

Printing Photographs



1993

Roy Pope

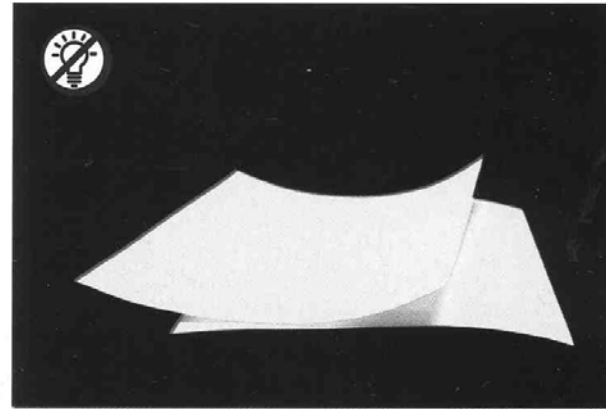
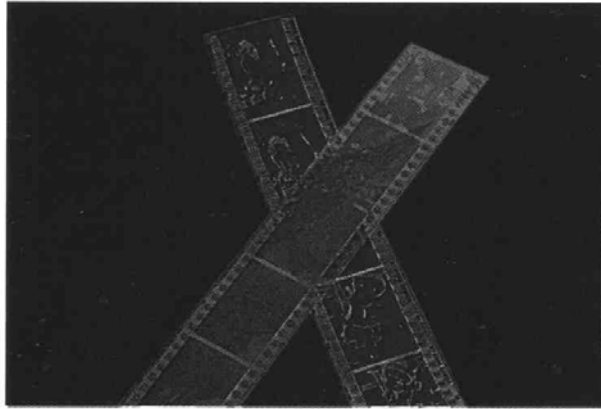
Kodak's definition of a good photograph: A good photograph is one that makes the viewer so aware of the subject that they are unaware of the print.



1994

Roy Pope

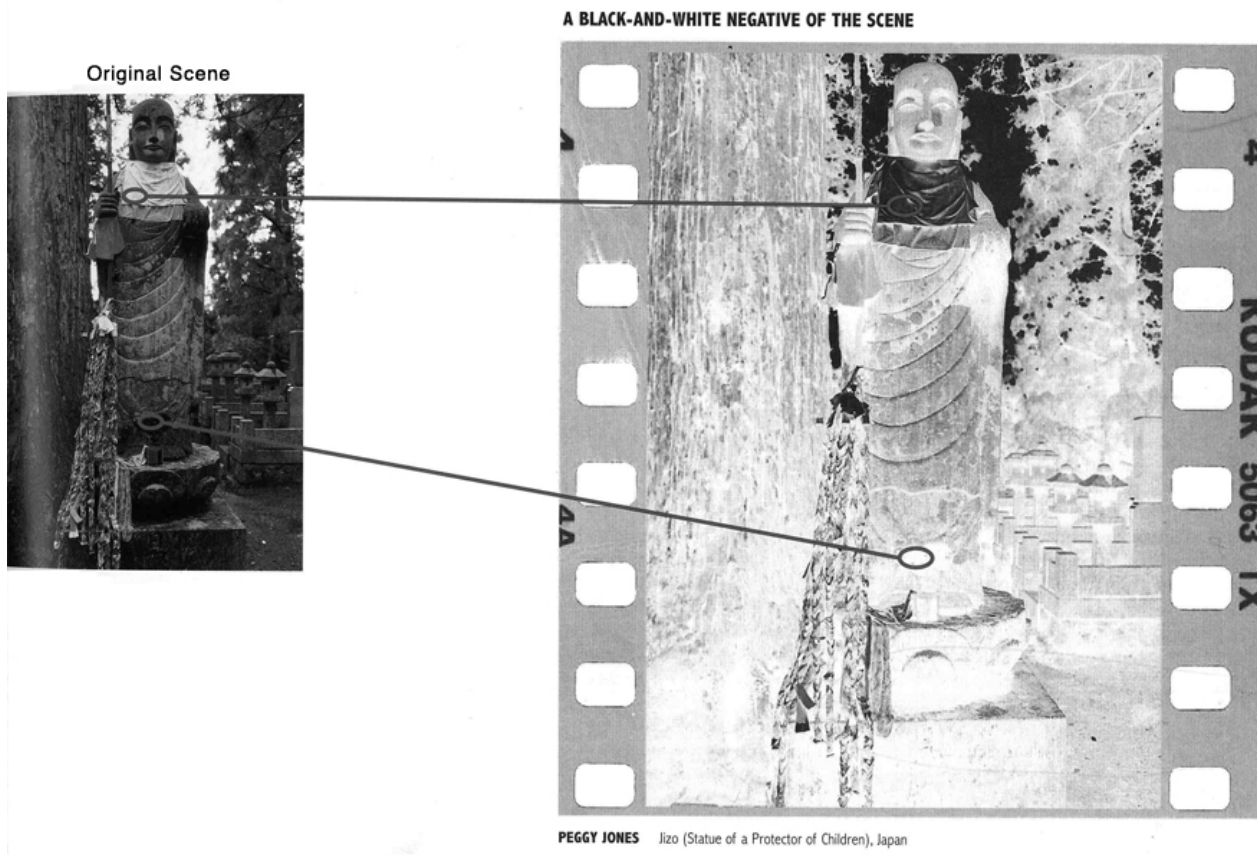
Photographs are made to delight the senses.



Like film, printing paper is coated with an emulsion containing light-sensitive silver compounds. Light is passed through the negative and onto the paper. After exposure, the paper is placed in a developer where chemical action converts into visible metallic silver those compounds in the paper's emulsion that have been exposed to light.

A *stop* bath halts the action of the developer; a *fixer* removes undeveloped and unexposed crystals; a *wash aid*, or *hypo clear* bath converts the residual thiosulfate to sodium sulfite which is soluble in water; finally the print is *washed* and *dried*.

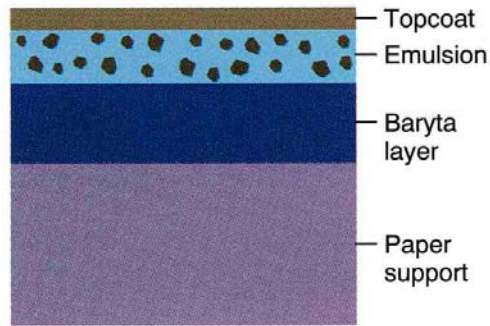
Identifying the emulsion side:
Film and Paper curl toward the emulsion side. The film's emulsion is dull. The base side is shiny. If the manufacturer's name is right reading (Kodak) then you are looking through the Base side.



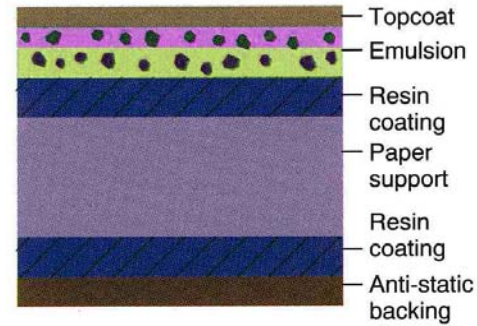
The negative is a reversal of the tones in the original scene. Where the scene was bright, the negative contains many dense, dark grains of silver that hold back light from the paper, prevent the formation of silver in the paper's emulsion, and so create the high values areas in the print.

