

MAKING A BLACK AND WHITE PRINT

- I. Enlarging the Negative
 - a. Insert the negative, emulsion side down and the top edge of the negative closest to you and the bottom edge furthest away from you, into the negative carrier and place into the enlarger.
 - b. Move the enlarger head up or down to determine size. Be sure to loosen the tightening knob before attempting this or the gears will be damaged.
 - c. Once the image size is set, focus the image by adjusting the bellows, which controls the distance of the negative to the lens.
 - I. Place a sheet of paper (the same kind that will be used to enlarge on) onto the easel and fine focus through a grain magnifier.
 - d. Print Exposure
 - I. When printing paper is exposed to light, it forms a latent image just as film and the image will not be visible until developed chemically.
 2. The more light that reaches the paper the darker the image will become, and vice versa.
 3. Thin areas of the negative represent dark areas of the print, these are the shadow areas and the dense areas in the negative represent the light areas of the print, these are the sunlit or highlighted areas.
 4. A decision must be made to determine how much light (exposure) is needed for an individual print exposure.
 - a. Negatives vary in overall density and they each require varying amounts of exposure.
 5. Two factors that controls the amount of light that reaches the print from a given negative are:
 - a. The aperture opening in the enlarging lens and the time the enlarger bulb is on.
 - I. These correspond to the two camera controls, the aperture and the shutter. The same relationship exists; if one is increased the other is decreased equally, the exposure will remain constant.
 - a. 20 seconds at $f/11$ will give the same exposure as 10 seconds at $f/8$ or 40 seconds at $f/16$.
 - I. These combinations allow you to minimize or maximize the duration of exposure so that manipulation of light is allowed, or enlarger vibration is minimized, or depth of field is increased.
 6. With camera, exposures are determined with a light meter. In enlarging, they are determined by test strips.
 - a. Choose an aperture opening (2–3 f/stops from wide open is acknowledged as the sharpest performance of the lens) and expose a strip of enlarging paper in time increments, for example, at $f/8$ at 3, 6, 9, 12, 15, and 18 seconds, and develop the strip.
 - I. From this test strip, choose or determine an exposure that looks proper. Base your decision on how the highlighted area is represented. Make a test print with that exposure to determine whether that exposure is correct. If too light, increase exposure; if too dark, decrease exposure.
 2. Chemical Processing
 - a. Four or more trays are used - one each with developer, short stop (3% acetic acid solution or Kodak Indicator Stop Bath), fixer (a two fixer bath is recommended) and a water holding tray for wet print storage.
 - b. Immerse the just exposed photographic paper with a smooth stroke into the developer for two or three minutes (choose one) and agitate constantly by rocking the tray so a wave is produced to continually sweep over the print. The range of time in the print developer is $1\ 1/4'$ - $5'$.
 - I. For RC Paper: $2'$ is the normal time w/range from $1'$ - $3'$.
 2. For Fiber Paper: $3'$ is normal time w/range from $1\ 1/4'$ - $5'$.
 - c. 10 seconds before the developing time is completed, drain the print by lifting with a tong at the corner to drain surface developer.
 - d. It is important that the print is totally immersed in the short stop as soon as the developing time is completed and agitate continuously for 20", drain the print with the stop bath tong for 10" and transfer the print to the fixer.
 - e. Agitate the print continuously in the fixer for 5' or if a two fixing bath is used, $2\ 1/2'$ in each.
 - I. For RC Paper: $1\ 1/2'$ in each of two baths.
 - f. Transfer the print to a water holding tray until the printing session is completed.

