want to lift it out of the water a couple of times to dislodge any air bells that may be clinging to the surface. Do the same with the Red, or 3 punch film. Then the Blue, or 1 punch. Handle all of the films the same. When they are all in the water, interleave them a couple of times. It is important that the emulsion of each of the films is completely wet. Failure to achieve this may result in uneven processing. You may not see this on the processed film, but you will see it on the print.

At this point, the stack in the water tray should be Blue on top, and Green on the bottom. Now lift the top film out and let it drain for a bit. Now, start the clock and at the proper time, place the film face down in the developer and rock the tray side to side. Roll the film face up and rock the tray again. Roll the film face down and rock again. Agitation should be continuous and vigorous. At this time, you may want to keep rolling the film as you rock the tray. However, just keep the agitation going. When it is close to the time for the Red film to go into the developer, leave the Blue face down in the tray, while you maintain the rocking cycle, and with your left hand, lift the Red film from the water and let it drain. At the proper time, immerse it in the developer.

When the Red film hits the developer, rock the tray and roll the

film over a couple of times to make sure that the surface was wet with the developer. Now, with the Red emulsion down, lift the Blue out of the tray, and lay it back down, face down, and rock the tray. Continue doing this until time for the Green to go into the tray. Keep track of where the films are in the tray. It will be important when the time comes to remove the films into the fix. Handle the Green film the same as the other two, and continue agitation. The films should always be in the order of R-G-B, with the R on the bottom.

Agitation should continue to be both vigorous and continuous, moving the bottom film to the top and rocking. It should not take you more than five seconds to go through all three films, and preferably a bit faster. When the clock shows 10 seconds left, move the Red into the fix tray, and agitate it there. At 5 seconds, move the Green, and at 0 move the Blue. Agitate the films in the fix to make sure that they have stopped developing. Set the clock for another three minutes, and continue agitating the films until thirty seconds have passed. Turn the lights on. If the fix was fairly fresh, the films (or at this stage, negatives) should be either cleared or very nearly so. Fix for twice the clearing time, but no more than five minutes. If clearing takes more than two minutes, the fix should be changed.

While the films are fixing, dump the developer and wash out the stainless tray. Then leave it under the faucet with the water running. When the films are fixed, move them into this wash bath. Agitate them for a bit, then pour off the water, and allow the tray to refill. Do this twice more. This will remove about 95% of the fix that is in the films. Another five minutes of washing, and it's time to squeegee the negatives and hang them to dry. Air dry the negatives. Never at any time should separation negatives be allowed to dry with high heat. If they are handled so, they will change sizes, and will never register.

Now that you have the negatives processed and drying, it's time to make the mid-range negatives.

EXPOSING AND PROCESSING THE MID-RANGE NEGATIVES

Once again, there are vastly different procedures between contact and enlarging for determining the exposures of the mid-range negatives. This first part will handle the contact procedure.

With your data sheet in hand, go once more to the light table. On the wall, to the left of the densitometer, is a chart labeled "Contact Hilites". On this chart are the exposure times for the hilite negatives that will be made at a later stage of the process. For now, we will use the figures for the determination of the mid-range negative exposures. You might want to copy the exposures for the hilites onto the data sheet for use later.

Using the Exposure Increase factor that you calculated for the masking exposures, and the hilite exposure times, the procedure is as follows:

Increase the hilite exposure times by the exposure increase factor and then reduce that figure by .35 (log 10). Do this for all three colors. You should come up with three different figures. The results are the exposure times you will use.

In the separation room, you will use the same glass that you used to make the separations. In fact, the procedure is much the same. The masks that will be used are the second set that was made. The masks should be noticeably more contrasty than the principals.

The mask is first on the pins, emulsion up, the transparency second. With your carry-box handy, and the Kodalith Pan film safe in a good spot, set the first exposure. Set the power selector switch to TAP 5, and swing the #4 Red Hilite filter into place. Turn off the lights.