Where the scene was dark, the negative is thin or even clear, and passes much of the light to the paper, creating dense silver in the emulsion and a dark area in the print.

Black-and-White Printing Papers



Fiber-Base Photographic Paper Structure.



Resin-coated (RC) Photographic Paper Structure.

Characteristics

Base:

Print base materials come either as resin coated (RC) or fiber-base. Both use paper as a base for the emulsion, but the RC paper is coated on both sides with a plastic layer. Because of this, RC paper has more rapid processing and drying times.

Weight:

The weight of the paper is an indication of the base thickness. Double weight paper is easier to handle, and is less likely to crease.

Surface:

Some papers come with different surface textures-listed in decreasing smoothness. The Ilford Paper we will use will be glossy for contact sheets, and pearl for prints.

Variable-contrast papers have 2 emulsion layers magenta and yellow, which enables the use of variable-contrast filters to vary the contrast of the paper.

Black-and-White Printing Papers

Color Sensitivity:

Black-and-white printing papers are usually blue sensitive, which means limited exposure to yellow or amber light will not affect the paper. This allows working with the papers under lights of special color called **safelights**.

Paper Contrast:

Variable-contrast papers have 2 emulsion layers magenta and yellow. By mixing amount of yellow and magenta light through filtering on the enlarger, contrast can be varied widely using paper from the same box.



Variable-contrast filters are available as sets, and control the contrast in half-grade steps. Most variable-contrast papers can produce contrast grades from 0 to 5 in half steps. Printing without a filter approximates a grade 2 paper.

Sizes:

Photographic printing paper comes in common sizes 8x10, 11x14, 16x20, etc.

Speed:

Papers for enlargements need to be fast since the enlarging light is dim. The speed of variable contrast papers change with filtration used. Since the grain structure of the paper is not enlarged, it is not perceptible to the unaided eye. Paper speed is not as closely calibrated as film, so you may find variations from box to box.

Black-and-White Printing Papers

Cold-tone paper

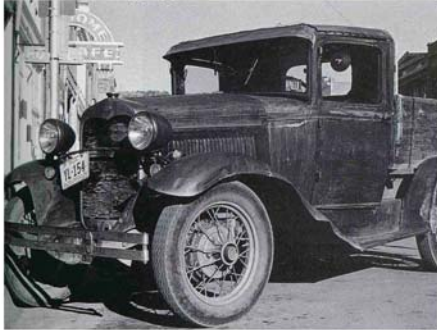
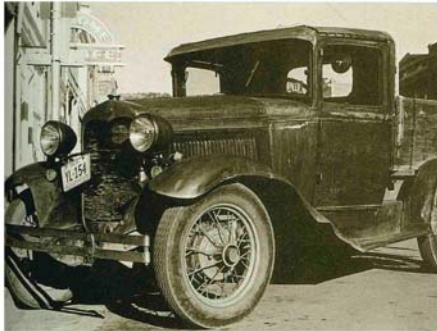


Image Tone:

Although black-and-white papers are monochrome, the color of black can vary from warm to cold. The image color is determined by the emulsion type used, and by the tint of the paper's base. Silver Chloride and Silver Bromide produce neutral and cold tone Images. When combined they can produce warm-toned images, but mostly they are mixed together to make the paper faster, and neutral.

Warm-tone paper



Many modern papers use both Bromide and Chloride silver salts, these papers are called ***Chlorobromide papers***.

Paper Base Tint:

The color of the paper stock can range from pure white to off-whites such as cream. Many papers contain optical brighteners to add brilliance to the highlights.

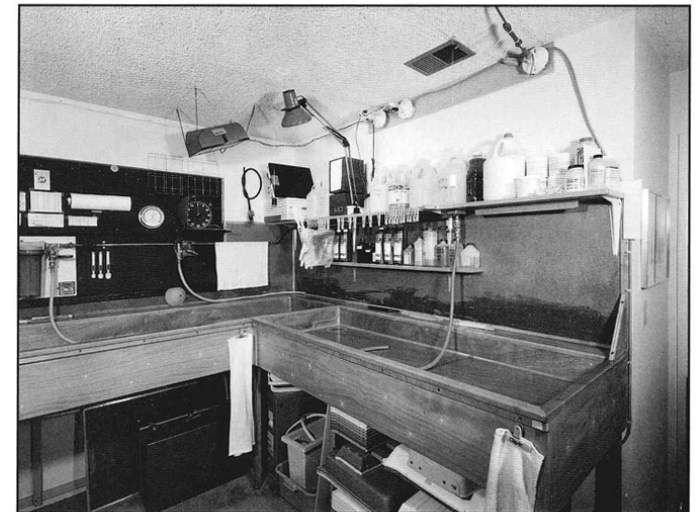
The Darkroom tool has 2 sides

Dry Side: photographic paper is exposed to make a print. Water, and wet fingers will ruin your negatives.



Dry side

Wet Side: the exposed paper is processed in chemicals similar to those used for developing film.