- g. Before the final wash, the prints are treated with Kodak Hypo Clearing Agent. Agitate by moving the bottom print to the top continuously for five minutes minimum time.
 - 1. For RC Paper: No hypo clearing bath is necessary.
 - h. The hypo cleared prints are transferred to a print washer and washed for a minimum time of forty (40) minutes.
 - 1. For RC Prints: 10'.
 - i. Squeegee the prints and place face down (for fiber based prints) on a fiberglass screen to dry.
 - 1. For RC Paper: Squeegee the prints and place face up on a fiberglass screen to dry or hang from a clothes line or dry in a blotter book.
3. Printing Definitions
- a. Brightness - the lightness or darkness of a print which is controlled by and is a function of exposure.
 - b. Contrast - the quantity of greys between black and white. High contrast is the emphasis of dark and light values with a minimum of middle greys. Low contrast is the emphasis of middle greys and the minimizing of dark and light values.
 - c. Burning-In - adding more light or exposure to a section (s) thus darkening that section (s) only.
 - d. Dodging - subtracting exposure from an area(s) during the initial exposure thus lightening that section(s) only.
4. Fine Tuning the Print
- a. Expose for the high values and adjust contrast for the low values.
 - 1. The more light a print receives the darker the print in both the high and low value areas.
 - a. Look for important high value areas and how they are rendered by increasing or decreasing the exposure - ignore the shadows, they are controlled by contrast.
 - 2. Adjust the contrast for the low values.
 - a. Once the print has good exposure (good high value rendition), examine the shadows. If it is too light, increase the contrast; if it is too dark, decrease the contrast.
 - 1. Contrast is manipulated with either variable contrast filters for variable contrast paper or fixed graded papers. In either case: grade #0 is the lowest; grade #1 is lower than #2; grade #2 is normal; grade #3 is higher than #2; grade #4 is higher than #3; and grade #5 is the highest.
 - 2. With a normal contrast negative yielding the full 10 zones; grade #0 would yield 12 zones; grade #1 = 11 zones; grade #2 = 10 zones; grade #3 = 9 zones; grade #4 = 8 zones; grade #5 = 7 zones.
 - 3. Variable Contrast Papers have two emulsion layers that yield two contrasts. One layer is sensitive to yellow light and yields lower contrasts. The other is sensitive to blue light and yields higher contrasts. Grade #0 filter is yellow and grade #5 filter is magenta. A problem arises with the use of a "Cold Light" source for your enlarger, which is predominantly blue light, which would render a normal grade #2 to an actual grade #3 or #4. The solution is to insert a Wratten 40Y filter to considerably warm the "Cold Light" source so the variable contrast filters could be used as is and not deviated.
 - b. The final step
 - 1. Generally speaking, changing contrasts changes exposure times. Examine your high values again, as contrast changes affect both the middle greys and the high and low values.
 - c. Fine tuning is primarily aimed at balancing the tones and adjusting the contrasts between the high and low values.
5. General Notes
- a. The larger the print, the longer the exposure, and vice versa.
 - b. Larger prints need more contrast, and vice versa.
 - c. Contrast can be adjusted to a small degree by over and under development of a print. (With RC papers: Developer incorporated papers will not exhibit a net gain or loss in contrast. Use instead Non-Developer incorporated papers to manipulate contrast to a small degree in the print developer.
 - 1. To add contrast - decrease exposure times and increase development.
 - a. Long development times increase the possibilities of safelight and chemical fog.
 - 2. To lower contrast - increase exposure time and decrease development time.
 - a. In underdeveloping, fullness and richness of tone may not be achieved in the low values and may take on a weak, chalky grey appearance.

6. Photographic Papers
 - a. The appearance of your print is affected by the photographic papers you choose. Consider the following:
 1. Surface texture - paper surfaces range from glossy to mat and include "luster," "pearl," "semi-mat." Glossy surfaces depict the richest black, and mat surfaces are the easiest to retouch or paint on.
 2. Base Tint - white is the most popular color, but others include "warm white" and "cream white."
 3. Paper Thickness - range from single to double to heavy weight. Double weight is the most popular and is robust, and easy to handle when wet.
 4. Contrast grade - up to six contrast grades including variable contrast.
 5. Base type - fiber based paper or resin coated (RC). Fiber based has inherent archival qualities and is the preferred choice for fine art photographers, while RC offers the flexibility of fast processing and drying.
7. Printing Errors
 - a. Wrong density or contrast
 1. A print which appears too light or too dark has probably had the wrong printing exposure. If, for example, high value details in the negative come up blank on the print, increase the print exposure time, either overall or just in that area. Equally, areas of detail that are too dark can be improved by "dodging" during the base exposure.
 2. Excessive contrast - too few greys between black and white. Greys can be increased by going to a lower contrast filter.
 3. Low Contrast - too much greys giving a "flat," "muddy" appearance: The result of too low filter or paper grade use, print underdeveloped, or print developer being exhausted. Also may be dust, condensation or marks on the enlarging lens. An unsafe safelight or a "light-leak" will reduce print contrast by "fogging" - minutely tinting the high values. Or maybe even chemical fogging through overdevelopment.
 - b. Marks and stains
 1. The usual cause of grey, yellow or purplish patches is insufficient fixing. Sometimes refixing can remove these stains. Contamination marks are caused by handling dry paper with damp fingers, or by splashes by other chemical solutions while processing.
 - c. Unsharpness
 1. Always check the sharpness of the grain on the print first; if this is sharp, any unsharpness of the final image must exist on the negative. If the print grain is unsharp, but the negative is sharp, then the fault must have arisen during enlargement. Perhaps the enlarger shifted position or was jarred during exposure, the negative may have buckled in the carrier, or the image was focused through a contrast filter.
 - d. Abrasion of the paper
 1. Although printing paper emulsion is very tough, it can be easily marked. Handle the paper always with support and while wet with liquid, by the edges only in a hanging position. Black lines on the emulsion usually is an indication of a scrape or scuff. If extreme, the emulsion will be dislodged from the paper.