Get a sheet of film, and punch Emulsion down. Place the film on the pins and close the platen. Start the vacuum. After about 15 or so seconds, start the exposure. When the exposure is complete, identify the color, and put a single notch along one edge of the film, much the same as you did for the mask. Put it into the carry-box. On with the light.

Change the mask, set the second exposure on the timer, set the power selector switch to TAP 4, and swing the #5 Green filter into place. Off with the lights. Expose the film, mark it, and into the carry-box. The Blue filter exposure is done in the same way, except for the change of filter (use the #6 Blue), and changing the exposure time. Do not change the power selector. When all three films have been exposed, go process them.

Calculating the exposures for 4X5 transparencies is handled the same

as above. The exposure of the films is handled in the same manner as when you made the separations. Use the filter and power settings anumerated above.

EXPOSING THE MID-RANGE NEGATIVE
ON THE ENLARGER

When the mid-range masks are dry, punch the identity along one edge of the mask, and cut them out of the sheet. With oil-carrier on the light-table, remove the mask left over from the exposing the negatives. Put the 3 punch mask into the carrier using the same techniques as before.

When the carrier is finally back into the enlarger, set the exposure level in the same way you did for the negatives. In fact, the same setting is used on the Ciba meter. Use either the same hilitite area, or the light patch on the step-tablet. The exposures for the mid-range negatives are the same as that used to make the hilitite negatives.

They are:

Red (3 Punch)
#29 + ND Filter
15 seconds

Green (2 Punch)
#61 Filter
1.6 seconds

Blue (1 Punch)
#47B Filter
5.5 seconds

The film used for this is Kodalith Pan. Punching and exposing the films, as well as changing the mask, are all handled the same as when you were exposing the seps.

When the three films are exposed, go process them.

PROCESSING THE MID-RANGE NEGATIVES

Back in the process room, clean out the stainless tray, and measure 1 liter of HC-110 from the spigots in front of the sink, and pour it into the tray.

Set the timer to 3:15 and flash the front of it to charge the face. With the lights off, open your carry-box, remove the films, and holding them in your hand, start the timer. When the timer reaches 3:10 place the 3 punch film into the developer, emulsion down. Quickly roll it over and rock the tray. As the timer reaches 3:05, the 2 punch goes in, and gets the same treatment. At 3:00, the 1 punch is started the same way. When all three films are in the tray, and have been given the initial agitation, begin interleaving the films while rocking the tray. Continue until it's time to move them into the fix.

When the clock shows 10 seconds left, move the 3 punch film into the fix and push it down. At 5 seconds, the 2 punch is transferred. At 0, the 1 punch. Agitate the films by interleaving for about 30 seconds, and turn on the lights. While the films are fixing, dump the spent developer, and wash out the tray. Start to fill it from the faucet to wash the mid-ranges when they have completed fixing. When the films have fixed for at least twice the clearing time, move them into the wash, and wash for about 4 to 5 minutes before squeegeeing and hanging on the line to dry.

If all has gone well, you now have a set of balanced mid-range negatives .

EXPOSING AND PROCESSING OF
THE HILITE NEGATIVES
FOR ALL AND SUNDRY

If you are working with contact separations, somewhere on the data sheet will be a set of numbers representing the exposure times for the hilite negatives, so you don't have to go back to the light table.

The process of exposing contact hilites will be the same with the exception of the easel (or glass) that you are using. The 6X10's will be made on the same glass as the separations, and the 4X5's on the wooden easel that you used before.

All of the exposures will be made with the power selector set at TAP 1. The filters will be the three that you used in making the mid-ranges: the #4, 5, & 6. Other than that, it's all pretty straightforward, with no changing of masks. Merely change the exposure times and the filters that you use. Make sure that the films are identified as to the color they represent.