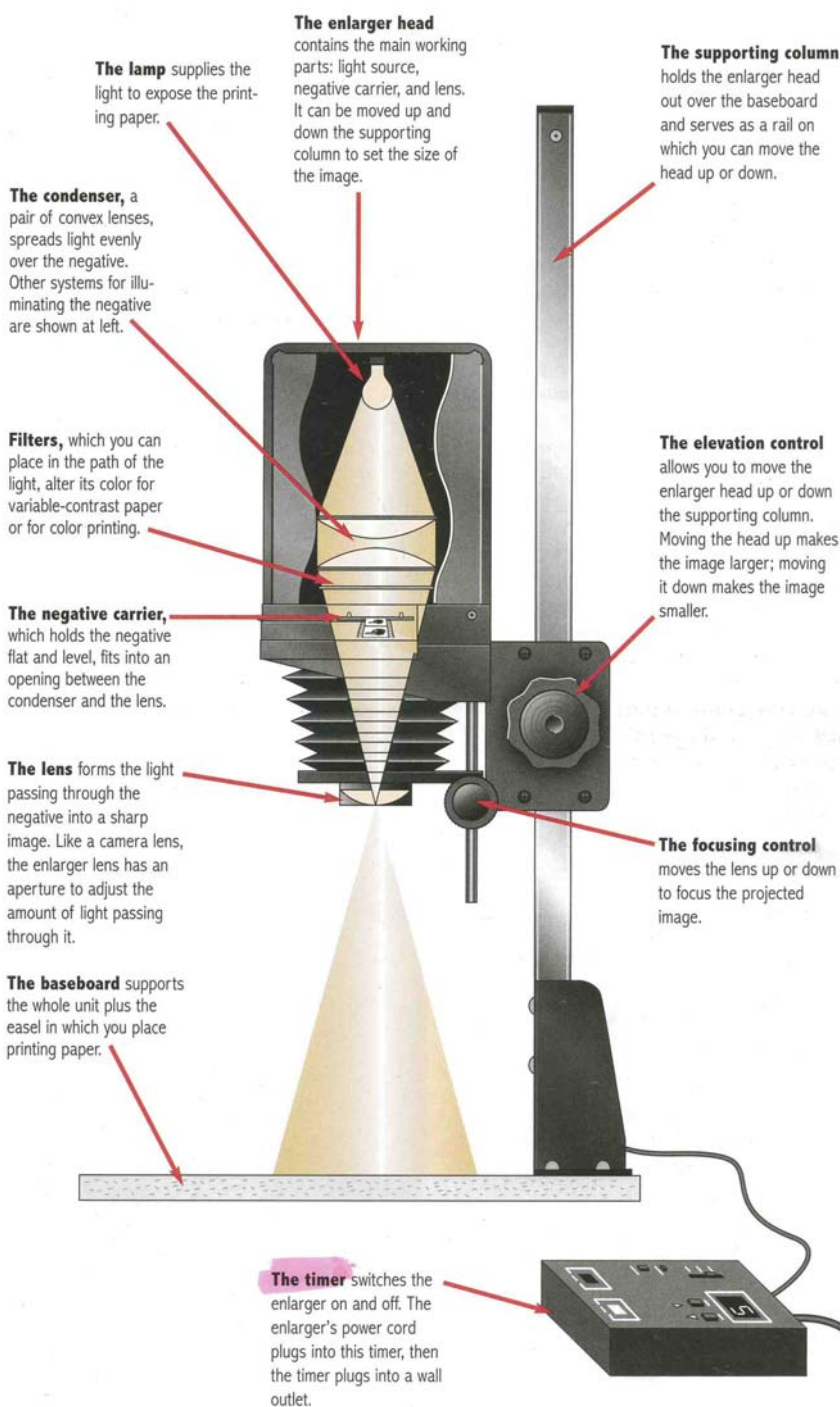
Wet side

Enlargers

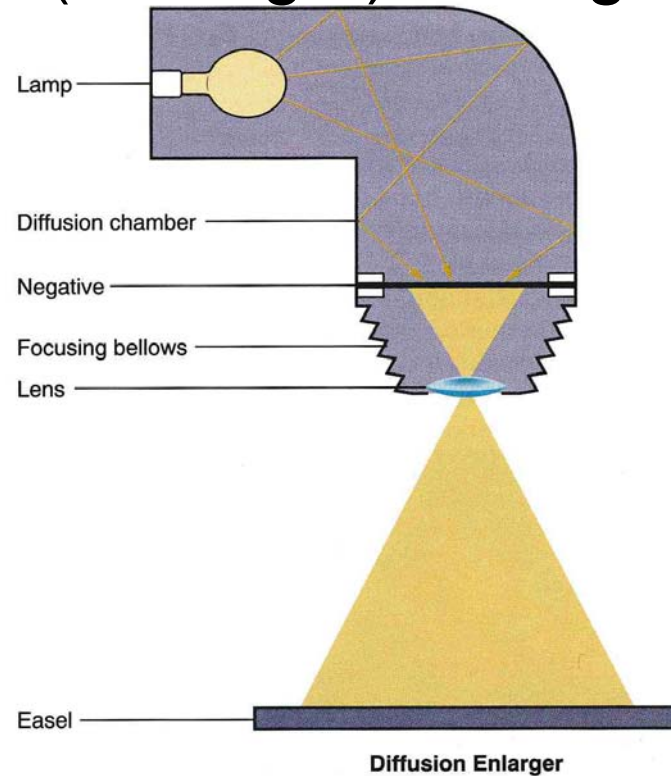
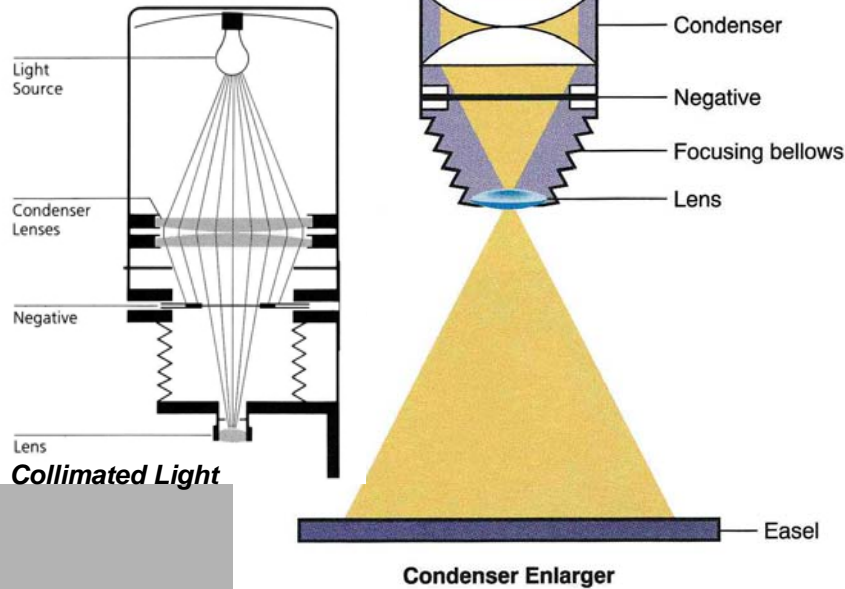
- An enlarger can produce a print of any size.
- Most enlargers are designed to accept a range of film format sizes and are usually described by the maximum format size.

Enlarger Lens Negative Size	Focal Length to use
35mm	50mm
21/4x21/4	75mm-90mm
4x5 inches	135-150mm

*Always clean your lens before you begin. Blow off the dust, and use lens cleaner to remove finger prints, and atmospheric pollutants.



Condenser vs. Diffusion (cold light) Enlargers



- Provide more light for shorter exposures
- Light is focused by *condenser lenses* that need to be adjusted to match the negative size and focal length lens in use.
- This focused light reaches the negative traveling in the same direction. Light in which the rays are parallel is called **Collimated Light**; these rays are scattered by the denser values in the negative, and produce more contrast in the print.

*Think of it as a fire hose whose water splatters when hitting a

- The light is diffused by being supplied indirectly to the negative through a mixing chamber, or by being passed through a diffusion material such as frosted glass or plastic.
- They minimize negative faults, such as minor scratches, dust spots, and grain.
- They give a more even gradation of tonal differences, especially in the light tone areas.

*Think of this as pushing a screen into a pool of water, where the water slowly rises.

Black-and-White Print Processing



Developer: Converts the latent image on the printing paper to a visible silver image, and are generally more active than film developer.

Print developers have limited working capacity, and are diluted to working strength.

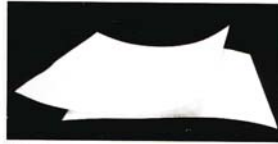
Stop: A weak solution of acid that neutralizes the developer, stopping the development process and extending the life of the fixer.

Fixer: Dissolves out the unused silver halides. Use hypo-check to test condition of fixer.

Washing Aids: Converts residual thiosulfate to sodium salts which are soluble in water, and shortens wash times.

Water Holding Tray: Store prints in until ready to transfer prints to the wash.

Enlarger projects light through the negative onto the printing paper. See pages 134-135.



Printing paper is coated with a light-sensitive emulsion onto which the image is exposed.



Easel holds printing paper flat on the enlarger's baseboard for enlargements. This easel has adjustable sides for cropping the image and creating white borders.

Printing frame holds negatives and paper tightly together for contact prints. A sheet of plain glass can be a substitute.



Focusing magnifier enlarges the film grain or the projected image when setting up an enlargement so that you can focus sharply.



Means of cleaning the negative. To remove dust, use a soft, clean brush, or, if you use compressed gas, buy a type such as Dust-Off, which does not contain environment-damaging chlorofluorocarbons. Use a liquid film cleaner to remove fingerprints or other sticky dirt; even better—handle negatives by their edges so they don't get dirty in the first place.



Safelight. Printing paper is exposed and developed under safelight, not ordinary room light. A relatively dim amber safelight produces enough light for you to see what you are doing, but not so much that the paper becomes fogged with unwanted exposure. A suitable safelight for most papers is a 15-watt bulb in a fixture covered with a light amber filter (such as Wratten OC) placed at least four feet from working surfaces. Check the manufacturer's instructions if you use any special-purpose papers; safelight filters vary for different types of papers.



Paper cutter or scissors cuts paper for test strips or small prints.



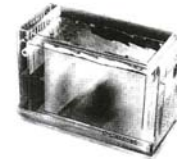
Timer or clock with sweep second hand times the processing.



Trays hold solutions during processing. For 8 x 10-inch prints, you'll need three trays of that size for developer, stop bath, and fixer, plus a larger tray to hold fixed prints until you are ready to wash them.



Tongs lift prints into and out of solutions, keeping your hands clean so that you don't need to wash and dry them so often. You'll need at least two sets, one for the developer only, one for stop bath and fixer.



Print washer circulates fresh water around prints to remove fixer during washing.

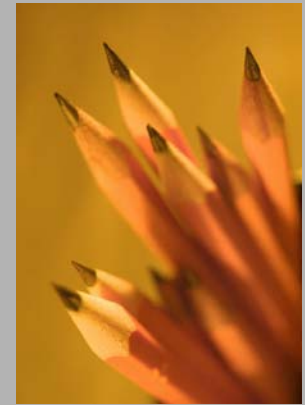
Washing siphon is a simple means of washing. It clamps onto a tray, pumps water into the top of the tray, and removes it from the bottom.



Sponge or squeezegee wipes down wet prints to remove excess water before drying.



Drying rack—other devices dry prints after processing.



Always use a **#2 Pencil** to write printing information (f/stop, exposure time, and printing filter used) on the back of your **test strips** and **Work Prints**. *Write relevant information on the back of work prints.*

DO NOT WRITE ON THE BACK OF YOUR FINAL PRINTS!

Equipment & Supplies

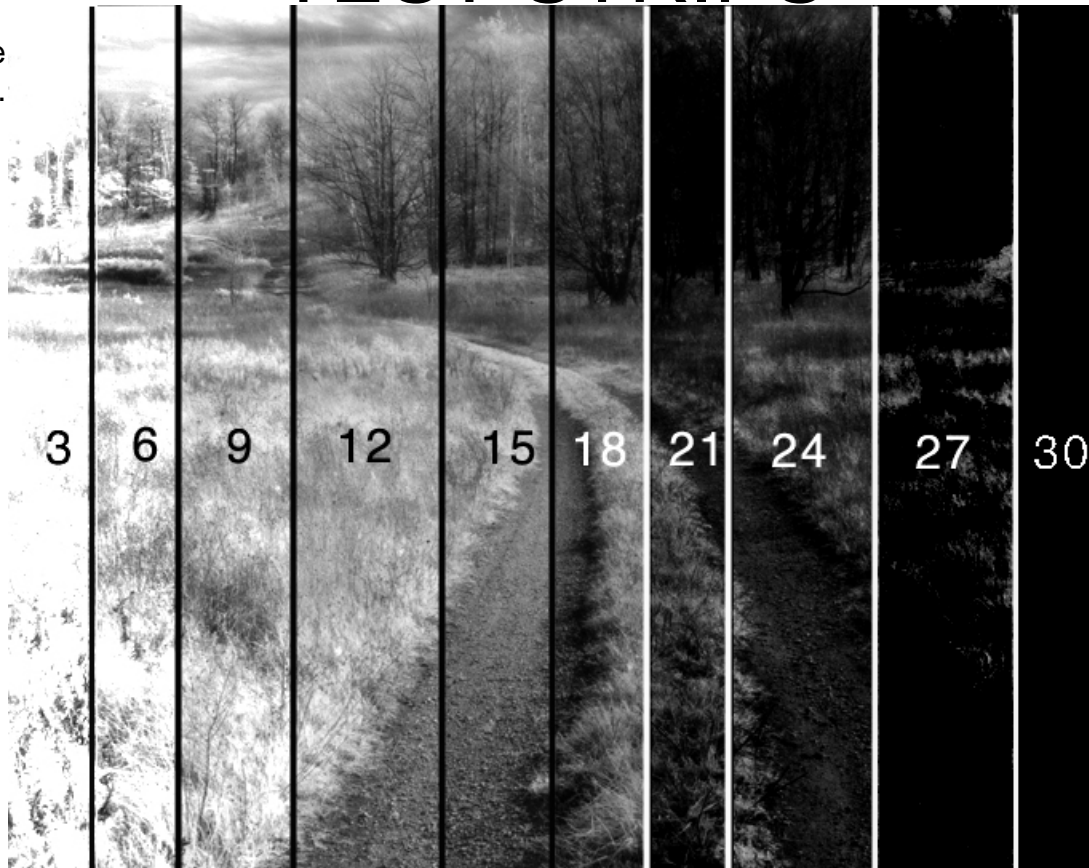
1. Grain focuser
2. Magnifying focuser

TEST STRIPS

*Look for the lightest tone that has tone and texture. Skies are not typical and require burning & dodging.

*Look for a time between 12 & 20 seconds, if your exposure doesn't fall in this range, adjust f/stop and redo test.

*3 second increments are large enough to see, and still create a fairly subtle difference.

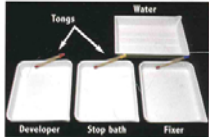


When printing, expose for the highlights, and develop for the shadows.

- Test Strips are controlled mistakes that tell us what exposure produces the high values we like. Using 3 second increments add an additional 3 seconds by moving the cover card one inch at a time to make 10 strips adding up to 30 seconds. One strip will be too light; one too dark.
 - Because of **Intermittency Effect**, we will use 3 second exposures to make our test strips, find the best overall time, and set our timers to this time. **In our example above, if 12 seconds looked correct, we would set our timer to 12 seconds to make out print.*
- Intermittency Effect: Because of timer errors, several repeated exposures on paper do not produce the same density as one long exposure of the same time.**
- Keep printing times between 12 & 20 seconds. Under 12 seconds is too short for burning&dodging. Over 20 seconds becomes boring.

Making a Contact/Proof Sheet

MAKING A CONTACT SHEET



1 Prepare the developing solutions. Mix developer, stop bath, and fixer and set them out in trays along with a tray of water so they will be ready to use as soon as the print is exposed. Set out tongs, if you use them. See steps 1 and 2, page 145.



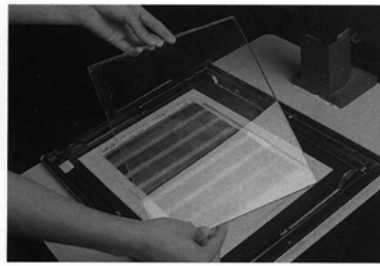
2 Prepare the enlarger. Insert an empty negative carrier and lower the enlarger head onto the carrier. If you will be using variable-contrast paper, insert a #22 filter into the enlarger's filter drawer. Turn on the enlarger lamp and raise the head until the light that is projected covers slightly more than the entire printing frame or easel. Turn the lamp off. Open the lens aperture to f/4.