HILITE NEGATIVES ON
THE ENLARGER

With no masks in the carrier, and the transparency oiled and in place in the enlarger, set the Ciba meter for the hilite value, and set the exposure level by stopping the lens down. On E 1/4's this will necessitate putting a light ND filter in the enlarger head. When the two lights on the meter are approximately equal, that's it.

The exposure times will be the same as when you were doing the mid-range negatives. You can expose the hilites rather quickly inasmuch as all you have to do is change the filters and exposure times. Don't forget, on the Red hilite exposure, you will need not only the #29 filter, you will also need the ND filter at the same time. You should not be able to see any image on the easel while you are exposing the Red hilite. If you DO, you goofed, and the film is unusable.

When you are through exposing, go process.

PROCESSING THE
HILITE NEGATIVES

Now that you've processed mid-range negatives, you can easily

handle the hillites. They are handled in exactly the same way.

VERIFICATION OF THE VALIDITY
OF THE SEPARATION NEGATIVES

At this time, you will read the grey scales of the separations to be sure that they are balanced. When making separations for the DT process, it isn't enough to have three images, each representing the various color densities of the transparency, the neutral densities on the negatives must have received equivalent exposures (based on the color sensitivity of the separation film), as well as having been processed so that all three negatives exhibit the same contrast ranges (we will use the density range of the grey scale as a measure of the contrast). If the negatives don't have equivalent exposure, and have equal contrast, it will be VERY difficult to achieve a reasonable print.

You've just hung up the hillites that you've made, and by this time the negatives are either totally dry or very near so. If they are, it's now time to read them and see if they are usable.

Take the negatives over to the densitometer, and calibrate it. A good practice is to calibrate the densitometer every time you intend to use it. You will find that the calibration will wander all over the place during the time that it's not being used.

You will be reading the grey scale that should be on every separation that you make. On the 3-step (8X10 and 35mm enlarged seps) you will use the end steps for your readings. On the 21 and 11-step scales, do not use the end steps. You should read the step next to the end step at either end. The end steps represent areas in the transparency that would exhibit no or little information, and would be of no use to us. Note: The grey scale doesn't represent the transparency. It is used ONLY to verify that you have either achieved your goal (a balanced set of seps) or that you've blown it, and have to start over at some point. If the negatives don't balance, the readings obtained from these scales will tell you where you went wrong.

Now that the densitometer is calibrated, read the two points I mentioned above. For each of the negatives, subtract the lower reading from the higher to get the density range of the film. When this is done for all three, compare the ranges to each other.

Ideally, the three ranges should be equal to each other. Practically, the ranges can vary by as much as .05 and still be acceptable. This is to say, that the spread cannot be more than .05 between any two of the three, and less is preferable. If the spread exceeds this limit, the negatives will have to be remade, with the development times changed to bring them into balance.

Compare the low readings of the negatives . Once again, the ideal is for all three to be the same. This represents the exposure that the negatives recieved. Practically, they will vary slightly. In this case, a spread of more .03 is not too good. If the negatives are to be remade for contrast, the chances are that the exposure was off as well.

The foregoing discussion applies also to the mid-ranges and the hilites, although the tolerances must be much tighter. The hilites should exhibit equal densities in the step next to the end step, should drop at the same rate. Mid-ranges need the same, though the range shown by the scale will be much greater.

If either the mid-ranges or the hilites are out of balance, the whole set should be remade. The only control you have over them will be in the exposure. Experience will guide you in adjusting as necessary.

ADDENDUM A

ON THE NECESSITY AND
USE OF PRE-HILITE MASKS

One of the things that you will learn as you get further into the DT process, is that you will be working all the time to keep the hilite detail. Shadow detail will be preserved by the judicious choice of the contrast of the Principal masks. However, the process of masking the transp to a level where it can be printed on paper lowers the contrast of the hilite detail. This is inherent in the very act of masking, and can be circumvented fairly easily.