3 Identify the emulsion side of the film. The emulsion side of the film must face the emulsion side of the paper or your prints will be reversed left to right. Film tends to curl toward its emulsion side, which is usually duller than the backing side. You are looking at the emulsion if the frame numbers on the edge of the film read backwards.



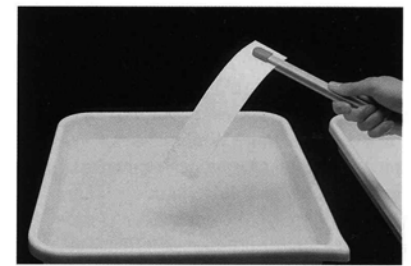
4 Identify the emulsion side of the paper. Darkroom safelights should be on, with room lights and enlarger lamp off, before opening the package of paper. The emulsion side of paper is shinier and, with glossy papers, smoother than the back. Fiber base paper curls toward the emulsion. RC paper curls little, but may have a visible manufacturer's imprint on the back. You'll need only a small piece of paper to test the exposure. Cut an 8 x 10-inch sheet of printing paper into strips, about 2 x 5 inches each. Put all but one strip back in the package and close it.



5 Place negatives and test strip under glass. You can leave the negatives in clear plastic storage pages, if you wish. The contact print will not be quite as sharp, but leaving the negatives in the page saves time, minimizes handling, and protects against accidental damage.

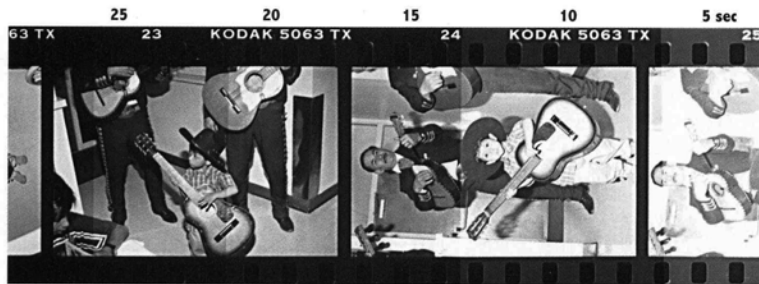


6 Expose the test strip. Set the enlarger timer to 5 sec. Press the timer button to turn the enlarger light on and expose the entire test strip. Cover about 1/5 of the strip with a piece of cardboard. Expose for 5 sec. Give the strip three more 5-sec exposures, covering an additional 1/5 of the strip for each exposure. Your finished test strip will have five exposures of 5, 10, 15, 20, and 25 sec.



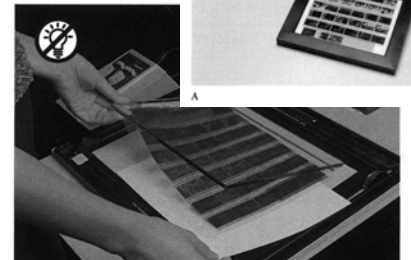
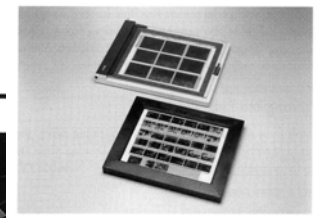
7 Process the test strip as shown on pages 144-147.

Emulsion to emulsion



8 Evaluate the test strip in room light to select a printing time. Look at the sprocket holes along the film edges. Choose the segment that just barely shows a difference between the sprocket holes and the surrounding film.

Don't be influenced by the images on the test strip. Standardizing the exposure of the contact print will give you a better guide to the negatives. When you are ready to make an enlarged print, it will be useful to see, for example, which images are too dark on the contact sheet (negative was underexposed) or too light (overexposed).

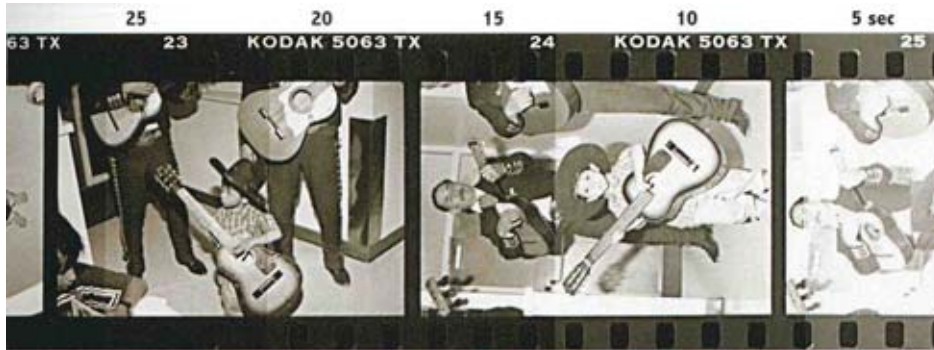


9 Make a complete contact print. Insert a full sheet of printing paper under the glass and expose for the selected time. Process the print.

>Locate first black stripe that is not different than the following stripes.

Proof Sheet

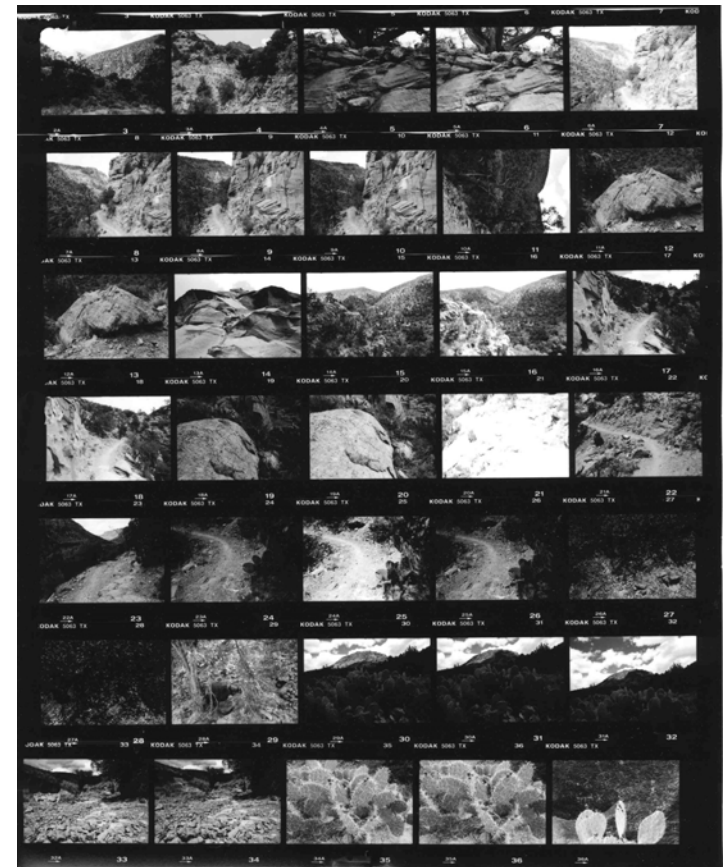
1. Determine Exposure via Proper Proof Test



**Look for the 1st black that is no blacker than the stripes that follow.*



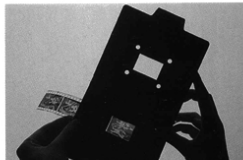
2. Make a contact sheet of your entire roll of film at your determined exposure time. Use a $1\frac{1}{2}$ filter.



>Cut film into strips of 5 frames for each strip. You should end up with 7 Strips totaling of 35 frames.

Making a Test Strip & Print

SETTING UP AN ENLARGEMENT



1 Select a negative for printing. Under bright light, examine the processed contact sheet with a magnifying glass or loupe to determine which negative you want to enlarge.

2 Insert the negative in the enlarger's carrier. Place the negative over the window in the carrier and center it. The emulsion side must face down when you put the carrier in the enlarger.



3 Clean the negative. Use an antistatic brush or compressed air to dust the negative and the carrier. Look for dust by holding the negative at an angle under the enlarger lens with the lamp on; it is often easier to see dust with room lights off. Dusting is important because enlargement can make even a tiny speck of dust on the negative big enough in the final print to be visible.

4 Insert the negative carrier in the enlarger. If you work in a darkroom with others, turn the enlarger lamp off whenever you insert or remove the negative carrier so that stray light doesn't fog other people's undeveloped paper. Room lights should be off so that you can see the image clearly for focusing.



5 Open the enlarger's aperture. Set the lens to its widest f-stop so you will have maximum light for focusing. Turn on the enlarger lamp.

Focus with lens wide open then close lens down to f/8 or f/11 & make test strip



6 Insert a piece of white paper in the easel. Paper shows the focus better than even a white easel surface.

**Make prints full negative.
Print size should be 6 x 9**



7 Adjust the masking blades of the easel. Set them first to hold the size of the paper being used and later to set borders and crop the image.

Insert focus sheet into easel

Focus and close lens down to your working aperture.



8 Arrange the picture. Raise or lower the enlarger head to get the desired degree of image enlargement, adjusting the easel as needed to compose the picture.



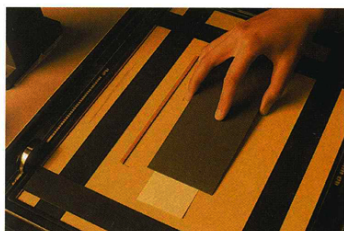
9 Focus the image. Focus by turning the knob that raises and lowers the lens. Shift the enlarger head only if you want to change the size of the enlargement.



10 A magnifier helps make the final adjustments in focus. Some types magnify enough for you to see and focus on the grain in the negative.

Evaluate the Test Strip

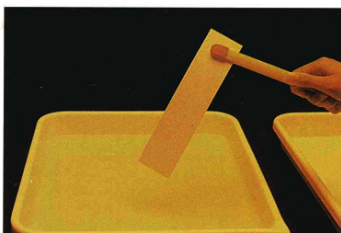
MAKING A TEST STRIP



1 Insert paper for a test strip. Before you turn the enlarger lamp off, locate an important highlight in the image, a light tone (dark in the negative) such as light-colored skin, clothing, or some other light area in the scene. Turn the enlarger lamp off. Remove a strip of paper (a 2 x 5-inch strip will be adequate) and place it, emulsion side up, approximately where the light-toned part of the image is.

2 Expose the test strip. Set the enlarger timer to 5 sec. Press the timer button to turn the enlarger light on and expose the entire test strip. Cover about 1/5 of the strip with a piece of cardboard. Expose for 5 sec. Give the strip three more 5-sec exposures, covering an additional 1/5 of the strip each time. Your finished test strip will have five exposures of 5, 10, 15, 20, and 25 sec.

For a test print with a greater range of tones, double the differences in the total exposure for each strip. For example, to get total exposures of 2 1/2, 5, 10, 20, and 40 sec, expose the entire strip for 2 1/2 sec. Cover 1/5 and expose for 2 1/2 sec. Cover 2/5 and expose for 5 sec. Cover 3/5 and expose for 10 sec. Cover 4/5 and expose for 20 sec.



3 Process the test strip as shown on pages 144–147.



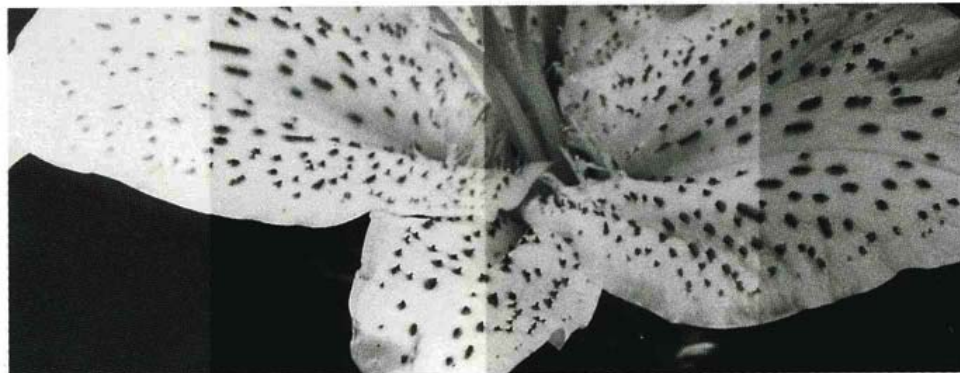
25 sec

20 sec

15 sec

10 sec

5 sec



5 seconds

10 seconds

15 seconds

20 seconds

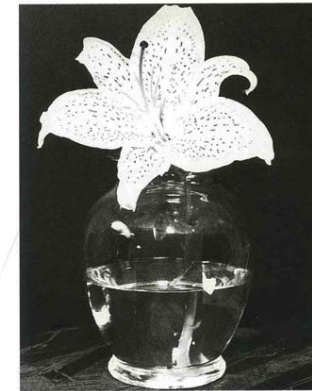
Look for the lightest section which shows all the detail in the light areas. If one time is too light and the next too dark, choose an intermediate time. Here the best time is about 10 seconds. Remember that the longer the printing time, the darker the resulting print tones.



Correctly Exposed Print. The light tone areas are light as they should be, and show full detail.



Overexposed Print. The light tone areas show detail, but are too dark.



Underexposed Print. The light tone areas are too light, looking washed out and showing a loss of detail.