The problem of preserving hilite detail is due to the nature of the mask itself. If you inspect the mask, you will notice that while the detail in the shadow areas is minimal, the hilite areas are there in full glory. When the time comes to make the separation neg, this detail lowers the contrast in the hilites to where there might be inadequate hilite contrast in the sep. Generally, you overcome this through the use of special negatives, which are exposed and processed to yield only the hilite information. These are the Hilite Masks, are used as a part of the Negative Sandwich that is used to make a matrix.

Every once in a while, though, you will have a transp that exhibits tremendous hilite detail. Brilliant clouds are a good example of this. In this case the use of a Pre-Hilite Mask during the exposure of the Principal masks will allow you to preserve this detail in the separation negative itself. After this, the use of the Mid-Range Negative and the Hilite Mask gives excellent control over the resultant hilite areas in the print.

EXPOSING AND PROCESSING

There seem to be no hard and fast rules for the making of the pre-hilite mask. The information that you derive in the making of the mask will be used to develop a method and charts.

You will use the pin glass that is used for making the separation negatives. In the case of 4x5 and 2 1/2 carrier sheets, the sets of

reverse pins are used. Once again, the relationship of the mask and the transp are important.

Once the pin glass is set in place (and taped if necessary), set the filter wheel so that the open hole is active. Place the .80 ND over the hole. This is the one that is mounted in a piece of white cardboard. It is usually kept in the Camera room, somewhere on the camera. If it isn't there, look in the filter stack next to the enlarger in the separation room. Set the power selector to TAP 2. Assuming that the hilite reading of the transp was about .30, a test exposure of about 10 seconds will be a good place to start. Turn on the Red safelight, and get out the box of Kodalith Driho.

Before the transp is put on the pins, the step tablet should be covered with black tape. This is important. Failure to do this will result in distorted grey scales on both the masks and the separations. The effect that you are looking for should occur only in the image area. The grey scales on the separation negatives are there only there to verify that you achieved the desired result.

Put the transp on the pins Emulsion Up. Turn the room lights off. Open the box and get a sheet of film. Punch Emulsion Down, and place on the pins the same way. Start the vacuum, close the platen, and at the appropriate time, start the exposure.

In the process room, set up the trays. Use HC-110. Set the timer for 2:30. With the lights off, (the red safe-light may be on), process the film for for the full time. After it's in the fix, turn the lights on, and after clearing, evaluate it.

If you think that it's too light, or dark, the mask will obviously have to be remade.

Air dry the mask to assure that it won't change size. Once the mask is dry, you can read it on the densitometer. In as much as there will be no greyscale on the mask, the readings will have to be in the areas of the image from which you made your exposure determinations. The ideal is a density range of .65 to .75 above base fog.

Another thing to look at is the apparent contrast of the pre-hilite mask. The idea is to under-expose, and over-develop to generate a high degree of contrast in the high middle and hilite range of the image.

Assuming that you have made a mask that will fill the basic requirements, it is time to make the principal masks, and the mid-range negative masks. The pre-hilite will be used in the generating of these. However, you cannot use the same exposure information that would normally be calculated. An exposure increase equal to the base fog of the pre-hilite must be factored in. Generally, this is in the area of log .85.

From this point on, the making of the masks is straight-forward, with the addition of the pre-hilite mask between the transp and the point source. Remember to remove the black tape that you had placed

over the step tablet. The same pin sets are used, the same power levels, and the same processing times are all used.

When the principals are dry, inspect them visually, and you will see the pre-hilite at work. In the unmodified principal, there will be definite discernable hilite detail. In the new principal, the hilite detail is either missing, leaving a very flat area, or there will be a noticeable reversal of tonal values. The amount of this effect will depend on the final contrast of the pre-hilite. When this principal is used to make the sep, the hilites in the transp are allowed to either translate directly (with all of their contrast intact) or in the case of the reversal masks, the contrast of the hilites will be enhanced, giving increased separation in the details. This may not be readily apparent until the first test prints are rolled.