Prints are judged- and adjusted-for density & contrast

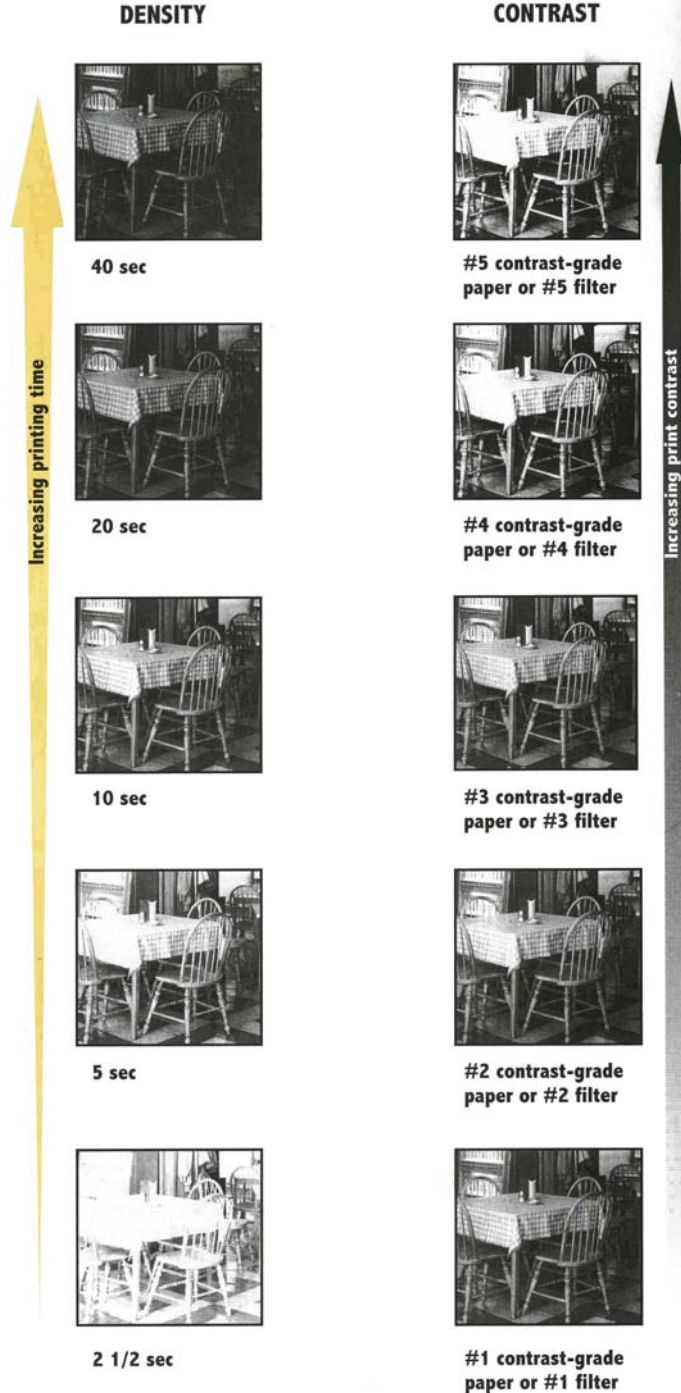
Expose for the
Highlights -
Develop for the
Shadows.

1. Choose an **exposure time** that shows detail and tone in the **high values**.

then

2. Make a full print at this exposure time.

then



3. Judge **contrast** in the **Low values**.

• **Look at the darkest tones.**

• *If they are uniformly black and show no signs of texture where texture exists in the negative, then **the contrast is too high**. Remake the print on using a lower contrast filter.*

• *If, on the other hand, the whites in the print are satisfactory but the dark areas are a dark gray rather than a black, the **the contrast is too low**. Remake the print using a higher contrast filter.*

Evaluate Density and Contrast

DENSITY



Too light. Increase exposure time.



Too dark. Decrease exposure time.

CONTRAST



Too flat. Use higher contrast paper grade or higher print filter.



Too contrasty. Use lower contrast paper grade or higher print filter.



950 HATS, DON'S BAR - MEMPHIS, NEBRASKA

Contrast Filter Test

Changing Contrast Filters

Make Test Strip
No filter in enlarger



Make Test Strip
#0 contrast-grade paper or #0 filter



#1 contrast-grade paper or #1 filter



#2 contrast-grade paper or #2 filter



#3 contrast-grade paper or #3 filter



Make Test Strip

#4 contrast-grade paper or #4 filter



#5 contrast-grade paper or #5 filter



Keep notes-write information on back of prints

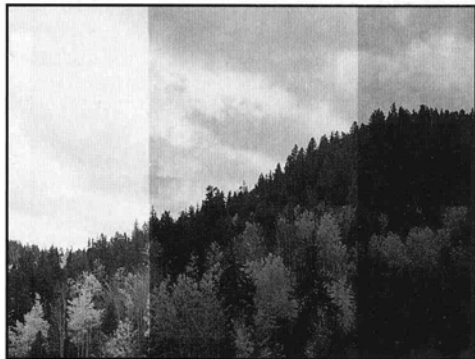
Make 7 prints (full negative). No filter, and #0 to #5 variable contrast filters.

Split Filter Printing

Using a high and low filter to make print

SPLIT-FILTER PRINTING WITH VARIABLE-CONTRAST PAPER

Test strip with number 0 filter



Test strip with number 5 filter



Split-filter printing lets you fine tune print contrast. It uses a low-contrast filter to control bright areas and a high-contrast filter to control dark areas.

Combined exposure



- 1. Make a test strip with a number 0 filter in place.** Choose the best exposure for the highlights.
- 2. Make a second test strip with a number 5 filter.** Choose the best exposure for the dark areas.
- 3. Make a full print** first through the number 5

filter, then on the same piece of paper through the number 0 filter. Be sure to use the number 5 filter first or the highlights will be too dark.

In the photo above, the two filters produced rich blacks plus good detail in the sky.

A Print
Recipe will
keep track
of printing
decisions.

PRINT RECIPE



Subject _____ Contact Sheet Number _____

Date(s)Printed _____ Neg. # _____

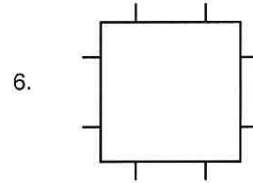
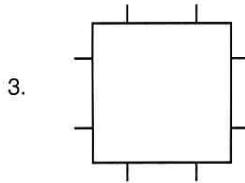
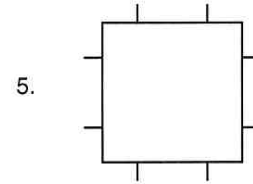
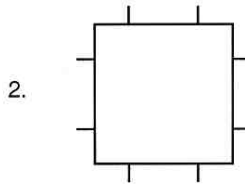
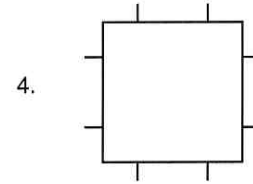
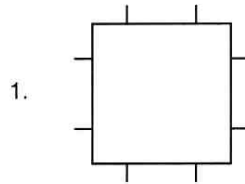
Print Size _____ F# _____ Time _____ Enlarger Position _____

Paper brand used. _____ Drydown _____ %
Contrast Grade, Filter #(s) _____
or Contrast Settings used _____

Developer/Time/Temperature _____

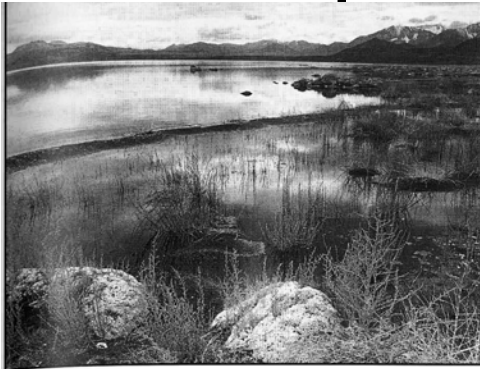
Symbols:  = (+)Dodge.  = (-)Burn (or STRAIGHT PRINT).

Base Time: F# _____ Time _____

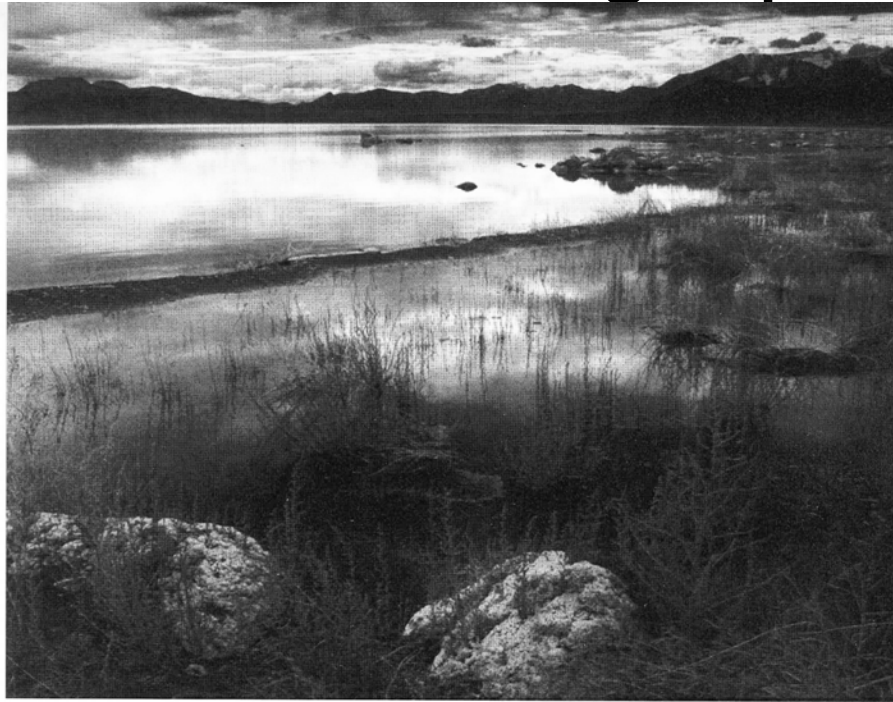


NOTES

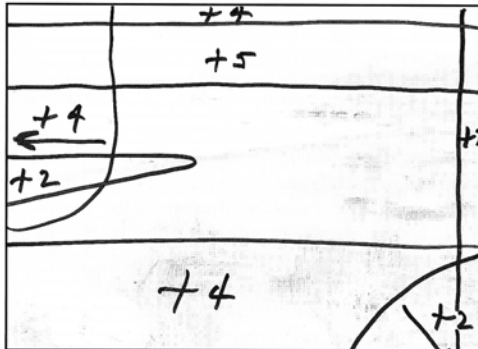
Our first print will be a straight print



Above, the original, straight print was exposed for 10 seconds without any manipulation. Below, each band of a test strip became darker as the photographer added light. Test strips not only help determine the best overall exposure, but also guide decisions about how much more time to expose certain areas (burn) or how much time to subtract from the basic exposure (dodge) in parts of the print.



5 sec 10 sec 15 sec 20 sec
Additional exposure



GERRY RUSSELL Mono Lake

Dodging, burning, and the exposure in general give you choices. You can make a relatively realistic rendition of a scene or choose to emphasize and dramatize parts of it, as in sky above.

Reprints will be easier if you make notes of what you did. A very light print (left) or a sketch of the print records how much to burn or dodge each part of the image.

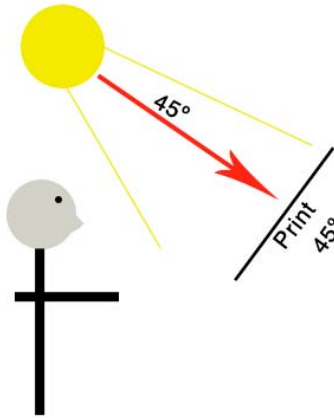
Evaluating Images



- When you finish your printing session, take your print home and live with it. Hang it in a place where you can look at it.
- After living with it, think about any changes that may improve the image.
- Write down your decisions, and reprint your image.

- Take time to evaluate a print.
- Poor technique will always attract attention.
- Evaluate for Contrast, Tone, and Texture.
- Are the tones balanced?

- Squeegee off image before viewing



View image at a 45° angle to the viewing light.



Turn your image upside down and look for strengths and weaknesses. Ask yourself: Does it help, leave it in - Does it hurt, take it out.

Adjust Contrast for Shadows

- If all shadows are too gray-increase overall contrast (use a higher contrast filter).
- If all shadows are too dark-reduce overall contrast (use a lower contrast filter).
- If one shadow is gray-burn it.
- If more than one shadow is too dark, but some are fine-dodge the dark ones.



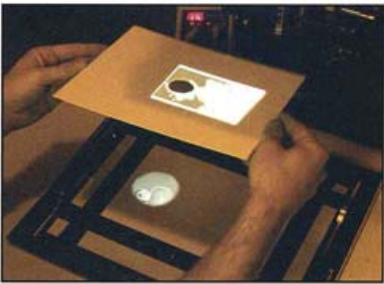
Dodging Is taking away light from the main exposure.
This procedure lightens an area of the photograph.

Using a small shape tool closer to the lens will conceal.
Using a large shape tool close to the print for precision.



*Perceptually, everything you do will effect everything else. For example: if you darken an area, the areas next to it will appear lighter, etc.
*A good starting point for Burning or Dodging is 30% of your main exposure.

*How much should you Burn and Dodge? As much as you can to direct the viewer's attention without the burning or dodging becoming noticeable.
Overlap adjoining areas when Burning and Dodging.*



Burning Is adding light in addition to the main exposure.

•Burning adds detail and contrast.

>Always move the card or your hand when burning or dodging to make sure it is not apparent.

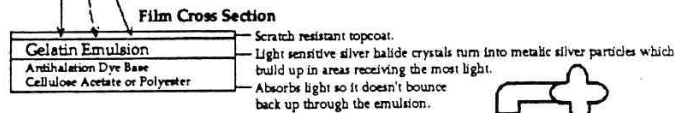
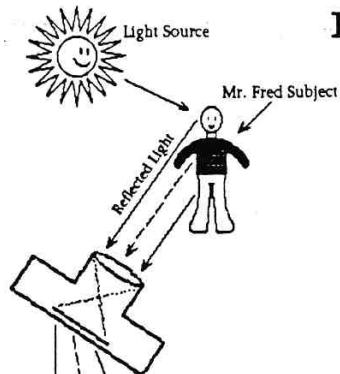
>Mold the light in a way that strengthens the composition whenever possible.

>Use a card that is white on one side and black on the other. This way you can see the area that you would like to burn or dodge (white side), and the light will not be reflected back into the print (black side).

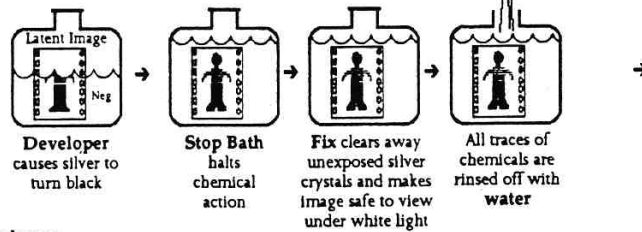


PHOTOGRAPHY

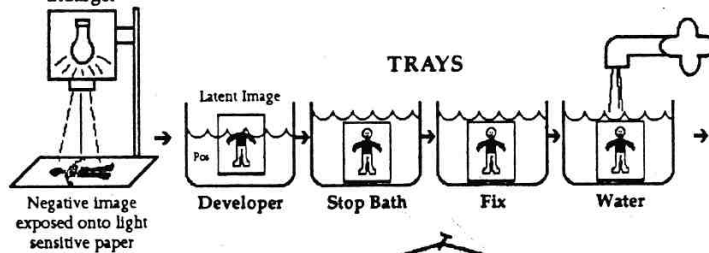
PHOTOGRAPHY IN A NUTSHELL



TANKS



Enlarger



TRAYS



Mount, Matt & Frame
Fred Looks Fabulous!